Classifiers: *hic sunt leones*

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1. Traditional assumptions

- They have something to do with shape.
- They vary across languages in unpredictable ways as a function of cultural differences.
- They are typically defined in terms of other categories: mass/count, individuation, enumeration
- Mensural classifiers can be distinguished from sortal classifiers From Grinevald 2002:

mensural classifier	**sortal classifier**
two [bags of] oranges	two [ROUND] oranges
a [stack of] shirts	a [FLAT.FLEXIBLE] shirt

- Only sortal classifiers are ‘true’ classifiers.
- Only languages with ‘obligatory’ classifiers are classifier languages.

2. New assumptions and claims

- Classifiers encode *spatial patterns of distribution* of the material denoted by their complement, not just shape.

- They do not vary across languages any more than phoneme inventories. Their 'obligatoriness' is orthogonal to their nature.

- They encode the result of a universal, internalist, and computational cognitive mechanism expressing Aristotelian hylomorphism. (see e.g. Chomsky 2005, passim, Pietroski 2018).

2. New assumptions and claims

- The distinction between mensural and sortal classifiers is not binary: mensural classifiers have ‘sortal’, i.e. shape properties.
  Sortal classifiers are basic, mensural ones are derived via grammaticalization.

~~two [bags of] oranges~~
two [FLEXIBLE.CONTAINER] oranges

two [ROUND] oranges

~~a [stack of] shirts~~
an [UPWARD.ALIGNED.SET of] shirts

a [FLAT.FLEXIBLE] shirt

2. Samples and Pointers

- **Samples** are classifiers that refer to materials whose spatial distribution can be *directly* perceived:
  splash, drop, slice, lump, spoonful, piece, drizzle, kernel.
- **Pointers** are classifiers that refer to materials whose spatial distribution can only be *indirectly* perceived:
  hint, trace, whiff, inkling, tinge, note, glimmer, flicker

Samples can be quantified
Two splashes/ drops of water
Three lumps of sugar
Four slices of cake
Five spoonfuls of sugar
Six slices of salami

Pointers cannot:
A hint/(*two) hints of cognac
A whiff/ (*three) whiffs of perfume
A tinge/(*four) tinges of green
A note/ (*five) notes of cinnamon
A glimmer/ (*six) glimmers of light

2. Samples and Pointers

- **Samples** operate through a mechanism of *identity*:
  a Sample is materially representative, identical to, and typical of the material sampled.
  - a *splash of water refers to a small amount of liquid that is forced to separate from a larger mass of water through the application of an external force*

- **Pointers** operate via a mechanism of *functional similarity*:
  a Pointer does not need to be identical to the material they represent
  - a note of cinnamon *refers to a sensorially perceptible sensation that is similar to but need not be proper cinnamon*

The binary distinction between classifiers in terms of direct and indirect perception of their spatial distribution is reminiscent of the proximal/ distal opposition in demonstratives, or the direct/ indirect distinction in evidentiality.

2. Samples and Pointers: minimal pairs

- **Samples**
  - a *drop* separates from a larger volume of liquid under the influence of an external force that **pulls** on it, i.e. gravity
  - a *splash* separates from a larger volume of liquid under the influence of an external force that **pushes** on it,

- **Pointers**
  - a *whiff of perfume* involves an **internal** force that spreads the perfume through the air.
  - a *sniff of perfume* involves an **external** force that acts on the perfume.

Types of material distribution can be tested:

A *slice/ *chunk/ drop of water

A slice/ chunk/ *drop of salami

2. Samples and Pointers: why and how?

- Imagine a language that does what mensural classifiers are traditionally thought to do: refer to mere quantities of material
  - *drop* 'the smallest subset of liquid'
  - *stream* 'a longitudinal subset of liquid'
  - *dollop* 'a subset of a thick liquid'

- From this perspective, the dynamic aspects of classifiers in terms of material distribution are a mere imperfection of language…
- Alternative view:
  - classifiers provide a window into the i-semantics of matter and objects.
  - classifiers involve a computational system that uses geometrical coordinates and vectors in an internally represented conceptual space. (cf. Zwarts 2003 for prepositions)
  - The use of classifiers as quantifiers is the result of grammaticalization.

3. Spatial distribution and distributivity

- Material distribution can be represented via the semantics of distributivity, see Champollion 2010:

Three boys each laughed	3 boys	is the agent of	laughed
Three liters of water	3 liters	is the volume of	water
John ran for three hours	3 hours	is the duration of	John ran
	Key	**Map**	**Share**

- **Key:** the entity about whose parts entailments are licensed
- **Share:** the "thing being distributed" over the parts of the Key
- **Map:** the function (e.g. thematic role, measure function) from Share to Key

3. Spatial distribution and distributivity

Three liters of water

3 liters	is the volume of	water
Key	*Map*	*Share*

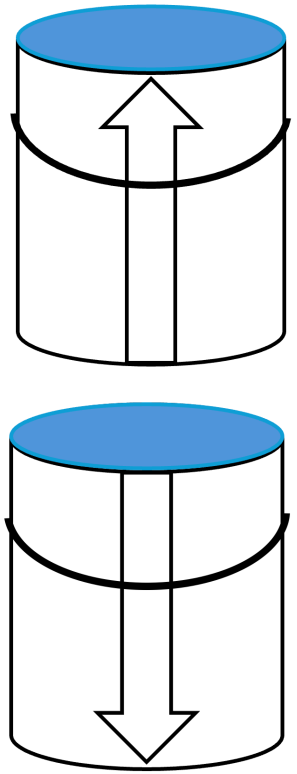
water…	is spatially distributed into …	a bounded capacity of a liter…	multiplied by three
Share	*Map*	*Classifier*	*Quantifier*

Volume: the space inside a hollow object (static)
Capacity: the amount that this space can be filled with (dynamic)

Liter: a pattern of material distribution:
the result of filling a bounded, flexible 3D unit of capacity

3. Distributivity and containers/ measures

- *–ful* and *–load* are compositional classifiers
  - *handful, mouthful, earful, spoonful, houseful, bucketful*
  - *carload, busload, truckload, bucketload*
- *–ful* and *–load* indicate the *direction of distribution* of the fluid into the container, which is *terminated* by the capacity of the container. (like Accomplishments in Aktionsart)
- *bucketful* has an *upward* direction: a *bucket* is filled from the bottom to the top along its primary (hollow) axis, and the container can be shallow: *spoonful, handful*.
- *bucketload* has a *downward* direction: the material presses down on the container, which can be flat: *a tableload*.
- *Up/ down* are associated with light/ heavy: *a truckful of feathers* is looser and 'lighter' than *a truckload of feathers*
- *A handful of friends/ arguments* represents the grammaticalized use of the classifier as a quantifier.



4. Parameters of spatial distribution: Vector

- Two main parameters: Vector and Dimension, 8 sub parameters
- **Vector** (each vector property can be specified or unspecified)
  - Magnitude: the length of a line
  - Direction: the order of the points on the line (up, down, sideways with respect to a plane of reference)
  - ± bounded (a *drop* is bounded, a *stream* is unbounded)
  - ± bundled: centripetal (*kernel*), centrifugal (*splash*), aligned (*string, stack, twinkle, glimmer, flicker, trickle*)
  - ± internal force (some forces are implied, as in *kernel*) (*sniff* vs *whiff*)
- Burmese as described by Becker (1975) (cited in Denny 1976:123)

myiʔ tə tan	river one line (e.g. on a map)	*magnitude*
myiʔ tə ‘sin	river one arc (e.g. a path to the sea)	*direction*
myiʔ tə θwe	river one connection (e.g. tying two villages)	*bounded*

4. Parameters of spatial distribution: Dimensions

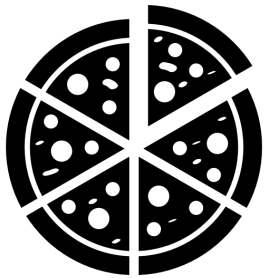
- **Dimensions**
  - 1D: *threads, lines*
  - 2D: *sheets, slices*
  - 3D: *lump, chunk, piece, drop, stream*
  - Axes: Primary and secondary axes
- Material distribution can include or exclude an axis. The material distribution of the ceramic that makes a cup, for instance, does not apply to the primary axis of the cup, allowing it to be hollow.
- A typology of holes and hollow classifiers (‘interioricity’ Denny 1976)
- Tzeltal,
  Berlin (1968:122)

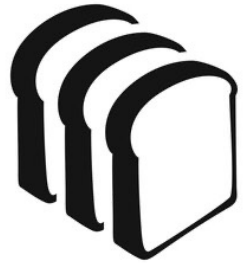
perforation	complete	incomplete
small	*hom*	*puh*
large	*huht*	*č’ub’*

4. Parameters of spatial distribution: Table

	Vector				Dimension		
	±internal force	magnitude	direction	± bounded	#D	± axis included	± 1ary axis & force aligned
drop	+	small	down	+	3D	+	–
splash	–	small	centrifugal	–	3D	+	–
stream	+	x	down	–	3D	+	+
cupful	–	cup	up	+	3D	–	+
beam (of light)	+	x	x	–	3D	+	+
flicker	+	small	aligned	+	1D	–	+
chunk, piece	–	x	x	+	3D	+	–
slice	–	x	down	+	2D	+	–
tranche 'slice'	–	x	down	+	2D	+	+
kernel	+	small	centripetal	+	3D	+	–

4. Parameters of spatial distribution: slices





- French *tranche* ‘slice’ and English *slice* are essentially 2D objects resulting from a cutting Force.
- They both have a downward direction and an orientation away from the horizontal plane.
- However, French *tranche* ‘slice’ can only be used for bread and salami, not for pizza:
- *une part/ *tranche de pizza* ‘a piece of pizza’
- French *tranche* ‘slice’ requires the downward force and the primary axis of the slice to be aligned.
- English *slice* does not require this alignment, so pizza slices are possible.

5. Pointers

- Pointers represent the distribution of material indirectly by referring to a characteristic that is hard to perceive by the senses.
- Pointers are *functionally similar* to the material they represent rather than identical to that material.
- Their material distribution is not necessarily spatial, and they often lack a clear direction.
- Pointers do not combine with numerals:
  - A hint/(*two) hints of cognac
    A whiff/ (*three) whiffs of perfume
    A tinge/(*four) tinges of green
    A note/ (*five) notes of cinnamon

5. Pointers

- Since they are not primarily about spatial distribution, and may therefore lack a number of Vector and Dimension properties, Pointers combine well with abstract nouns, as in the (b) examples below:
  - a. a touch of ginger/ wine
    b. a touch of madness/ the flu/ hesitation/ color
  - a. a whiff of perfume/ garlic/ fresh air
    b. a whiff of hypocrisy/ injustice/ fraud
  - a. a glimmer/ glint/ twinkle/ flicker of gold/ light
    b. a glimmer/ glint/ twinkle/ flicker of hope/ amusement/ understanding/ despair/ disappointment

6. The grammaticalization of classifiers

- However, some Samples also combine with abstract nouns:
  - a. a kernel of wheat/ wisdom/ of an argument
    b. a grain of corn/ truth/ insanity
    c. a drop of water/ wisdom/ insanity/ hypocrisy
    d. a handful of walnuts/ arguments
- They then lose the ability to be quantified, like Pointers:
  - a. two kernels of wheat/ *wisdom/ *of an argument
    b. three grains of corn/ *truth
    c. four drops of water/ *wisdom/ *insanity/ *hypocrisy
    d. five handfuls of walnuts/ *arguments
- But they retain Vectorial qualities:
  - a. a kernel of hope (centripetal, under pressure)
    b. a grain of hope (centrifugal, the possibility of growth)

Free dictionary defines *kernel of hope* as “A tiny amount of hope or optimism that exists within an abundance of doubt, skepticism, or pessimism”

6. The grammaticalization of classifiers

- Classifiers can become quantifiers via grammaticalization by incorporating the Classifier (both Samples and Pointers) into the Q-head of a QP projection (where Q is a convenient shorthand for measure, amount or degree).
  - $[_{QP}$ [Class°+Q°] $[_{ClassP}$ ~~Class°~~ $[_{NP}$ N°]]]
- I propose that incorporation of Class° into Q° correlates with bleaching the classifier's original Vector and Dimension properties.
- But whence the inability to combine with numerals/ quantifiers under grammaticalization?

6. The grammaticalization of classifiers

- **Proposal:** only classifiers that have spatial direction can combine with numerals/ quantifiers.
- *Drops, slices, splashes, lumps,* and *spoonfuls* have Direction when they describe the spatial distribution of a concrete material.
- *A beam/ flash of light* has length and spatial direction:
  five beams/ flashes of light.
- *a glimmer/ gleam/ glint/ twinkle/ flicker of light* lacks spatial direction, they only have a temporal order and direction rather than a spatial direction:
  **five glimmers/ gleams/ glints/ twinkles/ flickers of light*
- Countability may well largely depend on spatial Direction…

7. Conclusion

- Classifiers are how language i-semantically represents the spatial distribution of material in terms of direct and indirect sensory perception (Samples and Pointers).
- Classifiers represent the spatial distribution of material in a surprisingly fine-grained way, with consequences for the mass-count distinction and the spatial configurations inherent in collective nouns
- Implications for the semantic representation of objects.
- Take the noun *table*.
  - In e-semantics, the denotation of *table* is the set of tables in the world.
    Problem: (1) *tables* to sit at ≠ (2) *tables* to enter numbers into.
    Both of them have *ends* and *sides*…
  - In i-semantics, *table* is a flat 2D plane that sits away from but is aligned with its plane of reference, and that serves as a surface to place (distribute) things on.
  - This captures both (1) and (2), as well as *table*$_V$ 'to put on the table' (e.g. *to table a motion*).