



# A grammatical recipe for kind construction

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# Funes the Memorious

*Not only was it difficult for him to see that the generic symbol 'dog' took in all the dissimilar individuals of all shapes and sizes, it irritated him that the 'dog' of three-fourteen in the afternoon, seen in profile, should be indicated by the same noun as the dog at three-fifteen, seen frontally.*

[Borges 1942]

# Sameness

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our sorting of things into kinds.*

[Quine 1960]

*similarity [...] serves as an organizing principle by which individuals classify objects, form  
concepts, and make generalizations.*

[Tversky 1977]

### As-if-ism

Without the ability to evaluate sameness, there are no categories. **However**, no two entities or experiences are ever exactly the same! Still, we must nevertheless treat them as though they **are** the **same**.

Paula painted a still life with apples and bananas. She spent most of the evening painting and left the easel only to make herself a cup of tea, eat a piece of bread, discard a banana or look for an apple displaying a particular shade of red.

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*Dialogue with a lunatic*

**Lunatic:** What did you do yesterday evening?

**Paula:** The *only* thing I did yesterday evening was paint this still life over there.

**Lunatic:** This is not true. You *also* painted these apples and you *also* painted these bananas. Hence painting this still life was not the only thing you did yesterday evening.

[Kratzer 1989, 608]

The limits of as-if-ism?

The human mind does not divide the world in arbitrary ways.

## Splitting kinds

The domain of kind reference and quantification also requires “splitting the world” (Carlson 1977).

- (1) a. Two kinds of dog are sitting in the next room.
- b. There are two kinds of dog sitting in the next room.

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- (1) a. Two kinds of dog are sitting in the next room.  
b. There are two kinds of dog sitting in the next room.
- (2) a. ✓Context 1: there are three bull-dogs and two beagles.  
b. ✗Context 2: there is only Fido, who is a border collie and a watch-dog.

# Splitting kinds

- (3) There are two kinds of cars in the world: cars than run right and Fords.  
     $\leadsto$  *Fords don't run right*

[Carlson 1977, 213]

### *Noah's ark*

How many kinds of animals did Noah take into the ark? He took a pair of dogs. That's one kind. He also took a pair of cats. That's another kind. Hence he took at least two kinds of animals. He also took a pair of doves. Now we have three kinds. He also took mammals. That's certainly a kind we haven't had before. That makes four kinds of animals. And he took birds, which gives us five kinds . . . .

[Kratzer 1989, 609]

## Splitting manners

(4) Alex is dancing in two different ways tonight:

a. ✓ with and without a partner.

b. ✓ fast and slow.

c. ✓ with a partner and fast.

↪ *dancing with a partner is slow*

## Splitting amounts & quantities

- (5) On the table there are two piles of 10 apples, weighing 2kg each.
- a. ✗ There are four amounts of apples on the table.
  - b. ? There are two amounts of apples on the table  
where *amount*  $\approx$  *pile*

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where *amount*  $\approx$  *pile*
- (6) There are four apples in the basket.
- a. ✓ There are two pairs of apples.
  - b. ✗ There are six pairs of apples.

### Take-away

The grammar is sensitive to the ways in which we impose certain degree of structure on the world around us.

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### Overarching Goal

- Explore what grammatical constructions require what degree of organization.
- Assess the limitations of grammatically induced means to find structure.

# Today

## Working Hypothesis

Partitioning of domains is a pre-requisite for reference and quantification.

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### Test cases

- Ad hoc kinds.
- Equative/Similative constructions.

## Kind reference

(7) Typhoons arise in this part of the Pacific.

a. *Object-referring*

This part of the Pacific has the property that some typhoons arise in it.

b. *Kind-referring*

It is a property of typhoons that they arise in this part of the Pacific

[Krifka et al. 1995]

## Kind expressions in English

- |     |    |                               |                            |
|-----|----|-------------------------------|----------------------------|
| (8) | a. | Lions like to eat zebras.     | <i>bare plural</i>         |
|     | b. | The lion likes to eat zebras. | <i>singular definite</i>   |
|     | c. | A lion likes to eat zebras.   | <i>singular indefinite</i> |

## Kind expressions in English

- (8) a. Lions like to eat zebras. *bare plural*
- b. The lion likes to eat zebras. *singular definite*
- c. A lion likes to eat zebras. *singular indefinite*
- (9) a. {The dodo is / Dodos are} { widespread / extinct }.
- b. \*A dodo is { widespread / extinct }.

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(11) a. Unlike other types of big cats, (the) lions come in several varieties.

b. (The) dinosaurs became extinct at various points in time.

[Dayal 2004, ex.51b]

## Aside

### Two-views

- Bottom-up:  
Kinds are representative of perceivable commonalities that hold of a collection of objects, i.e. regularities that occur in nature.
- Top-down:  
Kinds are “sorts”, “categories”, “concepts”, etc.

## Varieties of kinds

### Kinds as regularities

Whatever a kind is we must be able to impute to them a sufficiently regular behavior.

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### Ad hoc kinds

- We are allowed to disregard natural regularities (as a constraint on kind-reference).
- Allow to build kinds spontaneously in real time.
- These kinds are built in by using grammatical means; they are neither natural, nor rule-based, nor pre-established within a speaker community.

## Ad hoc (sub)kind construction

- (12) a. These lions are widespread.  
b. These dogs are annoying.

*this kind of lion*

*this kind of dog*

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(12) a. These lions are widespread.

*this kind of lion*

b. These dogs are annoying.

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(13) a. The lions that eat people are quite widespread.

b. The dogs that bite are dangerous.

## Ad hoc (sub)kind construction

- (14) {
- a. The bigger dinosaurs
  - b. The vegetarian dinosaurs
  - c. The dinosaurs of this kind
  - d. The dinosaurs of the Permian period
  - e. The dinosaurs with big heavy scales
  - f. The dinosaurs that lived south of the equator
- } became extinct first.

## Ad hoc vs. conventional kinds

(15) a. *Taxonomic*

The rat that transmitted leptospirosis was just reaching Australia in 1770.  
[based on Krifka et al. 1995, ex.28]

b. *Ad hoc*

The rats that transmitted leptospirosis **were** just reaching Australia in 1770.

**Ad hoc kind reference** allows us to impute a regular behavior to some subset of a kind in real time, without any prior agreement as to whether the behavior in question actually qualifies (or is expected to qualify) as sufficiently regular.

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- ① A sort:  
something to be a kind of.

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## The partition view

### Kind-reference through partitions

Reference to subkinds is mediated by an **equivalence relation** that induces a **partition** of its superkind; each subkind constitutes an equivalence class.

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- (16) *Equivalence Class*: Let  $[\ ]_R$  be a function from a domain  $D$  to  $POW(D)$  s.t.:  
 $\forall x \in D [[x]_R = \{y : y \in D \wedge x \simeq_R y\}]$  ( $\simeq_R$  is reflexive, symmetric and transitive)
- (17) *Partition*: Let  $A$  be a non-empty set. A partition is a collection of subsets of  $A$  iff (i) for any two subsets  $X$  and  $Y$ ,  $X \cap Y = \emptyset$  and (ii) the union of all subsets of  $A$  equals  $A$ .

## From kinds to subkinds

(18) A partition is a function  $\Pi$  s.t. for any kind  $K$ ,  $\Pi(K)$  meets two criteria:

- a. Cover:  $\forall x_o [x_o \mathcal{R} K \rightarrow \exists y_K \in \Pi(K) [x_o \mathcal{R} y_K]]$
- b. No overlap:  $\forall x_o [\exists y_K \in \Pi(K)] \rightarrow \neg \exists z_K \in \Pi(K) [y_K \neq z_K \wedge x_o \mathcal{R} z_K]]$

(19) a.  $\llbracket \kappa \rrbracket = \lambda x_k. \lambda y_k. \Pi(x_k)(y_k)$

b.  $\llbracket \kappa \rrbracket(\text{DOG}) = \lambda y_k. \Pi(\text{DOG})(y_k) = \{\text{PUG, GREYHOUND, BORDER COLLIE}\}$

## From kinds to ad hoc subkinds

- (20) a.  $\llbracket \kappa+ \rrbracket = \lambda x_k. \lambda P_{\langle e, t \rangle}. \lambda y_k. \Pi(x_k)(y_k) \wedge \forall z_o [z_o \mathcal{R} x_k \wedge P(z_o) \rightarrow [z_o]_{\approx_R^c}]$
- b.  $\llbracket \kappa+ \rrbracket(\text{LION})(\text{eat-people}) =$   
 $\lambda y_k. \Pi(\text{LION})(y_k) \wedge \forall z_o [z_o \mathcal{R}(\text{LION}) \wedge \text{eat-people}(z_o) \rightarrow [z_o]_{\approx_R^c}]$

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$$(21) \quad \llbracket \text{The lions that eat people} \rrbracket = \\ = \iota y_k. \Pi(\text{LION})(y_k) \wedge \forall z_o [z_o \mathcal{R}(\text{LION}) \wedge \text{eat-people}(z_o) \rightarrow [z_o]_{\simeq_R^c}] \\ \approx \wedge \iota x. \text{lions}(x) \wedge \text{eat-people}(x)$$

[based on Mendia 2020]

## From kinds to ad hoc subkinds

$$(22) \quad \llbracket \text{The lions that eat people are widespread} \rrbracket = \\ = \text{widespread}(\wedge ix. \text{lions}(x) \wedge \text{eat-people}(x))$$

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(22)  $\llbracket \text{The lions that eat people are widespread} \rrbracket =$   
 $= \text{widespread}(\wedge ix. \text{lions}(x) \wedge \text{eat-people}(x))$

### Two ingredients

- NP as a SORT.
- Modifiers as a CUE to find  $\simeq_R^c$ .

# Discussion I

❓ What is a cue?

❗  $P \not\approx_R^c$

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1. Grammar:  $\forall x_o \in K \cap P \rightarrow [x_o]_{\simeq_R^c}$   
*all people eating lions are in the same cell of a partition*

# Discussion I

❓ What is a cue?

❗  $P \neq \simeq_R^c$

1. Grammar:  $\forall x_o \in K \cap P \rightarrow [x_o]_{\simeq_R^c}$   
*all people eating lions are in the same cell of a partition*
2. Context: figure out what  $\simeq_R^c$  is.  
*possibly a question for cognitive scientists*

## Discussion I: $\simeq_R^c$ ?

- (23) a. I went to the fruitmonger, I found the apples that you like so much.
- b.  $\llbracket P \rrbracket = \llbracket \textit{that you like so much} \rrbracket = \{x : \textit{you like } x \textit{ so much}\}$

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- What might  $\simeq_R^c$  be?

Whatever contextually retrieved equivalence relation that collects all apples that you like in a single cell of a partition of apples.

- *be the same kind as*
- *be as sweet as*
- *be as big as*
- *have the same shape as*

...

## Discussion II: limits

- (24) a. (%The) cars with tickets on their windshields are common in this street.
- b. (%The) bikes with flimsy locks do not last long on this town.

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(25) *\*(Los) coches con multas en la luna son comunes en esta calle.*  
the cars with tickets on the windshield are common in this street

(26) *\*(Las) bicicletas con candados débiles no duran mucho en este pueblo.*  
the bikes with locks flimsy not last much in this town.

## Discussion III: bottom-up

- (27) a. \**El león que come personas no es común aquí.*  
the.SG lion that eats people not is common here

~OK if *lion-that-eats-people* is e.g. the AFRICAN LION

- b. *Los leones que comen personas no son comunes aquí.*  
the.PL lions that eat people not are common here

## Interim conclusion

- Sameness  $\leftrightarrow$  Regularity  $\leftrightarrow$  Categorization

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### A balancing act

- The freedom of *as-if-ism*: behave as though such and such category exists.
- The limits to *as-if-ism*: do not divide the world in arbitrary ways.

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- The limits to *as-if-ism*: do not divide the world in arbitrary ways.

### The balance

Partitions provide the correct means to find balance.

# Splitting the world

(4) Alex is dancing in two different ways tonight:

a. ✓ with and without a partner.

b. ✓ fast and slow.

c. ✓ with a partner and fast.

↪ *dancing with a partner is slow*

# Today

(28) *Adnominal*

Yo tengo un coche {como este / como el de Alex}.

QUALITY/KIND

'I have a car like {this (one) / like Alex's}.

(29) *Adverbial*

Yo bailo como Alex.

MANNER

'I dance like Alex.'

➡ A cross-linguistically stable picture, but rich in variation.

## Aside: degree equatives

- (30) a. Yo soy **tan** estudiante como Alex. NOMINAL  
‘I dance as much as Alex.’  
↷ *as much as, as good as,...*
- b. Yo bailo **tanto** como Alex. VERBAL  
‘I dance as much as Alex.’  
↷ *as much as, as well as, as often as, for as long as...*
- c. Yo soy **tan** alto como Alex.’ ADJECTIVAL  
‘I am as tall as Alex.’

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① *Representation:*

[e.g. Umbach and Gust 2014]

$\text{sim}(\text{Alex}, \text{Toni}, \mathcal{F}) = 1$  iff *Alex* and *Toni* are indistinguishable wrt. set of features  $\mathcal{F}$ .

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[Hohaus and Zimmermann 2021]

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- ② *Property sharing:* [Hohaus and Zimmermann 2021]  
 $\{f : C(f) \wedge f(Toni) = 1\} \subseteq \{h : h(Alex) = 1\}$
- ③ *Partition induced:*  $Alex \in [Toni]_{\simeq_R^c}$

If  $\mathcal{F} = C(f) = \{\text{be good-natured, speak 4 languages, be } d\text{-smart}\}$ , then  $\simeq_R^c = \{\langle x, y \rangle : x \text{ is a good natured as } y \text{ and speaks as many languages as } y \text{ and is as smart as } y\}$

## What are the $\mathcal{F} \mid C(f) \mid \simeq_R^c$ that matter?

### König and Umbach (2018) on similarity demonstratives

- Similarity classes constitute ad hoc kinds.
- Features of comparison determine *principled connections* (e.g. Greenberg 2003; Prasada and Dillingham 2006; Prasada 2010; Carlson 2010, etc.).

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[Carlson 2010, 17]

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[Carlson 2010, 17]

❓ Do these ad hoc kinds follow the same principles as definite ad hoc kinds?

## Adnominal: ad hoc kind

- (33) Alex cocina una sopa como la de Toni  
'Alex cooks a soup like Toni's soup.'

a. ✓ *vegetarian*

PRINCIPLED  $\Rightarrow$  *kind*

b. ✗ *cold*

UNPRINCIPLED  $\Rightarrow$  *contingent*

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- (34) Alex tiene una blusa como la de Toni  
'Alex wears a blouse like Toni's blouse.'

a. ✓ *made of linen*

PRINCIPLED  $\Rightarrow$  *kind*

b. ✗ *full of stains*

UNPRINCIPLED  $\Rightarrow$  *contingent*

# Adnominal troubles

Paraphrases do not always help (from König and Umbach 2018, ex.42):

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(37) I have a {bike like this<sup>✓old and rusty; ✗new</sup> / car like this<sup>✓old and rusty; ✗with a ticket</sup>}.

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Principled:

|        |              |
|--------|--------------|
| AGE:   | <i>old</i>   |
| STATE: | <i>rusty</i> |

Unprincipled:

|        |              |
|--------|--------------|
| AGE:   | <i>new</i>   |
| STATE: | <i>rusty</i> |

# Adnominal troubles

During The Wine Battle:

- (38) Alex tiene la camiseta  
como la de Toni.  
'Alex wears a shirt like  
Toni's.'
- a. ✓ *covered in wine*
  - b. ✓ *made of cotton*



# Adnominal troubles

Principled connections do not always help:

(39) Tengo un gato como el tuyo.  
'I have a cat like yours.

a. ✓ *striped*

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c. ✓? *three-legged*

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d. ?? *four-legged*

(40) I have a turtle like yours.

✗ *with a shell*; ✓ *without a shell*

## Possible Answers

- ❗ Invariant feature values or properties.
- ❗ Trivial partitions.

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### Open question

What are the relevant properties that lead to the ad hoc kinds that support good equative comparisons?

- Must allow multiple values (e.g. turtle shells).
- Must allow for complex patterns of connection (shirts covered in wine, rhinos crushing bananas).

## Adverbial: ad hoc manner

Paraphrases do not help (based on König and Umbach 2018):

(41) Alex cooks veggies like Toni      ✓*in the wok/sauteed*; ✗*in the garden/hungry*

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(41) Alex cooks veggies like Toni      ✓*in the wok/sauteed*; ✗*in the garden/hungry*

(42) a. Cooking veggies in the wok is a kind of cooking veggies.

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- (42) a. Cooking veggies in the wok is a kind of cooking veggies.
- b. Cooking veggies in the wok requires a wok by virtue of the kind of cooking it is.

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(41) Alex cooks veggies like Toni      ✓ *in the wok/sauteed*; ✗ *in the garden/hungry*

- (42)
- a. Cooking veggies in the wok is a kind of cooking veggies.
  - b. Cooking veggies in the wok requires a wok by virtue of the kind of cooking it is.
  - c. # Cooking veggies {in the garden/hungry} is a kind of cooking veggies.

# Adverbial

(43) Alex prepara la barbacoa como Toni.

‘Alex sets the barbecue like Toni.’

- a. ✓ *with a knife*
- b. ? *in the shed*
- c. ?? *drunk*

# Adverbial

- (44) Alex bebe cerveza como tu bebes agua. 'Alex drinks beer like you drink water.'
- a. ✓ *with the same ease; in the same quantities*
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- (45) Alex levanta la piedra cilíndrica como yo levanto un paquete de arroz.  
'Alex lifts the round stone like a lift a package of rice.'
- a. ✓ *with the same effort*
  - b. ✗ *in the garden*

# Adverbial

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① Similarity of features?

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④ Why not just ad hoc category ascription?

# Today

## Working Hypothesis

Partitioning of domains is a pre-requisite for reference and quantification.

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## Conclusion

Allows explaining forms of ad hoc kind constructions: (i) definite descriptions and (ii) adnominal/adverbial equative comparisons.

# Tomorrow

## Goal

Understand how the grammar is sensitive to the ways in which we structure the world around us.

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- ② Why are certain ways of expressing comparison and equality sensitive particular properties of objects/events/situations but not others?
- ③ What other grammatical constructions of ad hoc categorization are there?
- ④ How general are these resources across-languages? How many are subject to variation?

# Sameness

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*Similarity, ever ready to solve philosophical problems and overcome obstacles, is a pretender, an impostor, a quack. It has, indeed, its place and its uses, but is more often found where it does not belong, professing powers it does not possess.*

[Goodman 1972, 437]

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## The balance

Partitions *qua* balancing pole.

**Thank you!**

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# Partitions

*The question of what makes a partitioning of the domain salient in the discourse bears some resemblance to the question of what makes the antecedent for a pronoun salient. In many instances there are linguistic clues [...] but arriving at a complete answer surely involves other branches of cognitive science. Such is the case for domain partitioning as well.*

[Schwarzschild 1996, 92]

## Deep anaphora analogy

- (48) a. [One of the ten balls]<sub>i</sub> is missing from the bag. It<sub>i</sub> is under the couch.  
b. Nine of the ten balls are in the bag. It<sub>j</sub> is under the couch.

[Partee 1989, fn.13]

- (49) a. I missed [some of the words]<sub>i</sub>. They<sub>i</sub> were spoken too indistinctly.  
b. I did not catch all of the words. They<sub>j</sub> were spoken too indistinctly.

[Carlson 1984, 320]

## Partitions in context

- (50) a. The children earned seven dollars.  
b. The boys and the girls earned seven dollars.

[Schwarzschild 1996, 94]