

Concepts, kinds and types

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Concepts, kinds and types

"Concepts"	Psychology; cognition + learning
"Kinds"	Semantics; meaning of generic NPs
"Types"	– everyday relational notion <i>token-of-a-type</i> – Mathematics; Computer Science; "safeguard"

Meaning of German **Art** ('kind', 'species', 'way')
vs. **Typ** ('type')

Background: project on similarity / sameness
hypothesis: **Art** vs. **Typ**
--> *das gleiche* vs. *dasselbe* ('the same')
(future work)

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Kinds

Enties referred to by, e.g. , English bare plurals in generic sentences
(Carlson 1980)

CATS

UNPAINTED KITCHEN APPLIANCES THAT ARE JUST BEGINNING TO RUST

Carlson (2010): Do kinds correspond to (labelled) concepts ?

--> Prasada & Diligham (2006), theory-theory of concepts
explains some puzzles in genericity

Varieties of kinds

- (intensional) kinds *green bottles* (**the green bottle*)
- well-established kinds *Coke bottles, the Coke bottle*
- encyclopedic kinds e.g. bare singular in Hebrew (Rothstein 2013)
- similarity-based kinds *such a tiger* (Umbach & Gust 2014),
(see also Anderson & Morzycki 2015)

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Types (Mathematics / Computer Science)

Russel: "ramified" theory of types to avoid antinomies in set theory

"Church typing" (common Semantics):

one type constructor, builds function types, $\sigma \rightarrow \tau$, for types σ, τ

Martin-Löf's *intuitionistic type theory* (Martin Löf 1984)
types are first class objects; dependent types

Cooper's *Type theory with records* (Cooper to app.)

$x:\text{Ind}, y:\text{Ind}, \text{hug}(x,y)$ *hug*
 $x:\text{Ind}, b:\text{Dog}, \text{hug}(x,b)$ *hug Bobbi*
 $a:\text{Boy}, b:\text{Dog}, s:\text{hug}(a,b),$ *Adam hugs Bobbi*
 $s:\sum x:\text{Boy}, \sum y:\text{Dog}. \text{hug}(x,y)$ *A boy hugs a dog*

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What is the difference between a type and a predicate?

(Suppose you have the freedom to decide)

Why represent something as a type or a predicate?

- Predicates have complements

prime numbers (subset of natural numbers)

complement: *non-prime numbers*

females (subset of humans)

complement: *non-female humans*

- Types don't have complements

natural numbers: what should be the complement?

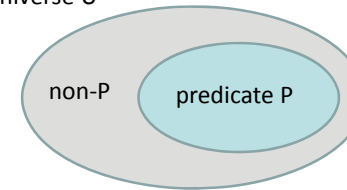
individuals: what would be non-individuals?

(Umbach 2005)

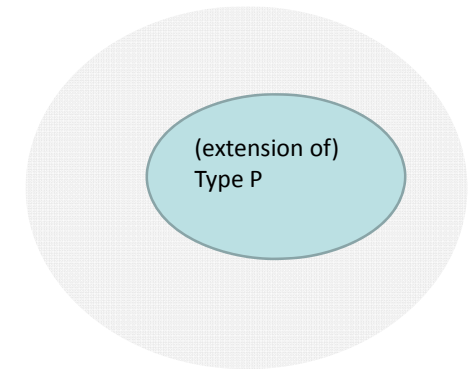
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Select a domain vs. create a domain

Universe U



Predicates select
part of a domain



Types create a
domain

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Kinds vs. types

How do kinds relate to types?

- Relational notion of type: instance : kind \approx token : type

- Do kinds have complements?

kind CAR

does it make sense to think of non-CARS?

CAR no because it is an individual

^UCAR no considering non-car individuals

yes considering non-car vehicles

Selectional restrictions, Asher (2011) type presuppositions

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change of perspective

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German *Art* vs. *Typ*

Meaning of German *Art* ('kind', 'species', 'way')
vs. *Typ* ('type')

Background: project on similarity / sameness

hypothesis: *Art* vs. *Typ*

--> *das gleiche* vs. *dasselbe* ('the same')
(future work)

- Dictionaries
- Questionnaire

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Dictionaries

"Wörterbuch der deutschen Gegenwartssprache":

Art - Verhaltensweise ('behavior', 'manner')
- Beschaffenheit, Natur ('nature', 'the way something is')
- Sorte, Species ('sort', 'species')

Typ, der -
- bestimmte Art eines in Serie gefertigten (technischen) Erzeugnisses ('kind of (technical) mass-produced items')

Type, die letter (for printing)



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Dictionaries

"Das Deutsche Wörterbuch" (Grimm)

Art origin unclear,
possibly slavic *rod*, which is connected to 'bear', 'generate'

Typ Grundform, Muster 'basic form', 'pattern'
origin greek τύπος ('imprint')

- Grimm: *Typ* pattern is observed from 18th century on
- Movable type printing was invented around 1450
- My guess: *Typ* pattern is closely connected to *Type* letter

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Corpus: *Art* contexts

Apposition

die Art Primula clusiana (a species of primroses)
die Art "Große Hufeisennase" (a species of bats)

Partitive genitive

die Art des Handballs 'the kind of handball'
dieser Art von Überprüfung 'this kind of control'
die Art wie gelernt wird 'the way how kids learn'

Hedges

eine Art "Story Board" 'a sort of story board'

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Corpus: *Typ* contexts

Apposition

Aufklärungsflugzeug des Typs U-2 'military plane'
Mercedes-Benz Typ 600 SE

Partitive genitive

jeder Typ einer Windkraftanlage 'wind power plant'
neuer Typ von aufladbarer Batterie 'rechargeable battery'
dieser Typ eines Museums 'museum'
ein bestimmter Typ (von) Mensch 'man/person'

ein Typ mit dunkler Stimme 'a man with a low voice'

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Online study: How do *Art* and *Typ* differ in meaning?

"Which version is the original one?"

- "Bats ..."
- Die Art "Große Hufeisennase"* (... let out location signals) **90 %**
 - Der Typ "Große Hufeisennase"*

- "Military operation ..."
- *Aufklärungsflugzeug der Art U-2* (... military plane ... caught)
 - ... *Aufklärungsflugzeug des Typs U-2* ... **93 %**

For appositions, biological terms require *Art*
technical terms require *Typ*

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Online study: How do *Art* and *Typ* differ in meaning?

"Which version is the original?"

- "Breaking the rules of football"
- (*depending on the*) *Art des Vergehens* ('offense'...) **96 %**
 - ... *Typ des Vergehens*

- "Wind power plants"
- diese Art der Windkraftanlage* (*has a specific capacity* ...)
 - dieser Typ der Windkraftanlage* ... **70 %**

- "Cell phones"
- (*depending on the*) *Art des Handys* (... transmission power ...) **50 %**
 - ... *Typ des Handys* ...

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Preliminary findings

Clear:

Appositions *Art* + bio species
Typ + technical label / name of a disease

Tendencies:

Partitive genitives *Art* of activities, ???
Typ of artefacts, men

BUT

50:50 *Art / Typ* (cellphones)

to be replicated

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Varieties of sameness / similarity

Hypothesis

Art refers to similarity classes within the domain

--> instances of an **Art** are conceived as similar
(Umbach & Gust to appear)

Typ picks up / introduces classifications upon the domain

--> tokens of a **Typ** are conceived as "clones"
(like the imprints of a letter)

Hypothesis

Art instances are preferably *die gleichen* ('alike')

Typ instances are preferably *dieselben / dasselbe* ('same')

to be tested

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Preliminary conclusions

- There is a difference in meaning between German **Art** and German **Typ**
- There is a difference between the idea of **kinds** and of **types** with respect to what they are intended to do in representations (of natural language meaning)
- The everyday notion of **type** seems close to **type-letter**; the formal notion of **types** appears related.
- The semantic notion of **kind** is less specific than German **Art**; (but there are at least four varieties of **kinds**)

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Das Deutsche Wörterbuch, Jacob und Wilhelm Grimm <http://dwb.uni-trier.de/de>

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