Arkady Shaldov, HSE, 31.05.2024

A proper name semantics for kinds

1 Introduction

1.1 Kind reference

Kind reference is the ability of NPs to refer to the intension of predicates as a whole. Diagnostic contexts are kind-level predicates (Carlson 1977):

- *rare*
- *inhabit*
- *extinct*
- *invent* (DO)
- etc.

Among the expressions that are usually considered to refer to kinds are

- The kind-level singular *the* (Carlson 1977).

(1) a. The mammoth is extinct.
b. The anteater eats ants.

- DPs in the taxonomic reading (quantifying over subkinds) (Dayal 2004).

(2) a. Some anteaters are extinct. At least one of {GIANT AE., SILKY AE., ...}
b. The anteaters are divided into two families. All of {GIANT AE., SILKY AE., ...}

- Bare plurals. Also note scopelessness (Chierchia 1998).

(3) a. Huge angry anteaters inhabit South America.
b. I didn't see huge angry anteaters. only ANTEATERS > ¬, not ¬ > ANTEATERS

- *kind-of* (Carlson 1977)

(4) He is the kind of person that always speaks first.

The first two refer to **well-established kinds** (WEK). The last two refer to ***ad-hoc* kinds** (Mendia 2019). This work only concerns the former.

1.2 Classificatory adjectives

The classificatory adjectives are the structurally lowest, semantically peculiar class of adjectives.

(5) a. polar bear
    b. technical architect
    c. functional grammar

McNally and Boleda (2004) propose that they denote properties of kinds.

1.3 What are kinds?

It is unclear.

- Carlson (1977): a special kind of entity.
- Chierchia (1998) (the Neocarlsonian approach): a special kind of entity — an intensional totality of individuals.

WEK-denoting nouns are considered to be **proper name–like** expressions (Carlson 1977; Krifka et al. 1995). They pass the *so-called* test.

(6) The giant anteater is so called because it can be more than two meters long.

(The anaphoric *so* must refer to something; likely not the post-insertion content)

2 The concern of this work

- To capture the semantics of classificatory adjectives and taxonomic readings with an untyped semantics of Chierchia (1984).
  - The Neocarlsonian approach does not predict that relational nouns can be kind-referring, but they can.
- To formalize the idea that WEK are referred to via proper names.

3 Nominalized predicates

3.1 The HST* (Cocchiarella 1974; Chierchia 1984)

An untyped lambda-calculus for natural language semantics.

- Types are limited to
  - individuals
  - N-ary predicates over **entities only**

  - functors (non-*t*-ending)
- All predicates have an individual counterpart.
  - Predicates are turned individual by the Down-operator $^{\cap}$.
  - Individuals are turned predicate by the Up-operator $^{\cup}$.
- This effectively allows predicates to range over predicates.
  - Including ranging over expressions of different types.
  - Including self-predication and much more.

Note. $^{\cup}$ and $^{\cap}$ are not type-shifters or semantics of null expressions. They are composition principles and come for free.

3.2 The Neocarlsonian semantics (Chierchia 1998)

Kinds are functions from worlds to totalities of individuals that belong to that kind.

Linkean semantics for pluralities (Link 1983): a join semilattice $\langle E, \oplus \rangle$ where elements above are mereological sums of elements below.

- Part-of relation $\leq$: e.g. $a \oplus b \leq a \oplus b \oplus c$.
- A kind is the uppermost element in the lattice.

Rethinking Chierchia (1984)'s DOWN and UP operators as type-shifters.

(7) a. $^{\cap}P = \lambda s\, \iota x \in D_k.\, P_s(x)$
b. $^{\cup}d = \lambda x.\, x \leq d_s$

Note. It follows that only one-place predicates can correspond to kinds. This makes incorrect predictions (section 8). Further employing the HST*: kinds are nominalized predicates with no connection to the content of the predicate.

4 Classificatory adjectives

(8) a. technical architect
b. pulmonary disease
c. brown bear

Tightly related to their nouns.

- Non-compositional semantics.
- Structurally lowest — always linearily adjacent to the noun. In Lithuanian, unseparable by possessors (Rutkowski and Progovac 2006).

(9) a. *žalia Reginos suknelė attributive*
green Regina-GEN dress
'Regina's green dress'

b. *Reginos žalioji arbata classificatory*
Regina-GEN green tea
'Regina's green tea' Lithuanian

- Available, but limited in predicative position. Require a compatible noun in the subject.
  ⟹ not compounds.

(10) a. This architect is technical.
b. {context: This guy is an architect.}
*This guy is technical.

Note. There can be more than one classificatory adjective.

(11) a. Scandinavian red fox
b. This red fox is Scandinavian.
c. *This fox is Scandinavian red.

4.1 Definite suffixes

Some languages (Serbian (Rutkowski and Progovac 2005), Lithuanian (Rutkowski and Progovac 2006; Holvoet and Spraunienė 2012), Latvian (Holvoet and Spraunienė 2012)) mark noun phrase definiteness on adjectives.

(12) a. *skudrlācis*
anteater
'a/the anteater'

b. *skaist-s skudrlācis*
beautiful-NOM anteater
'a/*the beautiful anteater'

c. *skaist-**ai**-s skudrlācis*
beautiful-DEF-NOM anteater
'*a/the beautiful anteater' Latvian

The same marker is required on classificatory adjectives, without implying definiteness.

(13) *liel-**ai**-s skudrlācis*
big-DEF-NOM anteater
'a/the giant anteater (*Myrmecophaga tridactyla*)'

The idea here: classificatory adjectives range over subkinds of the noun (or the noun with classificatory adjectives) (cf. McNally and Boleda 2004).

5 Kinds and proper names

WEK can be treated as proper names (Carlson 1977; Heyer 1985; Krifka et al. 1995)

(14) a. *Google* is so called because the creators dreamed of parsing a googol of pages.
b. *My neighbour is so called because he is the only living soul for miles.
c. The anteater is so called because it eats ants.
d. The giant anteater is so called because it can be more than two meters long.

Conceptual similarity: kinds are rigid designators (Krifka et al. 1995).

Predicative position availability for classificatory adjectives is symmetrical to that of *called*.

(15) a. Such architects are called technical.
b. *Such guys are called technical.

5.1 What are proper names?

Metalinguistic predicates that hold of all entities that bear the corresponding name (Burge 1973, a.m.o.).

(16) a. I saw a Zachary today.
b. There are many Zacharies here.
c. The Zachary I told you about is following me.

Names in their standard usage (*Zachary is crazy*) have a null determiner / are IOTA type-shifted: the unique most salient *Zachary* (Elbourne 2005).

6 The proposal

Both nouns and classificatory adjectives are proper names.

- One-place metalinguistic predicates over kinds.
  - True for any kind that bears the name.
- A IOTA is applied on every node in an NP's ext. projection to derive the unique kind.
- A predicate is true for individuals as well as its subkinds.
  - For any well-established predicates p and q, if $\forall x[p(x) \implies q(x)]$, then $q(^{\cap}p)$

(17) a. $[\![\text{anteater}]\!] = \lambda k.\, \textsc{called}(\text{anteater})(k)$
b. $\textsc{iota}[\![\text{anteater}]\!] = \iota k.\, \textsc{called}(\text{anteater})(k) = \textsc{anteater}$
c. $^{\cup}\textsc{iota}[\![\text{anteater}]\!] = \lambda x.\, \textsc{anteater}(x)$
d. $[\![\text{giant}]\!] = \lambda k.\, \textsc{called}(\text{giant})(k)$
e. $[\![\text{giant anteater}]\!] = \lambda x.\, \textsc{called}(\text{giant})(k) \wedge \textsc{anteater}(x)$

In simpler terms,

- the ANTEATER is the kind that is called "anteater".
- the GIANT ANTEATER is the kind of anteater that is called "giant".

-ai- is an opaque definiteness marker, with the semantics of IOTA. It naturally occurs on classificatory adjectives as well.

(18) a. $[\![\text{-ai-}]\!]([\![\text{liel- skudrlāci-}]\!]) = \iota k.\, \textsc{called}(\text{giant})(k) \wedge \textsc{anteater}(x)$

7 Taxonomic NPs

Determiners can range over subkinds. Singular *the* returns the kind itself.

(19) a. The anteater inhabits South America.
b. Some anteaters are extinct.
c. The anteaters are divided into two families.

Earlier: kinds are true of their subkinds.

- It follows that determiners can range over subkinds.

(20) $\exists k.\, \textsc{anteater}(k) \wedge \textsc{extinct}(k)$

- Kinds are also true of themselves.
- The totality of ANTEATER subkinds is extensionally equal to ANTEATER.
- The ANTEATER is a single kind.
  $\Longrightarrow$ To refer to the whole kind, singular *the* is used.

8 Additional: relational nouns against the Neocarlsonian semantics

If we accept the analysis above, we assume that classificatory adjectives and nouns range over kinds upon combining.

Relational nouns (type $\langle e, t\rangle$) combine with classificatory adjectives: *older brother*, *personal assistant*, etc.

(21) {Context: Anna has two older brothers.}

Anna-s *vec-āk-**ai**-s* *brālis* *iegūva* *Nobela* *premiju*
Anna-GEN old-COMP-DEF-NOM brother received Nobel's prize
'An older brother of Anna has received Nobel's prize.'

$\Longrightarrow$ Relational nouns denote kinds.

Neocarlsonian semantics cannot deal with it.

- There is no totality of BROTHERS to be the reference of the kind.
- The result of applying UP is always one-place, predicts ⟦older brother⟧ to be one-place.

9 Summary

- Well-established kinds — nouns, classificatory adjectives, (compounds…) — are underlyingly proper names.
- Classificatory adjectives range over subkinds.
- The kind-level singular *the* explained in terms of self-predication.
- Neocarlsonian semantics does not capture the whole picture.
- Still much work to do.
  - The external semantics of kind-referring NPs is yet to be developed.
  - Everything is murky with ad-hoc kinds.

References

Burge, Tyler (1973). "Reference and Proper Names". In: **The Journal of Philosophy** 70.14, pp. 425–439.

Carlson, Gregory Norman (1977). "Reference to Kinds in English". Amherst: University of Massachusetts.

Chierchia, Gennaro (1984). "Topics in the Syntax and Semantics of Infinitives and Gerunds". Amherst: University of Massachusetts.

– (1998). "Reference to Kinds across Languages". In: **Natural Language Semantics** 6.4, pp. 339–405.

Cocchiarella, Nino (1974). "Fregean Semantics for a Realist Ontology". In: **Notre Dame Journal of Formal Logic** 15.

Dayal, Veneeta (2004). "Number Marking and (in)Definiteness in Kind Terms". In: **Linguistics and Philosophy** 27.4, pp. 393–450.

Elbourne, Paul D. (2005). **Situations and Individuals**. Massachusetts Institute of Technology. 256 pp.

Heyer, Gerhard (1985). “Generic Descriptions, Default Reasoning, and Typicality”. In: 12.1, pp. 33–72.

Holvoet, Axel and Birutė Spraunienė (2012). “Towards a Semantic Map for Definite Adjectives in Baltic”. In: **Baltic Linguistics** 3, pp. 65–99.

Krifka, Manfred et al. (1995). “Genericity: An Introduction”. In: **The Generic Book**, pp. 1–124.

Link, Godehard (1983). “The Logical Analysis of Plurals and Mass Terms: A Lattice-theoretical Approach”. In: **Meaning, Use, and Interpretation of Language**. Ed. by Rainer Bäuerle, Christoph Schwarze, and Arnim Von Stechow. De Gruyter, pp. 302–323.

McNally, Louise and Gemma Boleda (2004). “Relational Adjectives as Properties of Kinds”. In: Empirical Issues in Syntax and Semantics 5.

Mendia, Jon Ander (2019). “Reference to Ad Hoc Kinds”. In: **Linguistics and Philosophy** 43.6, pp. 589–631.

Rutkowski, Paweł and Ljiljana Progovac (2005). “Classification Projection in Polish and Serbian: The Position and Shape of Classifying Adjectives”. In: **Formal Approaches to Slavic Linguistics 13: The South Carolina Meeting**. Ed. by Steven Franks, Frank Y. Gladney, and Mila Tasseva-Kurktchieva. Ann Arbor, MI: Michigan Slavic Publications, pp. 289–299.

– (2006). “Classifying Adjectives and Noun Movement in Lithuanian”.