Kinds of Kind Reference

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1. Introduction

The term "genericity" captures two independent phenomena (cf. Krifka e.a. 1995):

· characterizing statements, generalizations about a set of entities and/or situations.

· kind reference, to an abstract entity that is related to specimens.

Examples of characterizing statements:

(1) a. Delmer wálks to school.
'Whenever Delmer goes to school, he walks.'
'For all situations s such that Delmer goes to school in s, he walks in s.'
b. A potato contains vitamin C.
'Whenever x is a potato, x contains vitamin C.'
c. A member of this club doesn't drink alcohol.
'Whenever x is a member of this club, s/he doesn't drink alcohol.'

Examples of sentences with kind-referring NPs:

(2) a. The potato was first cultivated in the Andes region of South America.
b. Shockley invented the transistor.

Mixed cases are frequent. Example of kind reference in a characterizing statement:

(3) The potato contains vitamin C.

Certain forms may be used for both referring to kinds and for specifying a class of entities for characterizing sentences: bare plurals and mass nouns.

(4) a. Potatoes were first cultivated in the Andes region of South America.
b. The Zoroastrians worshipped fire.

(5) a. Members of this club don't drink alcohol.
b. Fog (typically) arises in the Éastern part of Scotland.

Goal of this article:

· discuss the nature of kind-referring NPs

· Present and improve on a recent proposal, Chierchia (1998).

2. Kind Reference

2.1 Tests for Kind Reference

Main argument for kind reference: Certain predicates subcategorize for kinds.

(6) a. The dodo became extinct in the 17th century.
b. Dodos became extinct in the 17th century.
c. *A dodo became extinct in the 17th century.

Become extinct does not express a general rule, but a particular event; yet the sentence is about a kind.

2.2 Types of kind-referring NPs:

· **definite NPs** (*the dodo*)

· **bare NPs** (*dodos, bronze*)

(7) Bronze was invented as early as 3000 B.C.

· **names** of kinds:

(8) *Raphus cucullatus* became extinct in the 17th century.

· NPs that are based on a **taxonomic** interpretation of the noun (the noun refers to subkinds, not to specimens).

(9) a. This bird became extinct in the 17th century.
b. A bird became extinct in the 17th century.
c. Many birds became extinct in the last three centuries.

There are indefinite NPs that do not have a taxonomic interpretation (*a dodo*) because the kind denoted by their noun is not associated with a subkind.

The kind must be well-established (or it must be possible to accommodate a well-established kind) (Carlson (1977), due to B. Partee).

(10) a. The Coke bottle has a narrow neck.
b. *The green bottle has a narrow neck.

2.3 How to Refer to Kinds

2.3.1 Names and Common Nouns

Natural-language ontology entertains entities called **kinds**. Kinds are related to **specimens**, and often to **subkinds**, forming **taxonomic hierarchies** (cf. Berlin, Breedlove, & Raven (1973)).

Reference to kinds may be by **names** (scientific, mythological, grammaticized):

(11) a. *Homo sapiens* has lived in Australia for at least 40,000 years.
b. Man has lived in Australia for at least 40,000 years.
c. Meister Petz nimmt nach dem Essen gerne ein Schläfchen.

But typically, natural languages use expressions that basically apply to specimens of a kind (**common nouns**, also called **appellativa**) also to refer to the kind itself.

(12) a. This is a schnauzer.
b. The schnauzer is first documented in a painting by Albrecht Dürer.

Name-like qualities of this use of NPs: The *so called* construction.

(13) a. Barbarossa was so called because of his red beard.
b. The schnauzer is so called because of its characteristic hair cut.

Also, natural languages use expressions that basically apply to specimens of a kind to refer to subkinds.

(14) a. Fido is *a dog*.
b. The schnauzer is *a dog*.

This re-use of common nouns appears to be widespread in human languages. But the specific ways how languages make use of common nouns to refer to kinds (or sub-kinds) depend on general features of their grammar, and can vary considerably. (cf. Gerstner-Link (1995), Chierchia (1998), Behrens (2000)).

2.3.2 Using Common Nouns to Refer to Kinds

Relevant principles:

A. The kind-referring use should add to the common noun as little as possible.

B. The kind-referring use should be marked as a definite NP.

English

Common nouns that can be used as full NPs because they require no determiner (mass nouns) can be used directly as names of kinds (cf. (A)).

(15) Milk contains a lot of calcium.

Common nouns that cannot be used as full NPs because they require a determiner are marked with the definite article when serving as names of kinds (cf. (B)). Cf. the use of the definite article with certain geographical names, e.g. *the Sudan*.

(16) The potato contains vitamin C.

Principle (A) appears to be stronger than (B): If a determiner is not necessery, as with mass nouns, it should not be used:

(17) ??The milk contains a lot of calcium.

English also allows plural NPs as kind-referring NPs:

(18) Potatoes contain vitamin C.

Possible explanation: Pluralization is another way to satisfy NP-hood for count nouns in a minimal way, satisfying (A). But there appear to be subtle differences between definite NPs and plural NPs.

Chinese

Every noun can be used as an NP. Hence kind reference uses bare NPs. (cf. (A)).

(19) a. xíong-mao júe zhong le
bear-cat vanish kind ASP
'The panda is extinct.'

b. Li jiàoshòu yánjiu xíong-mao
Li Professor investigates bear-cat
'Prof. Li investigates the panda.'

If bare NPs in Chinese are kind-referring, we can explain Kung-sun Lung's Paradox (cf. Hansen (1983)):

(20) pai ma fei ma
white horse not horse
'The white horse is not the horse.'

German

German is similar to English, but names are used much more frequently with definite articles in colloquial speech. This explains why mass nouns and even plural nouns used with kind reference may occur with the definite article in colloquial speech.

(21) a. (Die) Bronze wurde bereits 3000 v.Chr. erfunden.
'(The) Bronze was invented already 3000 B.C.'
b. (Die) Pandabären sind vom Aussterben bedroht.
'(The) pandas are facing extinction.'

German dialects (as well as in Frisian) have two articles: A short one that is used if the entity is known by world knowledge, and a long one that is used if the entity is known because it was introduced in the text or is given by the situation. Kind reference is with the short article, as kinds are established in the world knowledge of speaker and hearer. Examples (Bavarian):

(22) a. Da / *Dea Kini is gschtoabm.
the (short)/the (long) king AUX died.
'The king has died.'

b. Da / *Dea Schnaps is daia gworn.
the booze AUX expensive became
'Booze has bec\ome expensive.'

Romance (French, Italian)

Romance languages do not allow for noun-based NPs without determiners, ruling out simple common nouns as names of kinds. Following (B), the definite article is used:

(23) a. *Dodo est / *dodos sont / le dodo est / les dodos sont éteint.
dodo is / dodos are / the dodo is / the dodods are extinct.
b. *Or / l'or prend de la valeur.
gold / the gold takes value (goes up in value)

(24) *Cane è / *cani sono / Il cane è / I cani sono rari.

Even in the non-generic (indefinite) use, Romance languages don't have bare nouns:

(25) Dei cani stanno giocando fuori.
PARTITIVE dogs AUX play outside 'Dogs are playing outside'

Slavic (Czech)

Most Slavic languages lack articles, hence common nouns can refer to kinds (A):

(26) a. Mamut vymrel.
mammoth extinct
'The mammoth is extinct.'

b. Mamuti vymreli.
mammoth extinct.PL
'Mammoths are extinct.'

Hindi

Hindi allows for bare nouns as NPs. Singular indefinite nouns are marked by an article, *ek*; bare singular nouns are interpreted as definite. Hence both (A) and (B) predict that they can be used for kind reference. (Data: Dayal (2000)). Bare plurals are ambiguous between a definite and an indefinite reading.

(27) a. kutta bhaunk rahaa hai.
dog barking PROG
'The dog is barking.'

b. kutta aam jaanvar hai.
dog common animal is
'The dog is a common animal.'

c. kutte bhaunk rahe haiN.
dogs barking PROG
'The / some dogs are barking.'

d. kutte yehaaN aam haiN.
dogs here common are
'Dogs are common here.'

Hebrew

Hebrew also allows for singular bare nouns as NPs, but they have an indefinite interpretation (there is no indefinite article). Hence, kind reference requires definite articles, following (B). But this is not the case in the plural (Data: Dayal (2000)).

(28) a. ha kelev nadir be-arceynu.
the dog rare in our country
'The dog is rare in our country.'

b. klavim nedirim be-arceynu.
dogs rare.PL in our country
'Dogs are rare in our country.'

Indonesian

Indonesian allows for bare nouns as NPs that can have definite or indefinite interpretaitons. Following (A), they serve as reference to kinds (Data: Chung (2000)).

(29) Anjing suka tulang.
dog like bone 'Dogs like bones.'

Indonesian has a plural formation (by reduplication). But plural is not obligatory and used, in particular, if it should be stressed that the denotatum consists of discrete entities. Consequently, we do not find plural nouns in kind-referring function.

Positional and accentual factors

Syntactic positions are not created equal. Often, subjects and sentence-initial elements are more naturally interpreted as topical, hence definite, than object positions. This is especially important for languages with no article system, but also for others.

English subject/object asymmetries:

(30) a. The transistor was invented by Shockley.
b. Transistors were invented by Shockley.
c. Shockley invented the transistor.
d. ?Shockley invented transistors. (o.k. in taxonomic reading).

German positional asymmetries:

(31) a. Hunde bellen.
dogs bark (kind-reference possible)
b. Es bellen Hunde.
it bark dogs (kind-reference not possible)

The referents of definite NPs typically are known to speaker and hearer, and known expressions typically are de-accented.

(32) a. HUNde bellen. (kind-reference disfavored)
b. Hunde BELLen. (only kind-reference possible)

2.3.3 Using Common Nouns to Refer to Subkinds

Common nouns can refer to **subkinds** (**taxonomic interpretation**).

(33) a. The dolphin is a whale.
b. Two whales were put under protection.

This use of common nouns is wide-spread. With mass nouns, which lack a criterium of counting of objects, the taxonomic use results in count nouns, as subkinds always can be counted (cf. *three beers*; special form *fishes*).

The taxonomic reading can be marked explicitly:

(34) a. The dolphin is a type of whale.
b. Der Delphin ist ein Wal / eine Wal-art.
the dolphin is a whale / a whale-kind

In classifier languages, the use of classifiers distinguishes object-referring and kind-referring uses (cf. Chinese):

(35) a. yi zhi xiong
one CL bear
'an individual bear'

b. yi zhong xiong
one CL bear
'a kind of bear, a bear species'

2.4 What to Say about Kinds

What are the properties of kinds? They typically are derived from specimens of the kind, which can be observed. Krifka e.a. distinguish several cases:

(36) a. The dodo is extinct. (kind predicate)
b. Linguists have more than 8,000 books in print. (collective property)
c. The American family contains 2.3 children. (average property)
d. The potato contains vitamin C. (characterizing)
e. Dutchmen are good sailors. (distinguishing property)
f. Man set foot on the moon in 1969. (avant-garde)
g. In Alaska we filmed the grizzly. (representative object)

3. The Theory of Chierchia (1998)

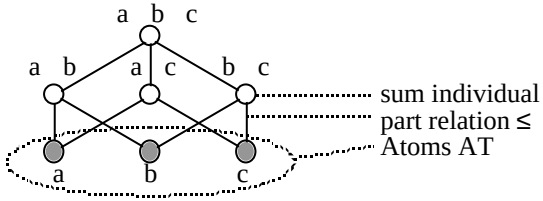
Chierchia (1998) proposes a principled theory to explain the variety of kind reference with common nouns.

3.1 Ontological requirements

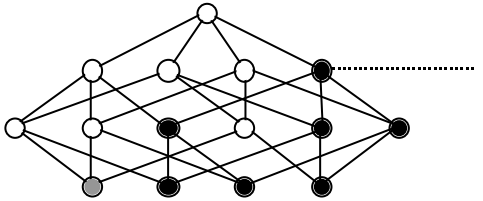
3.1.1 Individuals and sum operations

Individuals form an atomic join semi-lattice, with sum , part ≤, Atoms AT, and maximialization ι. We also have explicit quantification over possible worlds w.

(37) Sum lattice with three atomic individuals:



(38) Sum lattice with four atomic individuals, illustration of maximal element

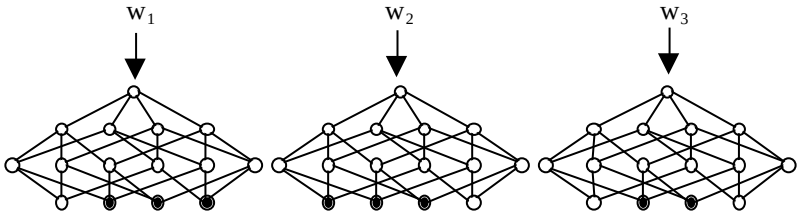


Notice: Not every predicate has a maximal element.

3.1.2 Meaning of singular and plural common nouns

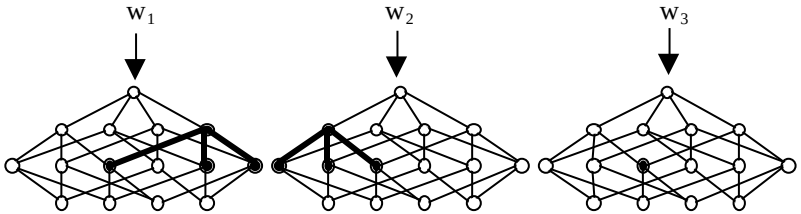
(39) ⟦*dog*⟧ = DOG, = λwλx[DOG(w)(x)],
the function that maps every world w to the set of (atomic) dogs x in w
(a property, in the sense of intensional logic).

(40) Illustration, ⟦*dog*⟧; we assume 3 possible worlds and "copy" the universe



(41) ⟦*dogs*⟧ = DOGS, = λwλx[¬DOG(w)(x) y[y≤x AT(y) → DOG(w)(y)]],
the transitive closure of DOG under minus DOG,
the function that maps every world w to the set of sum individuals
consisting of one or more dogs.

(42) Illustration, ⟦*dogs*⟧



It follows that DOGS is cumulative:
w[DOGS(w)(x) DOGS(w)(y) → DOGS(w)(x y).

3.1.3 Meaning of mass nouns

(43) ⟦*furniture*⟧: a cumulative predicate FURNITURE, including atoms.

Problem: The ontology of natural language does not necessarily endorse atoms.

3.1.4 Definite article and the maximialization operator (cf. Link (1983)):

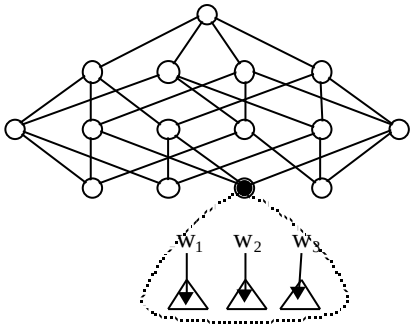
(44) a. ⟦*the dogs*⟧ = ιDOGS(w)
is defined, if DOGS(w) is not empty, due to cumulativity of DOGS

b. ⟦*the dog*⟧ = ιDOG(w), defined only if there is exactly one dog.

3.1.5 Kinds

Kinds are both functions from worlds to individuals, type s,e , and atomic individuals, type e; we have for the set of kinds K: K AT.

(45) Example, kind element



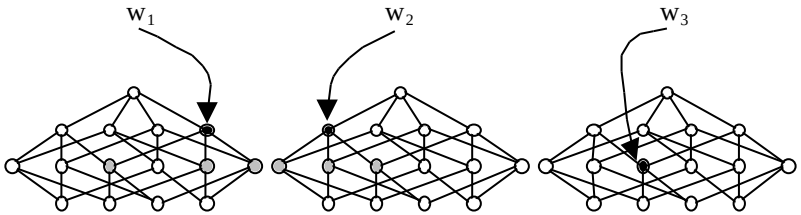
Relation between kinds and properties:

(46) Down-operator ∩: ∩P = λwι P(w), if this is an element of K, else undefined.

- maps every world to the maximal element of the extension of P in that world,
- is undefined if there is no maximal element in at least one world, hence ∩DOGS is defined [but only if there is at least one dog in every world!], ∩DOG is undefined [except if every world has exactly one dog]

(Problem with extinct kinds, like *the dodo.*)

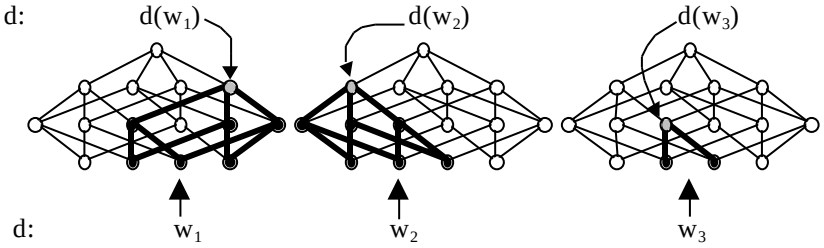
(47) Illustration, ∩⟦*dogs*⟧ = λwι P(w), if this is also a kind individual, d



(48) Up-operator ∪: If d is a kind, then ∪d = λwλx[x≤d(w)]

- maps every world to the set of parts of the kind in that world.

(49) Illustration, ∪d = λwλx[x≤d(w)]



Some theorems:

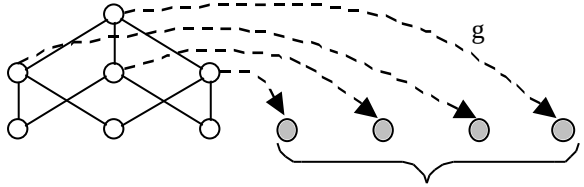
(50) a, If ∩DOGS = d, then DOGS ≠ d, as d contains atoms.
b. ∩ d = d, for every kind d.
c. If P is mass: ∩P = P
d. If P is count: ∩P = P the atoms that generate P.

3.1.6 Singular kinds

Purpose: Model singular generic article, as in *The dodo is extinct.*

Extension of ontology: Groups, cf. Link (1984), Landman (1989):

(51)



group individuals

Basic use of grous: *the* + Mass Noun, should not denote a plurality.

(52) a. ⟦*the furniture*⟧ = λw[g(ι FURNITURE(w))]
b. ⟦*the dogs*⟧ = λw[ι DOGS(w)]

Derived use: Singular generics after "massification" ('universal grinder'):

(53) a. MASS(DOG(w)) = DOG(w) DOGS(w)

b. ⟦*the dog*⟧ = λw[g(MASS(DOG(w)))],
a function from worlds to group individuals.

Chierchia explains by this the mass-like behavior of definite singular generic NPs, e.g. *Tigers are numerous* vs. **The tiger is numerous.* Cf. Kleiber (1989).

3.1.7 Plural kinds

(54) a. ⟦*dogs*⟧ = d = λw[ι DOGS(w)], = ∩DOGS,
a function from worlds to plural individuals

Why **the gold*, as a kind-referring term? Because ⟦*the gold*⟧ = λwg(ι au(w)) = au = ⟦*gold*⟧. (au: the kind aurum). Problem German:

(55) Gold / Das Gold ist ein Edelmetall.

3.2 Typology of Kind Reference

3.2.1 Types of Languages

Languages differ in their interpretation of nouns, involving two binary features:

- N[±arg]: Nouns can / cannot be **arguments** (entities);
- N[±pred]: Nouns can / cannot be **predicates**.

Language types:

- NP[+arg, -pred]: Chinese.
  N's denote kinds (type e): bare NPs.
  N's can serve directly as arguments: bare N's.
  no SG/PL-distinction necessary,
  classifiers induce shifts to predicates,
  e.g. ⟦*ren*⟧ = h, ⟦*ge ren*⟧ = λwλx[x≤h(w)], = h.
- NP[-arg, +pred]: Romance
  no bare NPs,
  obligatory use of articles (definite, indefinite, partitive; -articles in Italian in object position),
  N's can be predicates (count nouns) but don't have to be (mass nouns).
- NP[+arg, + pred]: English, Russian
  no ban on NPs without articles,
  N's come in two forms: predictes (count) or kinds (mass).
  Mass N's can serve directly as arguments.
  Plural N's can serve as arguments after type shift to kinds.

3.2.2 Type shifting of Noun Phrases

(56) Types of noun phrases:
  a. names, denote individuals (or individual concepts), type e, e.g. *John.*
  b. predicates, denote sets (or properties), type e,t , e.g. *a man*
  c. quantifiers, denote sets of sets, type e,t ,t , e.g. *every man*

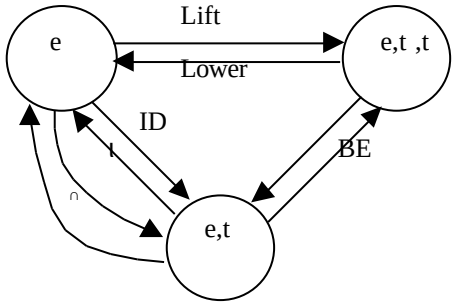
(57) Partee's type shift operations, extensional version (Partee (1987))

a.	Lift:	e e,t ,t ,	x λP[P(x)]	(general)
b.	Lower:	e,t ,t e,	λP[P(x)] x	(restricted)
c.	:	e,t e,t ,t	P λP′ x[P′(x) P(x)]	(general)
d.	BE:	e,t ,t e,t	λP′ x[P′(x) P(x)] P	(restricted)
e.	Id:	e e,t	x λy[y≤x]	(general)
f.	ι	e,t e	λy[y≤x] x	(restricted)

(58) Chierchia's type shift operations, intensional version

a.	Up, :	s,e s, e,t	d λwλx[x≤d(w)],	(unrestricted for kinds)
b.	Down ∩:	s, e,t s,e	P λwι P(w), if K	(restricted)

(59)



3.2.3 Free type shifts, indicated type shifts, and the blocking principle

In principle, type shifts between noun phrases can happen freely when required by the semantic environment. But type shifting can also be indicated by determiners:

(60) a. indefinite determiner: , e.g. *a dog*
  b. definite determiner: ι, e.g. *dogs*

Chierchia proposes a blocking principle (type shifting as last resort):

(61) If there is an overt determiner D that expresses a type shifting TS, then TS cannot happen freely but must be expressed by D.

- English has a definite determiner and a singular indefinite determiner, hence ι cannot apply freely, and can apply freely only in the plural. [Problem: Why no indefinite article for mass nouns?]
- Italian has also has a plural indefinite determiner, hence cannot apply freely.
- Slavic languages, Chinese have no determiners, hence , ι can apply freely.
- There are no specialized determiners for Up and Down, hence this type shift is always free.

3.2.4 Kind predications

Direct kind predications:

(62) a. Dogs are extinct. EXTINCT(∩DOGS)
  b. Gold is a metal. METAL(au)

Derived kind predications: Neo-Carlsonian analysis.

Chierchia follows the analysis of Carlson (1977): Uniform analysis of bare plurals as kind-referring, even in sentences like *Dogs are barking* that involve just some specimens of the kind. The verbal predicate reduces a predication of a kind to a predication of an individual:

(63) DKP-Rule:
  If P applies to objects and k denotes a kind, then P(k) = x[k(x) P(x)].

(64) Dogs are barking. BARKING(∩DOGS)
⇔ x[∩DOGS(x) BARKING(x)]

Narrow-scope phenomena

(65) John didn't see dogs.
a. LF: dogs$_1$ [John didn't see t$_1$]
b. interpretation: λx[¬[SEE(x)(JOHN)](∩DOGS)
(after type shift DOGS ∩DOGS, to satisfy type requirement)
c: after application: ¬[SEE(∩DOGS)(JOHN)]
d. after DKP: ¬ x[∩DOGS(x) SEE(x)(JOHN)]

Notice: DKP does not apply after step (b) because the variable x is either sortally unspecific or a variable for kinds. Only at step (c) the sortal requirements of SEE will trigger DKP.

In contrast, NPs with indefinite articles allow for wide scope:

(66) John didn't see a dog.
a. LF: a dog$_1$ [John didn't see t$_1$]
b. interpretation: λP x[DOG(x) P(x)](λx[¬[SEE(x)(JOHN)])
c. after application: x[DOG(x) ¬[SEE(x)(JOHN)]]

Apparent wide-scope with derived kind predications:

(67) Mary saw dogs. John saw them too.

E-type analysis of pronouns (cf. Heim (1990): *them = the dogs that Mary saw*.

3.3 Problems with Chierchia's Theory

3.3.1 A problem with number

Dogs are barking is true even if a single dog is barking, as ∩DOGS(x) may apply to single dogs. Perhaps this should be so:

(68) A: Did you hear dogs barking?
B: #No, just one. / Yes, one.

But *Dogs are barking* at least pragmatically implicates that there is more than one dog that is barking. This can be derived as a scalar implicature if we assume that *a dog* and *dogs* are members of a Horn scale. But then one would expect that they are of the same semantic type; in Chierchia's theory, *a dog* is a quantifier, and *dogs* an entity that denotes a kind individual.

3.3.2 Problems with Derived Kind Predications

Chierchia assumes a complex chain of type shifts to accommodate bare NPs for *Dogs are barking*:

(69) DOG DOGS ∩DOGS ∩DOGS ∩DOGS
pluralization type requirement DKP-rule DKP-rule

The first two shifts are explicitly triggered (pluralization, type requirement when combined with predicate of type e,t). The last two shifts are due to the DKP-rule.

Why not just the following chain, where each step is explicitly triggered?

(70) DOG DOGS DOGS
pluralization type requirement

Reason: Then *dogs* would just be the plural version of the indefinite *a dog*, and we could not explain why *dogs* induces narrow scope.

But two questions remain:

- The type raising sequence (70) cannot be prevented, and it should be the more prominent one, as it is shorter than (69).
- The DKP rule is problematic, as it has a complex, ad-hoc triggering condition. Normally, type shifts just change the type of an argument: *PRED(ARG) induces shift ARG ARG′ such that PRED(ARG′) or ARG′(PRED) is well-formed.

3.4 An Alternative

3.4.1 Count nouns are inherently relational

Assume: Count nouns have a number argument (cf. Krifka (1989)):

(71) ⟦*dogs*⟧ = λwλnλx[DOG(w)(n)(x)], = DOG (type s, n, e,t
⟦*gold*⟧ = λwλx[GOLD(w)(x)], = GOLD (type s, e,t

Determiners and number words bind number arguments:

(72) ⟦*a dog*⟧ = λRλwλx[R(w)(1)(x)](DOG), = λwλx[DOG(w)(1)(x)]
⟦*two dogs*⟧ = λRλwλx[R(w)(2)(x)](DOG), = λwλx[DOG(w)(2)(x)]

These are predicates, not quantifiers; cf. analysis of indefinites in Heim (1982).

Plural in *two dogs* is just syntactic agreement; it may be lacking in languages that have plurals e.g. Turkish; may be triggered by decimal fractions even if number is 1.

(73) a. iki köpek
two dog, 'two dogs'
b. köpekler
dogs

(74) a. one dog/*dogs (per square kilometer)
b. one point zero dogs/*dog (per square kilometer)

Measure constructions with mass nouns and in classifier languages:

(75) ⟦*two ounces of gold*⟧ = ⟦*two ounces*⟧(⟦*gold*⟧)
= λPλwλx[OUNCE(x) = 2 P(w)(x)](GOLD),
= λwλx[OUNCE(x) = 2 GOLD(w)(x)]

Bare plurals: Plural binds number argument (also, in Turkish).

(76) ⟦*dogs*⟧ = ⟦-s⟧(⟦*dog*⟧) = λRλwλx n[R(w)(n)(x)](DOG),
= λwλx n[DOG(w)(n)(x)]

3.4.2 Possible analysis of predication with indefinites (van Geenhoven (1998)):

If a nominal predicate α and a verbal predicate β should be combined, the verbal predicate undergoes type shift: β λP x[P(x) β(x)]

(77) Dogs are barking.
a. Type shift: BARKING λP x[P(x) BARKING(x)]
b. Application: λP x[P(x) BARKING(x)](DOGS),
= x[DOGS(x) BARKING(x)]

This explains narrow-scope interpretations if the type shift is triggered for lexical predicates.

Chierchia's objection: Why not **Dog is barking*? Answer in the modified theory: Because singular count nouns like *dog* are not predicates, type e,t , but relations between numbers and entities, type n, e,t .

3.4.3 Predications by forced type shift

Indefinites are basically predicates; can be type-shifted to quantifiers by ; this is forced by type clashes.

(78) *A dog barked.* Type shift: ⟦*a dog*⟧ ⟦*a dog*⟧
Dogs barked. Type shift: ⟦*dogs*⟧ ⟦*dogs*⟧

How do narrow-scope interpretations arise? Various options, for example:

(79) (John) didn't see dogs
a. λy[¬[λx[SEE(x)(y)](λx n[DOG(n)(x)])]], type clash!
b. Lifting of λx n[DOG(n)(x)] by :
λx n[DOG(n)(x)] λP x[n[DOG(n)(x)] P(x)]
c. new application:
λy[¬[λP x[n[DOG(n)(x)] P(x)](λx[SEE(x)(y)]])
= λy[¬[x n[DOG(n)(x)] SEE(x)(y)]]

Notice that the same derivation works for *a dog*; explains possible narrow-scope reading of *John didn't see a dog*, or *John didn't see a spot on the floor*. This reading may not be so prominent in the scope of negation because English has an alternative determiner *any* which forces narrow-scope interpretations.

How do wide-scope interpretations of *a dog* or *some dogs* arise? Various options, for example:

- NPs with overt determiners must undergo LF-movement, which means wide-scope interpretations (cf. de Hoop (1995) on weak vs. strong NPs.
- Overt determiners allow for an interpretation of indefinites by choice functions, which trigger specific readings (cf. von Heusinger (1997), Reinhart (1997), Winter (1997)).

(80) a. ⟦*a / some dog(s)*⟧: f(⟦*a / some dog(s)*⟧)

b. ⟦*a dog is barking*⟧, after existential closure:
f[BARKING(f(λx[DOG(1)(x)]))]

That is, there is a salient choice function f that gives us a unique dog or a unique sum individual consisting of dogs. No choice functions with bare plurals:

(81) ⟦*dogs are barking*⟧: x n[DOG(n)(x) BARKING(x)]

Choice functions translate into wide-scope readings, if existential closure of choice function variables happens globally:

(82) John didn't see a dog.
f[¬SEE(f(λx[DOG(1)(x)]))(JOHN)]
'There is a (particular) dog that John didn't see.'

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