The Nominal System Across Languages
Contemporary Formal Semantics

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Summary: the aim is to review the most important aspects of **noun phrases** in contemporary semantics. The focus is on **bare** noun phrases across languages. The framework is formal. We review the basic notions in natural language semantics: the notion of kinds, Chierchia's semantic parameters, and Link's formalization of the notions of plurality and mass. We very briefly touch upon the issue of semantic incorporation, an important notion if the object language is Spanish. The last class reviews some experiments on bare nouns in Brazilian Portuguese, and the controversy on mass and count across languages.

February 11th, 2019 - Introduction to Formal Semantics
Introduction to Contemporary Formal Semantics
Basic concepts: Predicates, arguments, λ Heim & Kratzer, Ferreira

(1) Ann smokes
(2) The woman in blue smokes

February 12th, 2019 – Plurals and Mass
Link (1983) What does plural mean?

(1) The women smoke.
(2) Wine stains.

What is a lattice structure?
Mass and Count across languages The canonical view and the challenges

February 13th, 2019 -Bare Nouns and Indefinites: kinds
Carlson (1977) on Kinds.What is a concept? How do languages express concepts?

(1) Women smoke/are smoking
(2) Whales are on the verge of extinction
(3) John is looking for secretaries/ John is looking for a secretary.

Individual level predicate vs Stage level predicate

February 14th, 2019 - Bare Nominals across languages

Generic and Episodic

Chierchia (1998) Semantic Parameters - looking into the nominal domain
Mandarin, a mass language?

(1) Dogs bark.
(2) A dog barks.
(3) The dog barks.
(4) * Dog barks.

Chierchia (2010, 2015)

February 15th, 2019 - Comparison and the Mass-Count distinction

Pires de Oliveira & Rothstein, 2011. Ferreira, 2017 for a review on the literature

(1) João tá procurando secretária/ secretárias/ uma secretária.
(2) ? Baleia está em extinção.

(1) João tem mais casa que a Maria.
(2) John has more house than Mary.

BrP is an outlier (Pires de Oliveira & Bevilaqua, submitted)

Chierchia (1998, 2010, 2015) Rothstein (2017)

References
Bevilaqua & Pires de Oliveira
Bertolini & Pires de Oliveira (em prepação)
Chierchia (2003), cap. 9.
Chierchia & McConnel-Ginnett (1990)
Heim & Kratzer, cap. 4
Kearns (2011), cap. 11.
Krifka
Pires de Oliveira & de Souza (2018).
Pires de Oliveira & Rothstein (2011)

Link, G. (1998). Algebraic semantics in language and philosophy. Stanford, California: CSLI Publications

WACHOWICZ, T. C. . A semântica dos reticulados para os plurais em PB. In: Ana Lúcia Müller; Esmeralda Vailati Negrão; Maria José Foltran. (Org.). Semântica formal. 1ed.São Paulo: Contexto, 2003, v. , p. 75-94.

February 11th, 2019 - Introduction to Formal Semantics
Introduction to Contemporary Formal Semantics
Predicates, and arguments Heim & Kratzer, Ferreira
The framework of my research is Natural Language Formal Semantics.

(1) Ann smokes.
(2) The woman in blue smokes.

1. What do we know when we know what a "sentence" means? What do we know if we know what the sentence in (1) means?

A sentence is a just a well formed formula. It expresses a thought. What is the thought that is expressed by (1) and by (2)?That a certain individual, say, Ann, has the property of being a smoker.

i. Truth conditions: how the world must be for the sentence to be true.

(1) *It is raining* is true if and only if (iff) ...
Object language Metalanguage

ii. Compositionality: the meaning of the sentences is a function of the meaning of its parts!

(2) Ann smoked
Ann => argument
smoked => predicate
ed => operator

iii. Inferences – Entailments, presuppositions

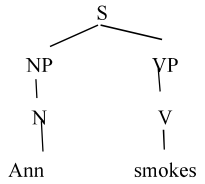
(3) If it is true that Ann smoked, then Ann did something.

2. Frege's conjecture

Saturated (Arguments) and unsaturated constructions (Predicates)
Functions and Functional Application

(4) Ann smoke(s)

Be careful Syntax: there is no semantics here! No meaning! It is just a well formed formula.



Direct (Heim & Kratzer) versus Indirect (Chierchia) semantics => a system of deduction

A. Inventory of denotations

Let D be the set of all individuals that exist in the real world.
Elements of D
Elements of {0, 1}, the set of truth-values
Functions from D to {0,1}

B. Lexicon
[[*Ann*]] = Ann
[[*smokes*]] = the set of smokers at t (sets as metalanguage) / the function that leads to 1 if x smokes and to 0 if x does not smoke (functions as metalanguage).

$[[smokes]]^t$ = {Peter, Ann, Mary}

$[[smokes]]^t$ = Peter → 1
Mary → 1
Ann → 1
Joe → 0
Carl → 0

λ - Lambda Calculus
https://en.wikipedia.org/wiki/Lambda_calculus

We need it for natural languages, like English or BrP. See Partee *et al* on lambda abstraction. Conjunction, relative clauses, negation,...

Check Heim & Kratzer (1998), Chierchia (2013) formal framework

C. Rules for non-terminal nodes: we climb the tree!
Heim & Kratzer, 15-16, for the simplest version.
(S1) if α has the form S , then [[α]] = [[γ]] ([[β]])
β γ

3. Nominal Phrases

John smokes
The whale died vs is on the verge of extinction
Some whale
Every whale
Whales
A whale

3.1 The Definite Article - DP phrase
(5) The woman in blue smokes.

SN SV

DET SN

N

the woman

[[the]] = ??

Frege and Russell on definite descriptions

(6) The king of France is bald
(7) the escalator in South College There is no escalator in South College
(8) the stairway in South College There are more than one stairway in South College

Heim & Kratzer page 81

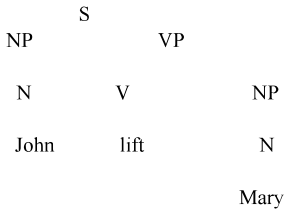
[[the]] = λf: f ∈ D $_{<e,t>}$ and there is exactly one x ∈ C such that f(x) = 1. the unique y ∈ C such that f(y) =1, where C is a contextually salient subset of D

Presupposition

Exercise 1

Propose a semantic derivation for the following syntactic tree

John lift Mary



Every boy smokes

February 12th, 2019 – Plurals and Mass
Link (1983) What does plural mean?

(1) The women smoke.
(2) Wine stains.

What is a lattice structure?
Mass and Count across languages The canonical view and the challenges

Count and Mass nouns

Properties of mass and plural nouns: cumulativity and homogeneity

singular properties: a dog ⊕ a dog is not a dog	no cumulativity
a dog partitioned is not a dog but parts of a dog	no homogeneity
plural: dogs ⊕ dogs = dogs (Link sum)	cumulativity
dogs partitioned into dogs	homogeneity
mass: water + water = water (Link fusion)	cumulativity
water partitionates into water	homogeneity

Rothstein (2017) cumulativity and divisiveness page 71

Cumulativity (upward homogeneity): P is a cumulative predicate iff: ∀x,y, x ∈ P ∧ y ∈ P : x ⊔ y ∈ P

Divisiveness (downward homogeneity): ≤is part of relation, O is the overlap relation

If P is divisive then ∀x ∈ P: ∃y, z: y ≤ x ∧ z ≤ x ∧ ¬ O(x, y) ∧ y ∈ P ∧ z ∈ P.

[[*dog*]] = λx: x ∈ D_A. x is a dog

Link: “Inherent in the notions of set is atomicity which is not present in the linguistic behavior of mass.” (129)

(3) This is a gold ring. The ring is new but the gold is old.

Wachowicz 83

x ≤ y ´part of˝ relation
⊔ join operation

||a|| ≤ ||b|| iff ||a|| ⊔ ||b|| = ||b||

A lattice structure is a partially ordered set <A, ≤ > closed under a join operation ⊔

a⊔b⊔c a⊔d⊔d ... *dogs*

a⊔b b⊔c a⊔d ….

[a b c d e...] *dog*

* generates all the individual sums of members of the extensions of P

[[*dogs*]] = *dog

“What I am getting at is that nominal mass terms do no seem to have a proper logic.” (130)

Hot debate on ontology.What is matter/stuff/mass nouns? There are different answers to this question. Rothstein (2017) ontologically, the primitive is non-atomic lattice structures. Mass are the identify operation, generating non-atomic lattice structures. Atomicity is a lexical operation. Thus *dog* in fact is the composition of a dog mass root noun which is turned into an atomic predicate via a lexical operation. This is much in tune with syntactic views as in Borer (2005)

Link (1998) claims that guided by language, there are things and stuff things are made off. He sorts the domain into atoms and stuff the atoms are made of. Objects are made of stuff. Stuff does not have atoms, they constitute the atoms. He also makes a difference between fusion and sum. Sum applies to objects, fusion to mass.

Chierchia (2010, 2015) proposes an epistemic view: ontologically the domain is always atomic, thus *water* denotes an atomic structure (as it seems to be the case), but there is an epistemic distinction based on what is known by the speakers: all lattices have atoms, some of them are stable (across the worlds), some of them are not stable (mass).

Contemporary count-mass distinction

The last few years have witnessed vigorous debates around mass and count, as the title of a very recent conference on the theme suggests: *the count-mass distinction: a linguistic misunderstanding?*[1]

Semantic theories: the route which relies on a perceptual, cognitive distinction (Link, 1983, Chierchia 2010, 2015), and the route where countability is a grammatical property (Krifka, 1989, Rothstein 2015).

Experimental data => several species, babies of less than 3 months distinguish between objects (discrete portions of matter) and substances (non-discrete)

One to one mapping => Count nouns correspond to objects. Mass nouns, to substances.

i. There is language variation.

Kulkarni, Rothstein and Treves (2013) corpora analysis of nouns in 6 languages show that “there is massive cross linguistic variation” (Rothstein, 2015: 69).

2. *Furniture* type of nouns
3. Flexible nouns: *rope* and *ropes*
4. *Bouquet*, *fence*,... Rothstein’s count nouns which are not discrete objects
5. Cross linguistic variation:

Mandarin, all nouns look like mass because classifiers are obligatory.

(1) san * (zhi) gou.
three classifier small animal dog (example from Rothstein 2015, page 113)

That linguistic fact made Chierchia (1998) claim that in Mandarin all nouns are mass. A claim he rejects in (2010, 2015). Rothstein maintains that in Mandarin nouns denote the kind.
Yudja (Juruna), all nouns can be directly counted:

(2) Txabiu uda apeta wi
3 someone blood bring
someone brough 3 (portions) of blood

[1] http://count-and-mass.org/becl2018/abstracts/Programfinal.pdf

Bare Singulars in BrP, mass and cardinal readings in comparatives

(3) É muito livro pro João carregar.
is much/many book for João to carry

The explanation for all these phenomena seem to point in the direction that some noun phrases denote the **kind**.

Exercise

Think about comparatives, its syntax and semantics. First, which forms are grammatical in your language? Take English as a metric just because we happen to know more about this language.

(1) Who has more X?

In English, it seems that we have two grammatical possibilities and four logical ones. Build a grammaticality judgment task.

February 13th, 2019 -Bare Nouns and Indefinites: kinds
Carlson (1977) on Kinds.What is a concept? How do languages express concepts?

(1) John is looking for secretaries/ John is looking for a secretary.
(2) Whales are on the verge of extinction
(3) Women smoke / are smoking

Individual level predicate vs Stage level predicate

Carlson (1977) **Bare Plural vs Indefinite**

Tests:

(i) Opacity

(1) John is looking for a secretary. Narrow and wide scope readings
(2) John is looking for secretaries. Only narrow scope.

II. Scope Interaction

(3) Everyone reads a book on caterpillars. wide and narrow scope
(4) Everyone reads books on caterpillars narrow scope

III. Differentiated scope phenomena

(5) % A dog is everywhere.
(6) Dogs are everywhere.
(7) Max discovered a rabbit in his yard for two hours.
(8) Max discovered rabbits in his yard for two hours.

IV. NP denoting kinds of things

(9) A whale is on the verge of extinction.
(10) Whales are on the verge of extinction.
(11) # John is on the verge of extinction

Carlson argues that the data is explained if Bare Plurals, which he names ∅NP, denote the kind. Their are proper names. The indefinite is a quantified phrase, thus it may remain in situ or move to a higher position.

Thus [[*whales*]] = the kind whale = the individual whale.
[[*a whale*]] = is a quantifier phrase $\lambda P \exists x$ [whale (x) & P (x)]

(5)′ ∃

Type e, as the denotation of definite descriptions and proper names as *John*.
Carlson treats proper names as set of properties, a la Montague. Thus *John* is of type < <e,t>, <<e,t>, t> >.

Thus the interpretation of a proper name as *Jake* is the set of properties that define that individual. In his representation
"Jake" translates as: λPP{j}
"Dogs" translates as λPP{d}

This is already an intensional system.

Kinds may occupy different spots at a particular moment in time, whereas individuals as you and me cannot. We are tied to one place at one particular point in time (Kaplan,).

Individuals realize the kind. R

Roberta realizes the Human kind

λxR (x, r) (Human kind)

What is the type of this function?

Individuals are spread in time. Thus, at the particular moment that I type this sentence I am a realization/ a stage of this individual that includes those moments when I was 14 years old… It is the same individual, different stages of that individual. An individual is more than the sum of the stages.

Stage level and Individual level predicates applies to individuals that are spread over time: you and me. Individuals have properties that are stable. Being legally called Roberta Pires de Oliveira is a stable property of myself. It will be on my grave. My birth is also a stable property of me as an individual. I am the realization of different kinds and at least the sum of all the stages that compose my history in time.

Kinds are **"abstract" entities**.
Kinds are the entities which are described by kind predicates, as *extinct*, (9) and (10) above.

Dogs are intelligent I (d)
Dogs are sick: ∃x [R (x, d) & sick (x)]

Krifka *et al* (1995) Genericity: an introduction
Generic versus Episodic predicates

(1) Women (usually) smoke.
(2) * Yesterday at the party a woman usually was smoking.

Generics, habituals,...
Intensional operator. What does it mean do be a habitual operator? What about the Generic operator? What sort of operator is it? What does it mean to quantify over possible worlds? When is (1) true?

Object level and kind level individuals
Relation with Aspect and Acionality
Dogs bark vs Dogs are barking
What are the syntactic trees? What does present tense mean? And present continuous. John smokes vs John is smoking.

A note on Semantic Incorporation - Carlson (2006)

Properties of Semantic Incorporation show that the Bare Plural in English is not semantically incorporated. He claims that the Bare Singular in BrP is not semantically incorporated. He is right!
(i) there seems to be no restriction, it may happen with any predicate in object position
(ii) it does not give raise to conventionalized interpretations
(iii) they are referentially recovered

Dayal (2004) proposes that the Bare Singular in Hindi in object position is semantically incorporated. In a footnote she claims that this is not so with BrP...Semantic incorporation or psdeu-semantic incorporation

Spanish => Bare Singulars are syntactically restricted. They are defective.
They only happen *have* predicates, and are semantically incorporated (Espinal & McNally, 2011). They are no DP, but NP. They are not expected in argument position.

Rinaldi (2019) for RioPlatense Spanish Group 1 => a number neutral (pseudo)incorporation analysis. Based on their referential properties, binding possibilities and singular number specification, I propose that they are DPs, albeit of a defective type.
Group 2 bare singulars (BP, Persian and ABS) are truly number neutral DPs. I propose that this is the case as bare plurals, standardly assumed to be number neutral, cannot fulfil that role in these languages.

BrP and RioPlatense Spanish have different nominal systems, but it is not the case that the BS in BrP is number neutral.

Exercise

How is genericity expressed in your language? Does it have Bare Plurals? Bare singulars?
What are the logical forms for *Dogs bark* and *Dogs are barking* according to Carlson's proposal?