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July 3, 2009

## 45. Bare Noun Phrases

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*The distribution and interpretation of bare NPs varies across languages. This article surveys the range of these possibilities and the theoretical accounts that deal with it.*

- 35 *Bare NPs are canonically associated with reference to kinds and the semantic operations involved in kind formation are central to the discussion. Differences between singular and plural terms with respect to kind formation, the relationship between kind formation and the semantics of definite and indefinite NPs, the correlation between lexical exponents of a semantic operation and its availability as a covert type shift, and the*
- 40 *syntactic location of semantic operations are among the issues explored in these accounts. The study of bare NPs thus overlaps with the study of genericity, number marking and (in)definiteness. The primary focus here is on recent research which addresses the issue of cross-linguistic variation in semantics. Current challenges for theories of variation are also discussed.*

45 1. Introduction

The study of bare NPs spans thirty years of semantic research and can be divided almost evenly into two phases. The first focused on the proper analysis of English bare plurals, with particular emphasis on the role of reference to kinds and the principles of quantification at play in statements with such NPs. The second took insights from the study of bare plurals beyond English to other languages. While questions regarding denotation and quantification remained important, this second phase was marked by a concern with cross-linguistic issues. Three questions emerged as particularly significant in this enterprise: Is variation in the mapping between form and meaning predictable? What is the impact of number morphology on bare NPs/kind terms? Is there a correlation between determiners in a language and available readings for bare NPs? This survey focuses on the second phase of the investigation. It fleshes out the empirical landscape that current work on the topic assumes, discusses three approaches to cross-linguistic variation that have been proposed, and identifies the research questions that remain open. For the first phase of the investigation the reader is referred to Krifka et al. (1995), Carlson (1991 and 1999), Delfitto (2006) and article 49 *Genericity*.

2. Empirical landscape

65 English bare plurals, the focus of Carlson (1977)'s influential work, are a natural starting point for any survey of the topic, being the most familiar and best-understood case of bare NPs. They have three primary readings: kind, generic and existential.

English typically does not allow bare singular arguments, setting aside exceptions like *man is mortal* etc. Bare mass nouns, which trigger singular verb agreement, align with  
70 bare plurals in terms of available readings (see also article 48 *Mass nouns and plurals*):

- (1) a. *Dinosaurs* are extinct.  
b. *Dogs* bark.  
c. *Dogs* are barking.

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An intuitively natural way of grouping these sentences might be to classify (1a) and (1b) together as statements applying to a whole class or species, separating them out from (1c), which describes properties of some members of the class at a particular point in time. Although (1a) and (1b) are both general statements, they are crucially different.  
80 While it is possible to relate the statements in (1b) to corresponding statements in which the predication applies to a particular individual, it is not possible to do so with the statement in (1a): *Fido barks* vs. *\*Fido is extinct*.

We also know that bare plurals cannot be used deictically or anaphorically. A definite is needed for that:

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- (2) a. *\*(The) dogs*, namely Fido and Rover, are barking.  
b. Some dogs<sub>i</sub> are barking. *\*(The) dogs<sub>i</sub>* must be hungry.

This suggests an inverse correlation between the presence of overt determiners and  
90 meanings of bare NPs but two points are worth noting in this connection. One, definite

NPs and bare plurals are not truly in complementary distribution. There are contexts in which one can be substituted for the other with no shift in meaning (Condoravdi 1992):

(3) There was a ghost on campus. (*The*) *students* were aware of the danger.

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Two, if the generalization about the relation between overt determiners and bare plurals is to hold, there must be some distinction between the existential/generic readings of bare plurals and such readings of indefinite NPs. The difference in existential readings was established early on by Carlson (1977):

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(4) a. Miles didn't see/is looking for *policemen/a policeman/some policemen*.

b. #*A building/#Some buildings/Buildings* will burn in Berlin and in Frankfurt.

The bare plural in (4a) can only take narrow scope, while the indefinites, singular and plural, can take wide or narrow scope. The readings of bare plurals are not, however, a subset of the readings of indefinites. (4b) with either indefinite cannot have the plausible reading in which different buildings burn in the two cities. With a bare plural, it readily allows for this differentiated scope reading.

Generic readings of bare plurals and singular indefinites can also be separated. Generic indefinites seem to be restricted to statements in which definitional rather than accidental properties are at issue, though what counts as definitional is open to contextual manipulation. The contrast in (5) is discussed in Krifka et al. (1995), cases like (6) by

Greenberg (1998) and Cohen (1999). The unacceptability judgments indicated are for generic readings only:

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- (5) a. *Madrigals* are polyphonic/popular.  
b. *A madrigal* is polyphonic/#popular.  
c. *A basketball player* is popular.

- 120 (6) a. *Italian restaurants* are closed today.  
b. #*An Italian restaurant* is closed today.

The rough generalization, then, is that bare plurals are a distinct kind of NP, characterized by their ability to serve as arguments of kind-level predicates, by their propensity for narrowest scope, and by their more liberal distribution in generic statements.

This empirical picture has been extended in a number of directions. A minimal but significant modification comes from a consideration of Romance languages, which like English generally disallow bare singular arguments. They differ from English, however, on plurals and mass nouns. French does not allow such arguments to be bare while Italian and Spanish allow them only in well-governed positions. The following from Chierchia (1998) shows a subject-object asymmetry in Italian:

- 135 (7) a. \**Bambini* sono venuti da noi  
“Kids came by.”

b. Ho preso *biscotti* con il mio latte

“(I) had cookies with my milk.”

Furthermore, these bare plurals arguably do not have kind or generic readings:

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(8) \*Leo odia *gatti*

“Leo hates cats.”

It bears emphasizing though that Romance bare plurals, like English bare plurals, cannot refer deictically or anaphorically and are unable to have wide scope readings.

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Another extension of the empirical landscape is prompted by languages like Chinese which do not mark number in the nominal system. Bare NPs in Chinese display the full range of readings associated with English bare plurals (Yang 2001). In addition, they are able to refer deictically and anaphorically, in keeping with the fact that Chinese has no definite determiner. They are also thought to have indefinite readings, again in keeping with the absence of indefinite determiners, but this generalization is subject to two caveats. In subject position, there is a tendency, not an absolute requirement, that the bare NP have definite rather than indefinite readings. And, in positions where an indefinite reading is available, the bare NP only has narrow scope. That is, in spite of the absence of indefinite determiners, the scopal properties of Chinese bare NPs are like those of English bare plurals, not English indefinite NPs.

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Finally, there are languages that fall in between Chinese and English. Hindi and Russian, for example, display morphological number like English but like Chinese do not

have articles. Interestingly, these languages freely allow bare singular arguments as well  
160 as bare plurals and both display kind and generic readings. However, bare singulars are  
not trivial variants of bare plurals. In the Hindi example below the same child is assumed  
to be playing everywhere, an implausible reading. Its plural counterpart, however, would  
readily allow for a plausible reading (Dayal 2004):

165 (9) #caaro taraf *bacca* khel rahaa thaa  
four ways child play PROG PAST  
“The (same) child was playing everywhere.”

The bare singular in (9) may appear to behave like a wide scope indefinite but standard  
170 diagnostics, such as those in (4), show that they resist wide scope readings just like bare  
plurals. The bare singular picks out an entity in the domain that uniquely satisfies the  
descriptive content of the NP. While this may be similar to a wide scope indefinite, it is  
not identical to it (see also article 42 *Definiteness and Indefiniteness* and 43 *Specificity*).  
Such languages thus reveal the importance of number morphology as well as the  
175 presence/absence of determiners in identifying interpretive possibilities for bare NPs.

Turning to theoretical issues, two broad approaches to the semantics of English  
bare plurals can be taken as the current baseline. Both follow Carlson (1977) in including  
kinds in the ontology. Both also agree with him that the quantificational force of bare  
plurals is external to the NP. They hold that quantification in bare plurals is sensitive to  
180 the same factors that Lewis (1975), Kamp (1981) and Heim (1982) identified for  
indefinites: schematically, [*Q*<sub>unselective</sub>] [*Restrictor*]  $\exists$ [*Nuclear Scope*]. They differ,

however, in whether bare plurals must always refer to kinds. According to the so-called ambiguity approach (Wilkinson 1991, Gerstner-Link & Krifka 1993, Kratzer 1995 and Diesing 1992), they refer to kinds when the predication is kind level but are property  
185 denoting otherwise. The neo-Carlsonian approach (Carlson 1989, Chierchia 1998 and Dayal 2004) holds that object level predication also takes kinds as arguments but accesses their instantiation sets. The difference between the ambiguity approach (10b, 11b) and the neo-Carlsonian approach (10c, 11c) is illustrated below, where superscript  $k$  indicates reference to kinds,  $R$  the realization relation between kinds and their instances,  
190 and  $s$  the world/situation index:

(10) a. Dogs bark

b. Gen  $x,s$  [dogs( $x,s$ )] [bark( $x,s$ )]

c. Gen  $x,s$  [ $R(x, \text{dogs}_s^k)$ ] [bark( $x,s$ )]

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(11) a. Dogs are barking.

b.  $\exists x,s$  [dogs( $x,s$ ) & are-barking( $x,s$ )]

c.  $\exists x$  [ $R(x, \text{dogs}_s^k)$  & are-barking( $x,s$ )]

200 The two approaches yield essentially the same truth conditions for the core cases but the neo-Carlsonian view, which formally distinguishes between bare plurals and indefinites, may have an advantage over the alternative, given that the two types of NPs do not display identical behavior.

Formal semantic analyses of individual languages contributed to and were, in  
205 turn, influenced by the possibility of cross-linguistic variation in the semantics of natural  
language (see article 107 *Language universals*). In the domain of bare NPs and  
genericity, the notion of parameterization within a set of universally available options  
emerged as the leading idea in this research agenda. We will see the results of this shift in  
perspective as we turn to theories that deal with the distribution and interpretation of bare  
210 NPs across languages.

### 3. Theories of variation: syntactic parameterization

Longobardi (1994, 2000 and 2001) analyzes the variation between Germanic and  
215 Romance languages as instantiating different settings of a parameter. He follows Stowell  
(1991) and Szabolcsi (1994) in taking reference to individuals to be tied exclusively to  
the D(eterminer) node and proposes that this can be established by means of chain  
formation via movement of a nominal expression to D:  $[_{DP} N_i \ [_{NP} t_i]]$  or by means of  
CHAIN formation via coindexing of a nominal with an expletive in D:  $[_{DP} D_{i\text{expl}} \ [_{NP} N_i]]$ .  
220 Languages differ in the level at which the link with D must be established. Romance  
languages instantiate the strong D setting of the parameter and force chain/CHAIN  
formation overtly. Germanic languages instantiate the weak D setting and do not require  
overt association. A general economy constraint that takes overt chain/CHAIN formation  
to be a last resort effectively works to make this association invisible in weak D  
225 languages.

Longobardi adduces strong support for his claim from Italian, where an adjective precedes a proper name only in the presence of a definite determiner:

(12) *L' antica Roma / Roma antica / \*antica Roma*

230 the ancient Rome Rome ancient ancient Rome

D being the locus for marking arguments and proper names being quintessentially argument-like, the paradigm is readily derived from the strong D parameter:

235 (13) a. [DP [D La<sub>i</sub> [AP antica [NP Roma<sub>i</sub>]]]]

b. [DP [D Roma<sub>i</sub> [AP antica [NP t<sub>i</sub>]]]]

c. \*[DP [D e [AP antica [NP Roma]]]]

In (13a) *Roma* forms a CHAIN with a semantically vacuous element in D. (13b) has  
240 internal movement of *Roma* from N to D. (13c) is ungrammatical because the link with D is unrealized. A covert operator in D cannot bind a name which is inherently referential. Grammaticality judgments about word order thus provide compelling evidence for the dependence between a syntactic node D and the semantics of proper nouns.

The extension of this account to common nouns is less clear-cut. Since common  
245 nouns are not inherently referential, they cannot form a chain by N to D movement. They can, however, form a CHAIN with an expletive or enter into an operator-variable relation with a covert  $\exists$  in D. This yields the following:

(14) *I grandi cani / grandi cani / \*cani grandi*

the big dogs big dogs dogs big

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- (15) a. [DP I<sub>i</sub><e> [AP grandi [NP (cani<e,t>)<sub>i</sub>]]]  
b. \*[DP [SHIFT(cani<sub>i</sub><e,t>)<e>] [AP grandi [NP t<sub>i</sub>]]]  
c. [DP ∃<<e,t>, <<e,t>t>> [AP grandi [NP cani<e,t>]]<e,t>]

255 Note though that an expletive, by hypothesis, cannot effect semantic change and a covert type shift from <e,t> to <e> has to be assumed in order for the CHAIN in (15a) to be well formed. One might ask, then, what blocks N to D movement of the kind shown in (15b), since the situation is now essentially parallel to the proper name case seen in (13b). A possible answer to this could be that CHAIN formation with an expletive in D is  
260 precisely the trigger needed to activate the requisite type shift, appealing perhaps to the principle of last resort as an underlying motivating factor (see also article 96 *Type shifting*).

The option in (15c) is consistent with Longobardi's view that Italian bare plurals are not kind terms. It also derives the restricted syntactic distribution of bare plurals by  
265 requiring the null operator to be licensed through government, as in Contreras (1986). And it provides an explanation for unexpected restrictions on generic readings. Syntactic licensing prevents the bare plural from occurring above VP (Diesing 1992), effectively ruling out generic readings. When syntactic conditions such as focus or modification allow bare plurals to occur above VP, generic readings become available (Longobardi  
270 2000). Why focus or modification has this effect is not explored. I note in passing an unclarity about the role of the operator inside bare plurals. A quantificational determiner

fits in with the idea of an operator in D but is at odds with the view of indefinites as predicates bound by external operators. This technical detail can be fixed by melding Diesing's Mapping Hypothesis with a quantificational view of indefinites, as in Chierchia  
275 (1995), for example.

Turning to languages like English, the weak D parameter delays linking of N with D. English proper names therefore cannot occur with an expletive nor can they precede adjectives. Similarly, English common nouns do not form an overt chain/CHAIN, allowing bare plurals to occur in the order adjective-noun:

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- (16) a. *\*The ancient Rome / \*Rome ancient / ancient Rome*  
b. *\*The big dogs / \*dogs big / big dogs*

- (17) a.  $[_{DP} e [_{NP} Rome_{\langle e \rangle} / Dogs_{\langle e, t \rangle}]]$   
285 b.  $[_{DP} Rome_{\langle e \rangle} / [SHIFT(Dogs_{\langle e, t \rangle})_{\langle e \rangle}] [_{NP} t_i]]$

English is postulated to have an empty D in overt syntax (17a). N to D movement takes place at LF, with covert type shift yielding kind reference for bare plurals (17b). This implies that kind formation is not dependent on the presence of an overt element in D, a  
290 dependence that we suggested could be used to rule out N to D movement of Italian bare plurals.

Longobardi's postulation of an empty D in English forces further comparisons with Italian bare plurals. He suggests that the licensing of empty Ds occurs at LF in English but at S-structure in Italian, taking structures with common nouns to have the

295 same semantics as indefinites. As mentioned above, he takes indefinites inside VP to map  
into the nuclear scope and yield existential readings while taking indefinites outside VP  
to map into the restrictor and yield generic readings. Since licensing works differently in  
the two languages and Italian bare plurals are necessarily VP-internal, they only have  
existential readings. English bare plurals, on the other hand, because they are not  
300 syntactically restricted, can be mapped into either domain, resulting in existential as well  
as generic readings.

The case of English bare plurals in subject positions with existential readings,  
however, remains problematic for Longobardi. The presence of an empty D in the subject  
position of episodic sentences is needed to ensure existential interpretation, but N to D  
305 movement has to take place in order to make it possible for bare plurals to appear in the  
ungoverned subject position. To deal with this, Longobardi proposes that existential  
interpretation is read off prior to LF movement but licensing is checked after LF  
movement in English.

Turning to singular terms, Longobardi takes the Italian definite singular to be in a  
310 CHAIN: [ $i_{\text{expl}}$  [ $\text{dodo}_{\langle e \rangle}$ ]], as in Vergnaud & Zubizarreta 1992:

(18) *Il dodo è estinto*

“The dodo is extinct.”

315 The evaluation of this proposal depends on the analysis of the bare singular as a kind  
term. It is generally thought that the type-shift used to derive plural kind terms is not  
defined for singular terms. If, however, bare singulars are taken to be inherently kind

denoting, it should be possible for them to form CHAINS with expletives. The problem is that this makes the wrong prediction for English. Just as English bare plurals correspond to Italian definite plural kind terms, English bare singulars should correspond to Italian definite singular kind terms. But we know that the two languages converge in ruling out bare singulars. The alternative is to take the singular common noun to denote predicates of taxonomic kinds, bound by *iota* (see section 5). Under this view, the definite determiner has semantic content, denoting a function from sets to entities: [ $il_{\langle\langle e, t \rangle, e \rangle}$  [dodo $_{\langle e, t \rangle}$ ]]. This delivers the correct result for both languages, but undercuts the notion of the definite determiner as an expletive.

To conclude, Longobardi's parametric approach gives a compelling account of the association of proper names with D in terms of chain/CHAIN formation and a very plausible account of the structural restrictions on Italian bare plurals. The notion of an expletive determiner in the case of common nouns, the conditions under which type-shifting operations are invoked, and the cross-linguistic variation between kind and existential readings, however, raise questions. Nevertheless, Longobardi's work which tied interpretation to fixed positions in the structure was extremely influential in propelling research in this domain.

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#### 4. Theories of variation: semantic parameterization

I now turn to another influential theory, proposed by Chierchia (1998). I first discuss its essential features, reserving modifications and criticisms prompted by further investigations for later sections.

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#### 4.1 Germanic vs. Romance

Chierchia (1998) starts at the other end of the spectrum from Longobardi, taking  
345 languages to vary on the syntactic level at which reference to individuals is located. Four  
principles and three semantic operations derive the range of paradigms considered by  
him:

(19) a. *The Nominal Mapping Parameter (NMP)*:  $N \Rightarrow [+/- \text{ pred}, +/- \text{ arg}]$

350 Languages without Mass-Count Distinction

i.  $[- \text{ pred}, + \text{ arg}]$  every lexical noun is mass. Chinese

Languages with Mass-Count Distinction

ii.  $[+ \text{ pred}, + \text{ arg}]$  bare arguments are allowed. With articles: Germanic

Without articles: Slavic

355 iii.  $[+ \text{ pred}, - \text{ arg}]$  bare arguments disallowed. With  $\delta_{\text{null-det}}$ : Italian

Without  $\delta_{\text{null-det}}$ : French

b. *Avoid Structure*: Apply SHIFT at the earliest level.

c. *Blocking Principle (BP)*:

For any type shifting operation  $\pi$  and any  $X$ : \*  $\pi(X)$  if there is a determiner  $D$

360 such that for any set  $X$  in its domain,  $D(X) = \pi(X)$ .

d. *Ranking*:  $\cap > \{t, \exists\}$

(20) a. *Nom* ( $\cap$ ):  $\lambda P_{\langle s \langle e, t \rangle \rangle} \lambda s \iota x [P_s(x)]$

b. *Pred* ( $\cup$ ):  $\lambda k_{\langle s, e \rangle} \lambda x [x \leq k_s]$

365 c. *Derived Kind Predication (DKP)*: If P applies to ordinary individuals and k denotes a kind,  $P(k) = \exists x [\cup k(x) \wedge P(x)]$

To elaborate, according to *NMP* NPs in some languages can denote type  $\langle e \rangle$ , in others not. Economy requires that a language in which an NP may denote an individual should  
370 shift covertly from type  $\langle e, t \rangle$  to  $\langle e \rangle$  without projecting a DP structure. The *BP* requires lexical determiners to be used over covert type-shifts. The availability of the three basic type shifts are regulated by ranking and *BP*. *Nom* is the kind forming operator that takes a property and returns the corresponding kind, conceptualized as a function from indices to the maximal entity that realizes the kind at that index. *Pred* takes the extension of the  
375 kind at an index, the maximal entity  $k_s$ , and returns the set of singular and plural entities that are its individual parts, yielding the instantiations of the kind at that index. Finally, *DKP* provides sort adjustment when an object level predicate combines with a kind level argument. Most importantly, *DKP* builds in local existential binding and delivers the narrow scope behavior that Carlson had shown to be integral to kind terms.

380 Chierchia treats English as a [+pred, +arg] language. Bare plurals are NPs of predicative type  $\langle e, t \rangle$ , which shift via the kind forming operator to type  $\langle e \rangle$ , consistent with the [+arg] setting of the parameter and economy of structure. The rest follows under a neo-Carlsonian approach to kinds where bare plurals uniformly denote kinds but the mapping to the quantificational structure, determined on independent grounds, is roughly  
385 as in the case of indefinites. With object level predicates, the inverse operation *pred* comes into play, yielding quantification over instances of the kind.

Chierchia also treats Italian bare plurals as kind terms. Italian being a [+pred, –  
arg] language, the bare plural projects a DP structure, with a null D encoding *nom*. The  
observed subject-object asymmetry follows from the licensing requirement on null  
390 elements, as in Longobardi. The absence of generic readings derives from the theory of  
mapping in Chierchia (1995). Details aside, the cross-linguistic difference in generic  
readings rests on the absence of D in English and the licensing requirement for null Ds in  
Italian.

Examples like (21) form the basis of the claim that Italian bare plurals denote  
395 kinds:

(21) *Insegnanti davvero dediti* nella scuola di oggi sono quasi estinti  
teachers really devoted in schools of today are nearly extinct  
“Really devoted teachings are nearly extinct in today’s schools.”

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The propensity of Italian bare plurals for narrow scope, a property that is entailed by an  
analysis in terms of kind reference is the motivation behind this claim. Nevertheless, it  
has been challenged by Longobardi as well as Zamparelli (2002), though the data in (21)  
is not easily accommodated by their view of Italian bare plurals as non kind denoting  
405 indefinites. Note, once again, the presence of modification in examples suggesting kind  
reference.

Chierchia’s analysis of Italian bare plurals has an interesting consequence for his  
analysis of Italian definite plurals. *BP* dictates that null determiners or covert operations  
not duplicate the meaning of lexical operators. This is substantiated by the fact that in

410 languages with definite determiners, bare plurals cannot be used deictically/anaphorically  
while in languages without such determiners, they can. But if the Italian bare plural is  
indeed a kind term, *BP* incorrectly predicts that the Italian definite plural cannot also be a  
kind term. Chierchia appeals to a formal difference between *nom* for the bare plural (22a)  
and an equivalent derivation involving the intensionalising of *iota* for the plural definite  
415 (22b) to handle this problem:

(22) a. extinct ( $\hat{\ } \text{dinosaurs}$ )

b. extinct ( $\lambda s \iota[\text{dinosaurs}_s]$ )

420 This does not fully account for cross-linguistic differences. If it is possible to abstract  
over the world variable in a definite in Italian, there is no reason why it should not be  
possible to do so in English, but we know that English definite plurals are not kind terms.  
Chierchia is aware of this and appeals to *Avoid Structure*, claiming that economy forces  
the simplest possible structure to be used for a given meaning. Since English allows NPs  
425 to denote kinds, that is preferred over DPs with a definite for the purpose. Note that this  
explanation rests on the premise that the two options given in (22) are in competition in  
English. In proposing that the Italian bare plural is a kind term, on the other hand,  
Chierchia argues that kind formation is not subject to *BP* precisely because they are not  
in competition. Thus there seems to be some conceptual unclarity about the relation  
430 between these two equivalent ways of deriving kind readings.

Turning to singular terms, Chierchia draws on the idea that the uniqueness  
imposed by number morphology on kind formation clashes with the notion of kinds and

rules out bare singular kind terms (Dayal 1992). Languages that are like English or Italian in having the singular-plural distinction but unlike them in not having articles, then, need  
435 to be accounted for. As noted, such languages have bare singulars in addition to bare plurals. Chierchia analyzes them as [+arg, +pred] languages like English. However, because they do not have a lexical definite determiner, *BP* does not block *iota* from functioning as a covert type shift and bare nominals are able to have deictic and anaphoric readings. Furthermore, because they do not have indefinite determiners, he  
440 suggests, indefinite readings are also allowed. Finally, bare plurals are able to denote kinds via the application of *nom* but not bare singulars. We will discuss arguments against the specifics of this account in section 5.1. Here we continue to examine *NMP*, looking at languages with a different setting of the parameter than Germanic ([+pred, +arg]) or Romance ([+pred, -arg]), namely those with [-pred] specification.

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#### 4.2 Chinese

The discussion so far has revolved around count nouns, which denote predicates that shift covertly to argument type in [+arg, +pred] languages and via a lexical or null D in [-arg, +pred] languages. We now turn to mass nouns which require us to step back and place  
450 Chierchia's cross-linguistic claims within his view of the count-mass distinction. This also allows us to separate those predictions that derive from his account of the mass-count distinction independently of *NMP* from those that rely crucially on the [+arg, -pred] setting of the parameter.

455            Contrary to the view of mass nouns as mereological sums, Chierchia takes mass  
nouns to have the same atomic structure as count nouns, noting that an individual chair or  
table would be identified as atomic parts of the denotation of mass nouns like *furniture*.  
Similarly, the denotation of mass nouns like *water* also includes atoms, even though  
those atomic entities may not be ordinarily identifiable. The real difference, he claims, is  
460 that count nouns denote a set of atomic entities, with plural entities entering the  
denotation as a result of pluralization, whereas mass nouns come out of the lexicon with  
both atomic and plural entities in their denotations (see also Krifka 1991, Landman 1996,  
Chierchia 2009 and article 48 *Mass nouns and plurals*):

465 (23) a.  $PL(F) = \lambda x [-F(x) \ \& \ \forall y [y \leq x \ \& \ AT(y) \rightarrow F(y)]]$

b. If *dog* (a count noun) = {f, b, s}, then *dogs* = {{f, b, s}, {f,b}, {f,s}, {b,s}}

c. If *furniture* = {{t, c, s}, {t, s}, {t, c}, {c, s}, t, c, s}, then *furnitures* =  $\emptyset$

(23a) defines the semantic contribution of the plural morpheme as an operation that takes  
470 a set of atomic entities and returns the set of pluralities generated by that set, minus the  
atoms. (23b) illustrates the denotation of singular and plural count terms. If Fido, Barky  
and Spotty are the dogs in the context, the singular term will be true of them while the  
plural term would be true of the groups they belong to but not of them. (23c) illustrates  
the denotation of mass nouns. If an individual table, chair and sofa are all the items of  
475 furniture in the world, the mass noun will denote them as well as the four groups they are  
part of.

Chierchia claims that the absence of pluralization on mass nouns and the inability of numerals to combine directly with them follows from this distinction. Mass nouns do not show a singular-plural contrast: *tables* vs. *\*furnitures*, because PL applied to a mass noun would denote the empty set. Since all the pluralities were already in the original set, they would all be removed. (Note that even if PL did not exclude members of the original set, one could argue that pluralization would be ruled out because it would be vacuous:  $PL(\textit{furniture}) = \textit{furniture}$ .) Furthermore, mass nouns do not lend themselves to direct counting by numerals because counting requires a salient level of individuation. In the case of count nouns, this is the level of atoms. In the case of mass nouns, no distinguished level is available since the singular-plural distinction is neutralized in the basic meaning of the noun. A measure phrase serves to individuate an appropriate level for counting: *\*three furniture(s)* vs. *three items of furniture*. Every language is expected to have some mass nouns for extra-grammatical reasons (there are substances whose atomic elements are not perceptible) and these properties will hold of them. Parameterization is not at play. Semantic parameterization is brought into the picture to account for languages in which no nouns manifest visible plural morphology or the ability to combine directly with numerals. It is worth emphasizing that Chierchia does not take languages which only have the first property to fall in the same class (see also section 6, Chierchia 2009 and article 108 *Count/mass distinctions*).

Chinese is sometimes thought to have a plural morpheme *-men* (Li 1999). Yang (1998) and Kurafuji (2004), however, show that this morpheme yields definite plural readings and is not a bona-fide plural marker. It cannot occur in *there*-insertion contexts or as a predicate nominal, for example. Thus it seems reasonable to treat it as a language

500 lacking morphological plurality. Chierchia takes such languages to be [+arg, -pred], with  
NPs that are obligatorily individual denoting. He further takes the following properties to  
be characteristic of such languages: (a) generalized bare arguments, (b) the extension of  
all nouns as mass, (c) no pluralization and (d) a generalized classifier system. Properties  
(b)-(d) cluster together, as already discussed. It is (a), the absence of determiners, where  
505 the semantic parameter plays a crucial role.

Chierchia takes mass nouns to always denote individuals, specifically kinds. But  
we know that kinds can be shifted to properties by *pred* (20b). Thus the following  
schematic possibilities are available in principle (although Chierchia's system does not  
have expletive determiners, I include the option here for completeness):

510

- (24) a. [DP D<sub>expl</sub> [NP N<sub><e></sub>]]  
b. [DP D<sub><<e,t>, e></sub> [NP PRED(N<sub><e></sub>)<sub><e,t></sub>]]  
c. [NP N<sub><e></sub>]

515 In a [+arg, -pred] language like Chinese, (24b) is not an option since NPs cannot denote  
properties, by hypothesis. And economy of structure rules out an expletive (24a). Thus  
the only viable option is (24c). The fact that classifier languages with definite determiners  
are not attested is explained in a surprisingly simple way. Now consider mass nouns in [-  
arg, +pred] languages. Here the only option is (24b), precisely the situation attested in  
520 languages like Italian. The distribution and interpretation of mass terms mirrors the  
distribution and interpretation of plural count nouns in requiring a definite determiner.  
Finally, consider [+arg, +pred] languages like English. Here (24b) is allowed and we

indeed see the definite determiner with mass nouns in anaphoric and deictic contexts. We also see (24c) with kind denoting bare mass nouns, (24a) being ruled out by economy.

525 One question that arises for such languages is why the extension of the kind (the maximal entity that is the sum of the instantiations of the kind at a given index) cannot be used to deliver the interpretive functions of *iota* without added structure, the unattested definite readings for bare nominals. By and large, however, the patterns of distribution and interpretation across languages are captured by the interaction of the *NMP* with economy  
530 of structure.

Finally, although Chierchia seems committed to the view that count nouns start out as properties while mass nouns start out as kinds, not much seems to ride on it. The same predictions about the form of mass nouns would obtain in his system if they were to denote properties:

535

(25) a. [DP D<sub>expletive</sub> [NP Nom(N<sub><e,t></sub>)<sub><e></sub>]]

b. [DP D<sub><<e,t>, e></sub> [NP N<sub><e,t></sub>]]

c. [NP Nom(N<sub><e,t></sub>)<sub><e></sub>]

540 In [+arg, -pred] languages like Chinese, NPs would be forced to denote individuals, shifting from properties to individuals covertly via *nom* (or *iota*), as in (25a) or (25c), with economy ruling out (25a). This would yield determiner-less languages. The obligatory presence of the determiner in [-arg, +pred] languages with mass nouns would follow exactly as in the case of count nouns. (25a) and (25c) would be ruled out by the [-  
545 arg] setting. And the selective occurrence of the determiner in [+arg, +pred] languages

would follow the explanation for the same pattern in count nouns. Reference to kinds would be derived most economically in (25c), while (25b) would be needed to host the anaphoric/deictic definite determiner.

550 Although the choice between properties and kinds is not crucial for predicting distribution and interpretation, it does have different implications for Chierchia's overall picture of variation. If mass nouns are basically kind denoting and the language prevents NPs from shifting to properties, determiners would have to be functions from expressions of type  $\langle e \rangle$ . They would have to include the shift to properties via *pred*:  $\lambda x^k \iota[\text{PRED}(x)]$ .  
555 Though Chierchia does not propose this, it is in keeping with his view of numerals and classifiers, which builds on the idea that Chinese nouns are kind terms (Krifka 1995). (Another possibility for deriving deictic and anaphoric readings of bare nominals is to take the extension of the kind at the relevant index. This would be the simplest and most economical solution but not one that Chierchia entertains.) This move is obviously not required if mass nouns are properties that *iota* can apply to directly. Determiners can  
560 continue to be functions from properties, albeit with the intervention of measure phrases/classifiers for purposes of individuation, as required. A question worth speculating on is whether languages that distinguish count and mass but do not have determiners could be [+arg, -pred] languages. This would align Russian and Hindi with Chinese rather than English but without a deeper investigation, no claims can be  
565 hazarded.

I have tried to separate three aspects Chierchia's theory, the claim that mass nouns have an atomic structure like count nouns but are lexically plural, the claim that mass nouns are necessarily kinds, and the claim that parameter setting predicts the presence or

absence of determiners. These distinctions will be useful to keep in mind when we  
570 discuss languages that have been claimed as problematic for *NMP* in section 6. In section  
5, however, we will consider some modifications to the theory that are not specifically  
related to this parameter. To sum up, Chierchia's is the first substantive proposal  
addressing issues of syntax as well as semantics, and the most articulated theory of  
variation in the mapping from nominal structure to interpretation. For this reason it has  
575 had a tremendous impact on research in this area.

## 5. Theories of variation: number, definiteness and lexicalization

In this section I summarize my own work, which highlights the role of number in kind  
580 formation and explicates the relation between definite determiners and kind formation.

### 5.1 Modifications of the neo-Carlsonian approach

A key observation about languages with number marking but no determiners is  
585 that bare plurals in such languages behave more or less like English bare plurals, but bare  
singulars are substantively different. This observation for Hindi prompted Dayal (1992)  
to propose that the semantics of singular morphology clashes with the conceptual notion  
of a kind (see also Chierchia 1998), ruling out *nom* as a potential type shift for bare  
singulars. The implications of this position were further explored in Dayal (2004).

590 Bare singulars and bare plurals in Hindi and Russian allow for kind as well as  
anaphoric/deictic readings. Their existential reading, however, is distinct from that of

regular indefinites in two respects. They cannot take wide scope over negation or other operators. They also cannot refer non-maximally. So, bare NPs cannot be used in translating (26b) or (26c) to refer to a subset of the children mentioned in (26a):

595

- (26) a. There were several children in the park.  
b. A child was sitting on the bench and another was standing near him.  
c. Some children were sitting on the bench, and others were standing nearby.

600 Even though there are no definite or indefinite determiners in these languages, only readings associated with definites are available to bare NPs. This shows that the availability of covert type shifts is constrained, as proposed by Chierchia (1998), but that the correct ranking is  $\{\text{NOM}, \iota\} > \exists$  not  $\text{NOM} > \{\iota, \exists\}$ .

The second set of issues raised by these languages bears on the connection  
605 between singular number and kind reference. Though bare singulars are kind terms, they are not a trivial variant of bare plurals. The awkwardness of the Hindi example (9) (cf. *child is playing everywhere*) is interesting because the only locus of difference between it and its acceptable plural counterpart is in the number specification in the bare NP. Neither of the approaches discussed in section 2 uses number in a way that can explain  
610 this difference. The neo-Carlsonian approach yields a representation like (27a), which is incorrect for the singular term. The ambiguity approach yields representations like (27b)-  
(27c), depending on where existential closure applies. (27b) is incorrect for the singular case, (27c) for the plural:

- 615 (27) a.  $\forall x [\text{place}(x) \rightarrow \exists y [\text{kid/kids}(y) \wedge \text{play-in-}x(y)]]$   
 b.  $\forall x [\text{place}(x) \rightarrow \exists y [\text{kid/kids}(y) \wedge \text{play-in-}x(y)]]$   
 c.  $\exists y [\text{kid/kids}(y) \wedge \forall x [\text{place}(x) \rightarrow \text{play-in-}x(y)]]$

Dayal resolves this impasse by differentiating between singular and plural kind terms in  
 620 the way they relate to their instantiations. An analogy can be drawn with ordinary sum  
 individuals *the players* whose atomic parts are available for predication, and collective  
 nouns or groups like *the team* which are closed in this respect: *The players live in*  
*different cities* vs. *\*the team lives in different cities* (Barker 1992, Schwarzschild 1996).  
*Nom* applies only to plural nouns and yields a kind term that allows semantic access to its  
 625 instantiations, analogously to sums. A singular kind term restricts such access and is  
 analogous to collective nouns.

Similarly telling contrasts between singular and plural kind terms are also evident  
 in English:

- 630 (28) a. *Airports* are busy places / *The airport* is a busy place.  
 b. Due to the weather, *airports* are closed today/ *the airport* is closed today.

While both the singular and plural in (28a) work equally well as generic statements, only  
 the plural in (28b) can be about airports in general. The singular refers to the salient  
 635 airport in the context. Since English kind terms differ in definiteness and number,  
 evidence from languages that do not have determiners underscores the importance of  
 number in differentiating plural and singular kind formation.

Taking *nom* to be undefined for singular terms, then, begs the question of how to characterize singular kind formation. Dayal argues that in these cases, the common noun  
640 has a taxonomic reading and denotes a set of taxonomic kinds, here indicated by superscripted *tk*. It can then combine with any determiner and yield the relevant reading:

- (29) a. *Every dinosaur<sup>tk</sup>* is extinct.  
b. *The dinosaurs<sup>tk</sup>* are extinct.  
645 c. *The dinosaur<sup>tk</sup>* is extinct.

The presupposition that *every* range over a plural domain or that *the* denote a maximal plural individual can be satisfied in (29a) and (29b) if the quantificational domain is the set of sub-kinds of dinosaurs. The uniqueness requirement of *the* with a singular noun in  
650 (29c) can be satisfied if the quantificational domain is the set of sub-kinds of mammals. In other words, singular kind formation is argued to require an adjustment in our view of common noun denotations, not of type-shift operations. Depending on whether the language does or does not have definite determiners, *iota* will be either overt or covert, and singular kind formation will result in definite or bare singular kind terms.

655 Although the evidence that bare NPs are not true indefinites in languages like Hindi (and Russian) is strong, there remains a residue of cases for which the most natural translation into English uses an indefinite:

- (30) lagtaa hai kamre meN *cuhaa* hai  
660 seems room in mouse is

“There seems to be a mouse in the room.”

The explanation rests on the view that covert and overt type shifts agree on semantic operations but not on presuppositions. English *the* encodes the same operation that Hindi bare NPs use to shift to type  $\langle e \rangle$  covertly, namely *iota*. Thus both versions entail maximality/uniqueness. In addition, *the* has a familiarity requirement that Hindi bare NPs do not. This non-familiar maximal reading can be confused with a bona fide existential reading of the Hindi bare singular but is distinct (see also article 39 *Dynamic semantics*, article 42 *Definiteness and indefiniteness* and article 42 *Specificity*).

The claim about the unavailability of the  $\exists$  type shift also applies to languages without determiners or number is consistent with the account of Chinese in Yang (2001), for example. The claims with regard to singular kind formation obviously do not extend to such languages. All nouns are expected to undergo plural kind formation via *nom*.

## 5.2 Cross-linguistic patterns

Dayal (2004) also deals with cross-linguistic generalizations about the correlation between kind terms and their syntactic form. A prediction made by her account of singular kinds, for example, is that deictic/anaphoric nouns and singular kind terms will agree in lexicalization. In a given language they will either both be bare or both definite, depending on whether *iota* is lexicalized or not. This prediction seems to be borne out across a wide range of languages.

Another cross-linguistic pattern addressed is the absence of dedicated kind determiners in natural language. Plural kind terms are either bare (English, Hindi, Chinese), or definite (Italian, Spanish). The rather simple explanation for this robust generalization is that *nom* is the intensional counterpart of *iota* (cf. 22) and languages do not lexically mark extensional/intensional distinctions. This way of looking at *nom*, however, opens up an interesting alternative way of looking at the Romance definite plural kind term.

Recall that Longobardi treated the definite determiner in Italian kind terms as expletives and Chierchia argued that their semantics was similar, but not identical, to *nom*. Dayal claims that the Romance definite determiner, in fact, lexically encodes *nom* (see also Zamparelli 2002). One advantage of this approach is that it does not predict complete identity of meaning between bare plural kind terms and definite plural kind terms, given that only lexical items are taken to be triggers for presuppositions. In the Italian (31), the kind term does not have the existential reading that the corresponding English bare plural would have:

(31) *I cani stanno abbaiano*

the dogs are barking

“(Some) dogs are barking” - *unavailable*

This is because the definite retains a weak presupposition of existence, which prevents it from occurring in contexts where existence is asserted. Bare plurals (if syntactically

705 licensed) or bare partitives must be used in such cases (see Dobrovie-Sorin and Laca  
1996, Chierchia 1997, Dobrovie-Sorin 2004, and Robinson 2005).

We have discussed definites at length in an article on bare NPs because variation  
in kind terms across languages ranges between bare NPs and definites. Even within this  
range of possibilities there are unexpected restrictions that call for an explanation. If a  
710 given language uses bare nominals for deictic/anaphoric readings, then it also uses them  
as plural kind terms. If a language uses definites as plural kind terms it also uses them  
for deictic/anaphoric readings. Had the correlation between form and meaning been  
arbitrary, we would expect there to be languages where bare plurals could refer  
deictically/anaphorically (as in Hindi or Chinese) and definite plurals could refer to kinds  
715 (as in Italian or Spanish) but such languages are not attested.

Dayal takes these patterns to follow from a universal principle of lexicalization in  
which *iota* (which is canonically used for deictic and anaphoric reference) and NOM  
(which is canonically used for generic reference) are mapped along a scale of diminishing  
identifiability: *iota* > *nom*. Languages lexicalize at distinct points on this scale,  
720 proceeding from *iota* to *nom*. Languages without determiners use the extreme left as the  
cut-off for lexicalization, with both *iota* and *nom* functioning as covert type-shifts. The  
cut-off point for mixed languages is in the middle, with *iota* lexicalized and *nom* a covert  
type-shift. Obligatory determiner languages have their cut-off at the extreme right,  
encoding both *iota* and *nom* lexically. For a language to have a lexical determiner for  
725 plural kind formation, its cut-off point would have to be at the extreme right. This would  
mean that *iota* could not be covert. That is, the unattested language type would be one  
where lexicalization would not conform to the proposed direction of lexicalization.

Dayal notes that although definite descriptions are readily used for identity oriented modes of reference, they also have attributive uses, in the sense of Donnellan (1966) (see article 4 *Reference*). This leads to the kind of overlap observed in (3): *There was a ghost on campus. (The) students were afraid.* The presupposition of *iota* can be satisfied because the existence of students on a campus is readily accommodated. And *nom* allows for existential quantification over instances of students in the situation without identifying any particular group of students. The semantic requirements of the two overlap, leading to a situation where either the bare plural or the definite can be used. Summing up, *nom* cannot be used referentially and *iota* cannot be used to assert existence but this allows for an overlap in the use of definites and bare plurals in mixed languages.

Dayal (2004), then, stresses the importance of number morphology in kind formation, establishes that bare NPs in languages without determiners are not true indefinites, and accounts for cross-linguistic variation between bare and definite NPs without appealing to the notion of expletive determiners. The problem of non-kind denoting bare NPs in Romance, and the tendency of classifier languages to be determiner-less are not addressed. As such, the issue of whether languages are subject to Chierchia's semantic parameterization is left unexplored.

745

## 6. Challenges for theories of variation

Having presented the essential aspects of current theories of variation, I now turn to some questions that remain open, using data from Brazilian Portuguese as illustrative.

750

## 6.1 Brazilian Portuguese

Chierchia's *NMP* was enormously successful in provoking interest in the meaning  
755 and form of NPs. It prompted, almost immediately, papers on Brazilian Portuguese by  
Munn & Schmitt (1999, 2005), followed by Müller (2001, 2002) and more recently  
Dobrovie-Sorin & Pires de Oliveira (2008). Like other Romance languages, Brazilian  
Portuguese has definite singular and plural kind terms. It differs from them in admitting  
bare singulars as well as bare plurals, both of which are acceptable in generic contexts.  
760 Both allow for existential readings in episodic contexts, and take narrow scope with  
respect to other operators.

Bare singulars, however, have some unexpected properties. Though  
morphologically singular, they are number neutral in interpretation:

765 (32) *Chegou crianca*

arrived child

“A child/children arrived.”

There is also some disagreement about their status as kind terms. Müller argues that they  
770 are not, since they cannot serve as arguments of kind-level predicates like *invent*. Munn  
& Schmitt and Dobrovie-Sorin & Pires de Oliveira, on the other hand, take them to be  
kind denoting. Finally, unlike other Romance languages, Brazilian Portuguese does allow  
bare plural subjects. However, bare singulars are not always acceptable subjects of

episodic statements. (32) has a singular in post-verbal position, but its pre-verbal subject  
775 counterpart is only good in the plural.

Munn & Schmitt claim that Brazilian Portuguese shows *NMP* to be either  
incorrect or irrelevant. The possibility of bare NPs as subjects shows, they argue, that  
there cannot be a null determiner in need of licensing, ruling out a [-arg, +pred] setting.  
The presence of definite plural kind terms, according to them, shows a [+arg, +pred]  
780 setting to be ruled out. The presence of determiners and the absence of a generalized  
classifier system makes a [+arg, -pred] setting unavailable. Similar criticisms against the  
parameter have been leveled on the basis of data from Creole languages (see the articles  
in Baptista & Guéron 2007). I will not try here to determine the extent to which Brazilian  
Portuguese is or is not a problem for Chierchia's approach (but see section 5, Chierchia  
785 2009 and article 108 *Count/mass distinctions*). Instead, I will use the data to comment on  
three phenomena that are of general relevance to theories of variation and, I believe,  
worth keeping in mind while investigating bare nominals in specific languages:  
optionality, number neutrality, scope.

## 790 6.2 Optionality

Brazilian Portuguese calls into question the empirical basis of the *Blocking Principle* but  
before one can account for the facts, some care is needed in establishing the nature of the  
optionality at issue. Independent diagnostics are needed for *nom*, *iota* and  $\exists$ , the three  
795 operations relevant to cross-linguistic investigations into the semantics of bare NPs. For  
*nom*, we can take as definitive the ability to serve as arguments of true kind predicates

like *be extinct*, *be endangered* or *evolve*, or any predicate that can apply to a species but not to its individual instantiations. This test, dating back to Carlson (1977), has held up to scrutiny.

800 For *iota* we can use the test from Löbner (1985), which distinguishes a true definite from its close-kin demonstrative determiner, which all languages seem to have. The hallmark of a true definite determiner is the maximality/uniqueness this test turns on:

(33) a. #*The dogs* are sleeping and *the dogs* are not.

805 b. *Those dogs* are sleeping and *those dogs* are not.

The  $\exists$  operator is identifiable by its scopal properties, discussed earlier. In addition, it must have the ability to function generically (Chierchia 1998). Substituting *a/an* with *some* in (34) results in the loss of this reading. These two tests together  
810 establish that only the former encodes  $\exists$ :

(34) *A dog* barks if it is hungry.

This diagnostic establishes that the numeral *one* in languages without determiners does  
815 not lexicalize  $\exists$ . In Hindi, for example, it does not have generic indefinite readings, at least in the basic cases, nor a neutral narrow scope reading (Dayal 2004):

(35) *jaun-ne ek kitaab nahii khariidii*

John-ERG one book not bought

820 “John didn’t buy a particular book/even one book.”  
“John didn’t buy any book.” *unavailable*

Turning back to Brazilian Portuguese we must first ask what the bare NPs are optional variants of. It turns out that they can never be used deictically or anaphorically, so they clearly do not encode *iota*. Since they do not allow for wide scope readings, they do not encode  $\exists$ . Optionality, clearly, is limited to generic/kind readings, suggesting that the overlap may be on *nom*.

Optionality between generic bare plurals and definite plurals was noted previously by Krifka et al. (1995) for dialects of German. Dayal (2004) pointed out that optionality does not hold across the board in those dialects. Bare NPs cannot be used to refer deictically or anaphorically. The suggestion is that such optionality calls for a distinction between canonical and non-canonical meanings. *Iota*, as the canonical meaning of the definite determiner, in any language, delivers the effect of the *Blocking Principle* via the lexicalization principle. This leaves open the possibility of covert type shifts for non-canonical meanings of the definite determiner. Under this perspective, German has the same cut-off point as English, lexicalizing *iota* and effectively blocking it as a covert type shift but it differs from English in partially lexicalizing *nom*, allowing for optionality. It also differs from Romance where the lexicalization of *nom* is firmly entrenched, effectively blocking both *iota* and *nom* as covert type shifts.

840 This approach still rules out a number of logically possible language types. Languages in which a lexical determiner would be needed for plural kind terms but not for deictic/anaphoric readings of plurals are ruled out. A definite determiner in any

language is expected to encode the basic semantic operation *iota* as its canonical meaning.

845           While optionality certainly poses a challenge for theories of variation, it does not appear to pose an insurmountable problem for them. The general point here is that independent diagnostics must be used to determine the operations involved in a given case before the implications for particular theories can be fully evaluated.

### 850   6.3 Number neutrality

Brazilian Portuguese bare singulars appear to be morphologically singular but semantically plural. This has been considered a problem for Chierchia's theory, on the view that it exemplifies a language without number marking but no classifiers. Whether  
855 this is so, however, depends on what underlies the mismatch between morphology and interpretation.

One obvious solution is to treat the bare singular as having a null plural morpheme. Or one might take the bare NP to denote a set of atoms, with a null determiner bringing in plurality. These ways of conceptualizing the mismatch between  
860 form and meaning are in keeping with various analyses that have been proposed (see Chierchia 2009). The challenge is in accounting for differences between bare singulars and plurals in a principled way. Munn & Schmitt note that bare singulars are ruled out from the preverbal subject position of episodic statements, but not bare plurals, surprising if they are simply a variant of bare plurals.

865 Another option considered by Munn & Schmitt is to treat bare singulars as mass nouns. They reject this, pointing to the contrast in (36). (36b) can be translated using a bare singular, showing that the bare singular could not be a mass noun:

(36) a. \* Gold weighs two grams.

870 b. Children weigh 20 kilos at this age.

Yet another possibility is to treat the plurality of bare singulars in terms of pseudo-incorporation (Farkas & de Swart 2003, Dayal *forthcoming*). In Hindi, for example, Dayal argues that the number neutral interpretation of bare singulars is  
875 restricted to non case-marked direct objects and is dependent on aspectual specification on the verb. In other words, the noun itself denotes in the atomic domain but properties of the incorporation context produce the effect of plurality. This has been explored for Brazilian Portuguese (see Traveira da Cruz 2008). If it turns out that their plurality is an epiphenomenon, Brazilian Portuguese bare singulars would have very different  
880 implications for theories of variation than they have so far been thought to have.

#### 6.4 Scope

Scope was used crucially by Carlson to distinguish between bare plurals and indefinites. Chierchia's *Derived Kind Predication* rule in (20c) captures Carlson's insight  
885 that a kind term can be a direct argument of the verb because, like any name, it is of type *e*. The existential quantification over its instances is due to a sort-adjustment operation whose effect is necessarily local. A true quantifier involving the type shift  $\exists$  can, and in

some cases must, take wide scope.

*DKP*, in combination with the notion of ranked type-shifts, accounts for another  
890 observation of Carlson, namely that non kind denoting bare plurals have the scopal  
properties of indefinites (see also Van Geenhoven 1999 and Zucchi & White 2001):

(37) a. \*Parts of this machine are widespread.

b. John didn't see parts of this machine.

895

Since *nom* is undefined in this case and *iota* lexically blocked, the bare NP shifts by  $\exists$   
and takes wide or narrow scope. Dayal's (2004) adjustment of the ranking accounts for  
an interesting cross-linguistic difference. Even non kind denoting bare NPs in Hindi lack  
scopal flexibility. This is because there is no definite determiner in Hindi and *iota* is  
900 always available as a type shift. The lower ranked  $\exists$  type shift never comes into play.

Brazilian Portuguese bare NPs, singular and plural, obligatorily take narrow  
scope, not surprising if they are in fact kind terms. If they are not, and if they are not  
incorporated, however, their inability to take wide scope calls for an explanation.  
Independently of Brazilian Portuguese, however, the problem holds for Italian bare  
905 plurals that also have this propensity for narrow scope though they are not kind terms.

The issue of obligatory narrow scope for non kind denoting, non incorporated  
NPs is an important one and needs to be settled before we can say that the semantics of  
bare NPs has been truly understood. The only conclusion that we can draw at this point is  
that the diagnostic of narrowest scope identifies not only kind denoting and incorporated  
910 NPs, but also concept denoting NPs, in the sense of Krifka (1995). This, however, begs  
the question of the relation between concepts and kinds, something that remains to be

clearly articulated in the literature on generics.

In this section I used Brazilian Portuguese to illustrate questions that I believe remain open for theories of variation. I restricted myself to a single language, assuming  
915 that a focused discussion of issues in one language will be relevant to other languages with similar properties (cf. 13 *Methods in cross-linguistic semantics* and 107 *Language universals*).

## 7. Conclusion

920

Cross-linguistic work in the semantics of bare NPs is a dynamic area of research that has produced many substantive results. It has allowed researchers to separate out the contributions of different aspects of the morpho-syntax of the noun phrase to its semantics, and expanded our understanding of bare NPs beyond English bare plurals, the  
925 initial starting point of research in the area. More generally, it has provided new insights into the way semantics interfaces with syntax. As knowledge of different languages and language types continues to grow, theories are faced with new challenges. A theory measures up to these challenges if it can be modified and adjusted to account for new and unexpected facts without losing predictive power. The requirement of empirical adequacy  
930 thus continues to push theoretical investigations, forcing us to ask deeper questions of languages we are familiar with, as of languages we encounter for the first time.

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- 1065 Keywords: genericity, type-shifting, definiteness

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