Bare Nominals and Number in Brazilian and European Portuguese*

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Abstract

This paper investigates the semantics of bare nominals (BNs) in Brazilian and in European Portuguese. More specifically, it addresses the constraints regarding their occurrence and interpretation in these languages, and evaluates their implications for the Nominal Mapping Parameter as proposed in Chierchia 1998. Chierchia's typology provides the theoretical background against which we investigate the matter. The paper claims – contra Chierchia – that count BNs may be argumental without denoting kinds. We also claim that the denotation of common nouns and Noun Phrases may vary from one language to the other and that this variation can explain typological differences across languages.

1. Introduction

The goal of this paper is to investigate the semantics of bare nominals (BNs) in Brazilian Portuguese (BP) and in European Portuguese (EP). More specifically, we will address the constraints regarding their occurrence and interpretation in these languages, and evaluate their implications for the Nominal Mapping Parameter (NMP) as proposed in Chierchia 1998.

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Romance and Germanic languages allow for bare plurals in argumental positions with both a generic and an existential interpretation, although their occurrence in Romance is more restricted (see Chierchia 1998 and Longobardi 2001). EP behaves mostly like other Romance languages in this regard. BP, on the other hand, besides allowing for bare plurals, also allows for count bare singulars in argumental positions.

This surprising difference between the two varieties of Portuguese under consideration poses the question of how different they are nowadays. Chierchia's typology provides an instigating theoretical background against which we will investigate this matter.

We will lay out two claims, namely that both Chierchia's ontology and Chierchia's typology of languages need to be recast. More specifically, we claim, first, that an ontology for natural language denotations needs to posit the existence of pre-sorted 'stuff' in the universe of discourse. Our second claim is that it is not the fact that languages are [+/-argumental, +/-predicative] that is relevant for their syntax and morphology, but the kind of denotations common nouns and bare nominals have in the language.

This article is organised as follows. In section 2 we present Chierchia's proposal. Section 3 presents the predictions of the Nominal Mapping Parameter for Romance languages. The distribution of bare nominals in EP and BP is discussed in section 4. Section 5 discusses the semantic number of bare nominals in BP and EP. Section 6 revisits Chierchia's proposal in view of the behaviour of BNs in EP and BP. The article ends with a concluding section.

2. Chierchia's Proposal

Chierchia (1998) presents a view of how the categories Noun (N) and Noun Phrase (NP) are mapped into their denotations across languages.[1] The author claims that the denotations of Ns and NPs may vary from one language to the other. In some languages, Ns and NPs will be argumental and denote entities – kinds in the case of common nouns. In other languages, Ns and NPs will be predicates, and denote properties. His proposal opposes the traditional view that Ns and NPs are always predicates, modelled as sets of atoms in predicate logic. According to this view, only full DPs can be arguments (see Stowell, 1989, and Longobardi, 1994).

The author argues for the existence of a semantic parameter – *The Nominal Mapping Parameter* (NMP). The NMP allows for bare maximal projections to be either predicative [+pred] (i.e., of type <e,t>) or argumental

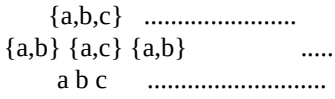
[1] We are assuming the following minimal syntactic structure for argumental nominals: [DP [NP [N]]], thereby adopting Abney's (1987) hypothesis. DP is taken to be the maximal projection of the determiner, whereas NP is the maximal projection of N without any functional items.

[+arg] (i.e., of type e). He claims that the setting of this parameter has consequences for both the morphology and the syntax of a language.

The way Chierchia models the possible denotations for nominals is presented in section 2.1. In section 2.2 the NMP is discussed.

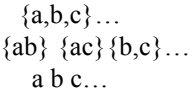
2.1. Chierchia's ontology

Chierchia posits an ontology for the domain of discourse, which can be visualised as a lattice structure (1). The domain of discourse, then, contains both singular and plural individuals. In (1), a, b, c … stand for singular individuals (atoms), such as *John* or *that table*. Sets of more than one atom as {a,b}, {a.c}, {b,c}, {a,b,c} … stand for plural individuals, such as *John and Mary* or *those tables*.

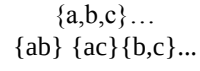
(1)


Chierchia departs from the more traditional theories that posit a fundamental distinction between mass and count denotations. In these theories, mass nouns refer to undifferentiated matter, to 'stuff', whereas count nouns refer to individuated entities.[2] Chierchia, on the other hand, sees no fundamental difference between count noun and mass noun denotations. According to him, both mass and count nouns denote entities of the same kind, the only difference being on how precise the delimitation of their atoms is.

In Chierchia's model, predicative common nouns ([+pred]) can be either count or mass. Their denotations are functions from worlds to sets of individuals that belong to structures like (1). When mass, their extensions are, for any world w, a whole lattice as in (2). Predicative mass nouns then are the neutralisation of the singular/plural distinction. Singular count nouns, on the other hand, have only atoms in their extensions at any world w, as in (3), and plural count nouns have pluralities as their extensions at any world w, as in (4).

(2) $[[\text{predicative mass nouns}]]_w$ =


(3) $[[\text{singular count nouns}]]_w$ = a b c….

(4) $[[\text{plural count nouns}]]_w$ =


[2] See Link (1983) for the more traditional view on mass nouns. Link claims that stuff constitutes, but is not identical to, plural or singular individuals.

This way, Chierchia's proposal is able to derive the standard properties of mass nouns. The impossibility of pluralisation follows from the fact that their denotations are already plural. And the impossibility of directly counting a mass noun follows from the fact that a suitable counting criterion is not provided since their denotations consist of both atoms and pluralities.

Kinds, in Chierchia's ontology, are conceived as spatiotemporally discontinuous individuals. They are modelled as the sum of all instances of the kind in every world. Kinds and properties are related so that any natural kind will have a corresponding property – the property of belonging to that kind. Conversely, to any natural property there corresponds a kind. Two operators capture this correspondence in Chierchia's theory. One manufactures properties out of kinds, and the other manufactures kinds out of properties.

Kinds make no distinction between mass and plural individuals, since they are manufactured out of the largest (sum) entity (at any given world). Conversely, properties that are built out of kinds will make no difference between singular and plural individuals, as they will be mass. According to Chierchia, kinds are undefined for properties that are realised by no more than one atom in every world.

In the next section, Chierchia's proposal of the NMP will be broadly introduced.

2.2. The Nominal Mapping Parameter

Chierchia (1998) claims that semantic parameters may exist. In his paper he proposes that there is a *Nominal Mapping Parameter* – the NMP – which determines how the categories N and NP are mapped into their denotations. A typology of possible natural languages emerges from the NMP, which is a combination of the features [+/- arg], and [+/- pred] for common nouns and NPs (5). We will present Chierchia's typology in very broad lines, and get down to the details, as we proceed whenever relevant to the discussion of BNs in Portuguese.

(5) Type 1 languages: [+arg,-pred]
Type 2 languages: [-arg,+pred]
Type 3 languages: [+arg, +pred]

In Type 1 languages, Ns and NPs must refer to kinds. Chinese is an example of this type of language. Type 1 languages have the following properties:

(i) Ns and NPs occur freely as arguments.
(ii) There is no mass/count distinction within nouns and NPs, and therefore no number morphology.

As far as bare nouns are concerned, the prediction is that they will occur freely in the language. Since NPs denote kinds in Type 1 languages, they must be shifted to properties when used as predicates such as in Determiner or Quantifier Phrases. When shifted to properties they will have denotations that encompass both singular and plural individuals, being mass in Chierchia's sense. One must, of course, think of a mass term as a term whose denotation is neutral in respect to singular or plural: "... saying that all members of category NP are mass-like does not mean saying that something resembling the mass/count distinction cannot be found ..." (Chierchia, 1998:355). Chierchia predicts that these languages must make use of classifiers in order to be able to individualise or quantify the denotations of their nominals.

Type 2 languages are languages in which Ns and NPs must refer to properties. French is the prototypical example of this type. [-arg, +pred] languages carry the following properties:

(i) Only DPs may be arguments.
(ii) Mass/count distinction is expected, and therefore number morphology for count nouns is also expected.

The prediction here is that bare nouns should not be possible, unless some kind of type-shifting device is available in the language in order to turn properties into kinds. If so, bare nominals will be bare plurals because kinds, according to Chierchia, are only defined for properties that have plural realisations.

In Type 3 languages, Ns and NPs may either refer to properties or to kinds. English is such a language. [+arg, +pred] languages behave as follows:

(i) Both DPs and NPs may be arguments, depending on whether they are [+pred] or [+arg].
(ii) Mass/count distinction is expected. Mass nouns will be [+arg] and count nouns will be [+pred]. Number morphology is expected for count nouns.

In Type 3 languages, bare singulars are possible for mass nouns since they are [+arg], but not for count nouns. Bare plurals will be possible for Type 3 languages because type-shifting from [+pred] to [+arg] is freely available.

Next section deals with the workings of the NMP in Romance languages.

3. Romance Languages and the NMP

Chierchia posits that Romance languages are [-arg, +pred], that is, languages where Ns and NPs are always predicates. As a consequence, they should display mass/count distinction and disallow bare arguments. Their count nominals are expected to display singular/plural morphology. French is

his canonical example. It displays mass/count distinction, and its count nouns have singular/plural morphology (6), whereas mass nouns do not (7). Also, mass nominals require classifiers or measure phrases in order to be counted (compare (8) to (9)). As expected, French does not allow for bare nominals in argument positions as illustrated in (10) and (11).

(6) a. L' enfant est venu chez nous.
the child is come at us
'The child came to visit us.'

b. Les enfants sont venus chez nous.
the children are come at us
'The children came to visit us.'

(7) a. L' or est cher.
the gold is expensive
'Gold is expensive.'

b. *Les ors sont chers.
the golds are expensive
'Golds are expensive.'

(8) a. *J'ai acheté or.
I have bought gold
'I bought gold.'

b. J'ai acheté deux barres d' or.
I have bought two bars of gold
'I bought two bars of gold.'

(9) a. J'ai acheté des oranges.
I have bought some oranges
'I bought oranges.'

b. J'ai acheté deux kilos d'oranges.
I have bought two kilos of oranges
'I bought two kilos of oranges.'

(10) *Enfant est venu/ Enfants sont venus chez nous.
child is come/ children are come at us
'Child came/ children came to visit us.'

(11) *J'ai mangé biscuit/ biscuits avec mon lait.
I have eaten cookie/ cookies with my milk
'I had cookies with my milk.'

Nonetheless, Chierchia is aware that, although bare arguments are generally disallowed in Romance, languages like Italian accept them in some restricted environments, such as the object position ((12) and (13)).

(12) Leo corteggia sempre belle ragazze.
Leo courts always nice girls
'Leo always courts nice girls.'

(13) Leo questa estate ha corteggiato belle ragazze.
Leo last summer has courted nice girls
'Leo courted nice girls last Summer.'

In order to maintain that all Romance languages are [-arg, +pred], Chierchia claims that bare arguments in Italian, when possible, are DPs with a null D. As other empty categories, they are submitted to licensing conditions. The null D is semantically a type-shifter, it shifts a predicate (<e,t>) into an argument (e). Its content is limited by the *Blocking Principle* which states that type-shifting is a last resort operation. It should apply only if there are no lexical equivalent operators in the language.

This accounts for (12) and (13). The object position is lexically governed, and thus allows for the empty D. The *Blocking Principle* predicts that the only type-shifting operations available will be from predicates to kinds and from predicates to plural existential DPs since the language already has a definite article and a singular indefinite article. The interpretation of the empty D as a predicate-to-kind shifter is the unmarked choice because it minimally affects the meaning of the NP (it turns a predicate into its corresponding kind). So it applies in (12) where *belle ragazze* gets a universal reading ('every beautiful girl'). If this choice is unavailable because the sentence has only an episodic reading, the language may resort to a plural existential empty D, as in (13), where *belle ragazze* gets an existential reading ('some beautiful girls').

How does the NMP fare regarding EP and BP? As Romance languages, they should be [-arg, +pred] languages. EP and BP have number morphology suggesting that they are indeed [+pred] languages. EP, similarly to Italian, does not allow for bare singulars and only allows for bare plurals to occur in restricted positions. Surprisingly, BP allows for both bare singulars and bare plurals to occur almost freely as arguments.

In the next sections we will take a closer look at the occurrence of BNs in EP and BP.

4. Bare Nominals in European and in Brazilian Portuguese

As mentioned above, EP and BP differ as far as the distribution and interpretation of bare nominals is concerned. EP, as expected for Romance languages, does not allow for bare singulars and only allows for bare plurals in licensed positions. BP, on the other hand, allows, almost irrestrictively, for both bare singulars and bare plurals. In the next sections, we discuss the distribution and interpretation of bare nominals in the two varieties of Portuguese.

4.1. Bare Plurals in EP

EP has count/mass distinction (compare (14) to (15)) and plural morphology for count nouns (15). EP does not allow for bare singulars.[3] In EP, bare plurals do not occur freely as arguments (see sentences (16-19)). They are ungrammatical in subject position of episodic (16), habitual (17), individual level (18) and kind level predicates (19).

(14) A Maria comprou *um ouro/*dois ouros.[4]
the Maria bought one gold / two golds
'Maria bought a gold/ two golds.'

(15) A Maria comprou um carro/dois carros.
the Maria bought one car/ two cars
'Maria bought one car/ two cars.'

(16) ?/*Amigos partiram ontem.
friends left yesterday
'Friends left yesterday.'

(17) ?/*Professores trabalham muito.
teachers work much
'Teachers work a lot.'

(18) *Elefantes são inteligentes.
elephants are inteligent
'Elephants are intelligent.'

(19) *Elefantes estão extintos.
elephants are extinct
'Elephants are extinct.'

[3] There are some rare exceptions to this claim, which fall outside the scope of this paper.

[4] It is possible in some contexts to say ‘dois ouros’ meaning two types of gold, but we will not consider this reading.

In object position – a governed position – count bare plurals are grammatical ((20)-(22)) in all contexts. They cannot have a kind reading though.[5] Sentence (23) cannot mean that Americans invented transistors. It may mean that they discovered different (types of) transistors.

(20) A Maria compra livros todos os dias.
the Maria buys books all the days
'Maria buys books every day.'

(21) A Maria comprou livros ontem.
the Maria bought books yesterday
'Maria bought books yesterday.'

(22) A Maria lê livros.
the Maria reads books
'Maria adores books.'

(23) #Os americanos inventaram transistores.[6]
the Americans invented transistors
'Americans invented transistors.'

Nevertheless, as also noticed for Italian (Chierchia, 1998; Longobardi, 2000), subject bare plurals become grammatical if 'made heavy' (examples (24)-(26)), except for kind level predicates that remain ungrammatical no matter how heavy they get (27). The authors give no explanation for the phenomena. Longobardi (2000) argues that 'heaviness' has the effect of remedying the absence of government of the pre-verbal subject position.

(24) Amigos de Coimbra partiram ontem.
friends from Coimbra left yesterday
'Friends from Coimbra left yesterday.'

(25) Professores de Coimbra trabalham muito.
teachers from Coimbra work much
'Teachers from Coimbra work a lot.'

(26) Elefantes de grandes dimensões são inteligentes.
elephants of big dimensions are intelligent
'Big elephants are intelligent.'

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[5] See Barbosa, Oliveira & Müller (2001) and Oliveira (1998) for an account of the interpretation of the object of sentences (20-22) as indefinites.

[6] This sentence has an implausible but grammatical taxonomic reading where the Americans kept on discovering different kinds of transistors.

(27) *?Elefantes de grandes dimensões estão extintos.[7]
elephants of big dimensions are extinct
'Big elephants are extinct.'

At this point, it is worth pointing out that there is an alternative to Chierchia's view that bare arguments with a kind interpretation necessarily denote kinds. Chierchia himself calls his a neo-carlsonian view. Krifka *et al* (1995), on the other hand, claim that natural languages make use of two different devices to express genericity: *kind referring expressions* – expressions that denote kinds (Carlson, 1977), and *generic quantification* – sentences under the scope of a generic operator (Wilkinson, 1986; Gestner and Krifka, 1987).

The sentences that become ungrammatical with bare plurals in EP are exactly those that demand that the nominal itself be kind-denoting. More examples are given in (28)-(29). We may conclude then, just as Longobardi (2001) has claimed for other Romance languages, that bare plurals are indefinites à la Heim (1982) in EP (see also Oliveira, 1998). This means that bare plurals are predicates whose variable gets bound either by a sentential unselective operator or by existential closure (see Heim, 1982). There is no need to pose an empty determiner that acts as a type-shifter turning the predicative bare nominal into an argumental kind-denoting nominal.

(28) *Lobos de pêlo cinzento estão a aumentar de tamanho à medida que vamos para Norte
wolves of fur grey are growing of size as go-2PPL to North
'Grey coated wolves are getting bigger as we travel North.'

(29) #Homens de coragem chegaram à Lua em 1969.[8]
men of courage arrived to-the Moon in 1969
'Men of courage set foot on the Moon in 1969.'

The behaviour of bare plurals in EP fits reasonably well Chierchia's typology for Romance languages. Since they are [-arg, +pred] languages, they should only allow bare arguments in governed positions, as it seems to be generally the case in EP. They should also display mass/count distinction and plural morphology for count nouns, which is also the case. The ungrammaticality of bare plurals (modified or not) with kind predicates remains unexplained within Chierchia's model.

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[7] Judgements about this sentence vary. It seems that the restriction to 'big elephants' leads to a taxonomic reading.

[8] *Homens de coragem* does not have a kind-denoting interpretation in this sentence. It may have an existential ('some men') interpretation though.

From this data, one could conclude that EP could be classified as a [-arg, +pred] language, where bare plurals are indefinites a la Heim (1982). So it seems the NMP fares well when faced with a typological classification of EP. Nevertheless, one must note that the same is not true for the neo-carlsonian view that posits that bare arguments necessarily denote kinds. The data from EP – the fact that bare plurals do not have an independent kind reading – argue against an empty D that is a type-shifter from predicates ([+pred]) to kinds ([+arg]).

In the next section, we turn to the behaviour of BNs in BP.

4.2. Bare Nominals in BP

BP, contrary to other Romance languages, has both bare plurals and bare singulars.[9] Their distributions and interpretations are not the same though. We will first investigate the distribution and interpretation of bare plurals and then move on to the distribution and interpretation of bare singulars.

One important observation to be made before we start looking at the data is that bare plurals belong mostly to written language or to formal spoken language. Bare singulars are the natural choice in informal spoken language unless one wants to make sure that only pluralities are to be taken into account.

4.2.1. Bare Plurals in BP

Interestingly, and contrary to EP and Italian, bare plurals may occur almost freely as arguments in BP. They are grammatical in subject position of episodic (30), habitual (31), individual level (32), and kind level predicates (33) with or without modification. As the examples show, bare plurals in BP may have both an existential (30) and a universal interpretation ((31)-(33)).

(30) Amigos partiram ontem.
friends left yesterday
'Friends left yesterday.'

(31) Professores trabalham muito.
teachers work much
'Teachers work a lot.'

(32) Elefantes são inteligentes.
elephants are intelligent
'Elephants are intelligent.'

[9] We are using the term *bare singular* as used in the literature for NPs with no number marking. We would like to point out that the term might lead to confusion because *singular* could be taken to imply the term is already marked for number.

(33) Elefantes estão extintos.
elephants are extinct
'Elephants are extinct.'

In object position, while in EP it was seen that bare plurals do not exhibit a kind reading, in BP, on the other hand, something unexpected occurs: the preferred reading in colloquial spoken language is a taxonomic reading, so that (34) preferably means that Mary buys different kinds of books every day, and (35) means that Mary bought different kinds of books yesterday.[10] This preference is even stronger in contexts that demand a kind-level interpretation, such as (36) and (37). In these contexts, (36) preferably means that Mary adores different types of books. (37) has only the taxonomic reading where Americans invented different kinds of transistors.

(34) A Maria compra livros todo dia.
the Maria buys books every day
'Maria buys books every day.'

(35) A Maria comprou livros ontem.
the Maria bought books yesterday
'Maria bought books yesterday.'

(36) A Maria adora livros.
the Maria adores books
'Mary loves books.'

(37) #Os americanos inventaram transistores.[11]
the Americans invented transistors
'Americans invented transistors.'

In a way, and unexpectedly, they behave just like their English counterparts, even in the absence of a kind reading for objects of k-level predicates (the sentence *The Americans invented transistors* does not have a kind reading for *transistors*). They are allowed in all argumental positions and may have either an existential or a universal reading depending on the context. One could not conclude straightforwardly that bare plurals are always indefinites à la Heim (1982) as we did for EP because bare plurals seem to have a legitimate kind-reading (see example (33)) which, in BP, is independent of the presence of a generic/habitual operator.

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[10] The first author thanks Nize Paraguassu for calling her attention to this fact.
[11] Same as for EP, the sentence is OK with a taxonomic iterative reading.

On the other hand, the unavailability of a kind-reading for the subjects of sentences (38) and (39) seems to support an analysis of bare plurals in BP as indefinites.

(38) *Lobos estão aumentando de tamanho quanto mais para o norte nós viajamos.
wolves are increasing of size as more to the north we travel
'Wolves are getting bigger as we travel north.'

(39) #Homens chegaram na Lua em 1969.[12]
men arrived in-the Moon in 1969
'Men set foot on the Moon in 1969.'

If BP were a [+arg, +pred] language, like English, type-shifting of count predicates to kinds should be freely available. This would leave the ungrammaticality of (38) and (39) unexplained.

In the next section we will examine the behaviour of bare singulars in BP, and get to see another piece of the puzzle.

4.2.2. Bare singulars in BP

Although unexpected for a Romance language, the use of bare singulars (modified or not) is extremely pervasive in BP – they are the unmarked choice in spoken language. Their occurrence does not seem to be an effect of an application of the universal grinder (Pelletier, 1975: a 'machine' that 'grinds' atomic count nouns into mass). Sentences (41) are perfectly common answers to question (40). All of them make use of the bare singular. The sentences in (42), on the other hand, are examples taken from written corpora.

(40) O que que você fez hoje de manhã?
the what that you did today PREP morning
'What did you do this morning?'

(41) a. Eu li revista feminina.
I read magazine feminine
'I read women's magazines.'

b. Eu comprei sapato.
I bought shoe
'I bought shoes.'

[12] *Homens* does not have a kind-denoting interpretation in this sentence. It may have an existential ('some men') interpretation though.

c. Eu tirei fotografia.
I took picture
'I took pictures'

(42) a. Menino não pode entrar aqui.
boy not can enter here
‘Boys aren´t allowed in here.’

b. Maçã, eu não como.
apple, I not eat
'I don't eat apples.'

c. Terremoto dá medo.
earthquake gives fear
'Earthquakes are fearsome.'

Bare singulars are grammatical both as subjects ((43)-(44)) and as objects ((45)-(47)). They are ungrammatical though as subjects of episodic sentences (48) and with a kind interpretation ((49) and (50)). Also, opposite to bare plurals, taxonomic readings are not possible.

(43) Professor trabalha muito.
teacher works much
'Teachers work a lot.'

(44) Elefante é inteligente.
elephant is intelligent
'Elephants are intelligent.'

(45) A Maria lê revista todo dia.
the Maria reads magazine every day
'Mary reads magazines every day.'

(46) A Maria leu revista ontem.
the Maria read magazine yesterday
'Mary read magazines yesterday.'

(47) A Maria lê revista.
the Maria reads magazine
'Mary reads magazines.'

(48) *Amigo partiu ontem.
friend left yesterday
'Friends have left yesterday.'

(49) *Elefante está extinto.
elephant is extinct
'Elephants are extinct.'

(50) *Os americanos inventaram transistor.[13]
the Americans invented transistor
'The Americans invented transistors.'

The distribution of bare singulars tells us that they are indefinites à la Heim (1982). They cannot denote kinds by themselves – they are ungrammatical with episodic (48) and kind ((49)-(50)) predicates. This means that they must get their generic interpretation from the presence of a generic/habitual operator. The ungrammaticality of sentences (51)-(52) further illustrates this point. These sentences demand kind-denoting objects.

(51) *Lobo está aumentando de tamanho quanto mais para o norte nós viajamos.
wolf is increasing of size as more to the north we travel
'Wolves are getting bigger as we travel north.'

(52) *Homem chegou na Lua em 1969.
man arrived in-the Moon in 1969
'Men set foot on the Moon in 1969.'

These facts pose many puzzles and there are no straightforward answers to them. The fact that BP has singular/ plural morphology and no general classifying system should make it a [+pred] language in Chierchia's typology. On the other hand, the fact that bare singulars may occur in ungoverned positions should make it a [+arg,] language. Is BP a [+arg, +pred] language? If so, how does one explain the ungrammaticality of kind-readings for bare singulars?

Let us now take stock of what we have found so far. Table I below expresses the relevant properties of bare nouns in the two varieties and compares them to English and Italian. We see that the behaviour of bare plurals in EP is the same in Italian, as expected for Romance languages. BNs in BP, on the other hand, do not line up either with Romance languages or with English. Most importantly, BP allows for bare singulars. Bare plurals, in BP, on the other hand do not seem to be able to denote kinds, as their counterparts in English do.

[13] (50) has an implausible but grammatical iterative reading where Americans keep inventing transistors for a certain period of time.

TABLE I: The behaviour of Bare Nouns		
	Kind-denoting	Need for licensing
English	Yes	No
Italian	No	Yes
Bare Plurals in EP	No	Yes
Bare Plurals in BP	?No	No
Bare Singulars in BP	No	No

We will proceed in investigating this matter in the next sections.

5. Bare Plurals, Bare Singulars and Number in BP and EP

In this section we investigate the interpretation of BNs in BP and in EP. In particular, we will be looking at their denotations with respect to the count/mass and the singular/plural distinctions. In section 5.1, we discuss Schmitt & Munn's (1999, 2002) analysis of BNs in BP. Then, in section 5.2, we will present our analysis and compare it to Chierchia's proposal.

5.1. Schmitt & Munn (1999, 2002)

Schmitt & Munn (1999, 2002) argue that BNs in BP are interpreted as names of kinds and that their behaviour can be explained by an interaction between *The Free Agr Parameter* (Bobaljik, 1995) and the morphosyntactic properties of number in BP. First, we discuss their claim that BNs are names of kinds in BP. Then, we go through their claim that bare singulars lack syntactic number in BP. In what follows, we won't be able to do justice to the detailed argumentation of Schmitt & Munn, and will focus on the points that are relevant to this paper.

5.1.1. Bare Singulars as Names of Kinds

The authors argue that both bare singulars and bare plurals in BP have the same properties as English bare plurals. First, they do not behave like regular indefinite DPs as far as their scope interactions are concerned. Second, BNs are never specific. Third, BNs are not ambiguous between a generic and an existential reading – their readings are dependent on the predicate they are part of. And, finally, BNs in BP, like English bare plurals, are not canonical types.

While singular indefinites can take scope over intensional verbs, bare plurals and bare singulars in BP cannot. An indefinite DP embedded within a modal, such as in (53), has both a transparent reading where the policeman *Pedro* wants to meet is a specific person, and an opaque reading where *Pedro* wants to meet any policemen. The logical form of each of the two readings is

expressed in (54). The same sentence with either a bare plural (55) or a bare singular (56) has only an opaque reading.

(53) Pedro quer encontrar um policial.
Pedro wants to-meet a policeman
'Pedro wants to meet a policeman.'

(54) a. (∃x) [policeman (x) & Pedro wants (Pedro meet x)] (transparent reading)
b. Pedro wants ((∃x) [policeman (x) & (Pedro meet x)]) (opaque reading)

(55) Pedro quer encontrar policiais.
Pedro wants to-meet policemen
'Pedro wants to meet policemen.'

(56) Pedro quer encontrar policial.
Pedro wants to-meet policeman
'Pedro wants to meet policemen.'

Bare nouns in BP, opposite to indefinite DPs, always take narrow scope under negation. Sentence (57), with an indefinite DP embedded under negation, has both a narrow scope (paraphrased in (58a)) and a wide scope reading (paraphrased in 58b). Bare plurals (59) and bare singulars (60) in BP, on the other hand, have only narrow scope readings in the same context. The same is true for the interaction of bare nouns in BP and universal quantification.[14]

(57) João não viu uma mancha no chão.
João not see a spot on-the floor
'João didn't see a spot on the floor.'

(58) a. João saw no spots on the floor (narrow scope reading).
b. There is a spot on the floor João didn't see (wide scope reading).

(59) João não viu manchas no chão (narrow scope reading only).
João not saw spots on-the floor
'João didn't see spots on the floor.'

(60) João não viu mancha no chão (narrow scope reading only).
João not saw spot on-the floor
'João didn't see spots on the floor.'

[14] We won't repeat the cases here and refer the reader to Schmitt & Munn (1999).

Specific readings are never allowed for bare plurals and bare singulars in BP. Sentence (61) is ambiguous between a reading where *Pedro* sees the same specific dog every different hour, and another reading where he sees different dogs in different hours. Sentences (62) and (63), on the other hand, have only non-specific readings.

(61) Pedro viu um cachorro no jardim às 3, às 4 e às 5 da tarde.
Pedro saw a dog in-the garden the-at 3, 4 and at-the 5 of-the afternoon
'Pedro saw a dog in the garden at 3, 4 and 5 in the afternoon.'

(62) Pedro viu cachorros no jardim às 3, às 4 e às 5 da tarde.
Pedro saw dogs in-the garden at-the 3, 4 and at-the 5 of-the afternoon
'Pedro saw dogs in the garden at 3, 4, and 5 in the afternoon.'

(63) Pedro viu cachorro no jardim às 3, às 4 e às 5 da tarde.
'Pedro saw dog in the garden at 3, 4, and 5 in the afternoon.'

Bare nouns in BP behave like English bare plurals in that their interpretation as generic or existential depends on the predicate they are part of. Sentence (64) allows only for a generic reading of its object, whereas the object of sentence (65) can only be interpreted existentially.

(64) Pedro gosta de crianças / Pedro gosta de criança.
Pedro likes PREP children/Pedro likes PREP child
'Pedro likes children.'

(65) Eu notei crianças no ônibus/Eu notei criança no ônibus.
I noticed children in-the bus/I noticed child in-the bus
'I noticed children in the bus.'

Schmitt & Munn point out that BNs in BP, similarly to bare plurals in English, do not behave as canonical types since examples with novel types are easy to construct. In (66), *notebooks without coloured covers* can hardly be thought of as a well-established kind.

(66) Caderno sem capa colorida estava em liquidação ontem.
Notebook without cover coloured was on sale yesterday
'Notebooks without coloured covers were on sale yesterday.'

Based on evidence such as the one mentioned above, Schmitt & Munn argue that BNs in BP are names of kinds such as proposed by Carlson (1977) for English bare plurals. They argue against an analysis of bare singulars as mass nouns, and base this claim on contrasts such as (67a-b) and (68a-b). For them, mass nouns are incompatible with predicates which require atomisation

such as *pesa 20 quilos* ('weighs 20 kilograms') (67a), whereas bare singulars accept those predicates (67b). Also, both reflexives and reciprocals are acceptable with bare singulars (68b), whereas mass nouns are not (68a).

(67) a. *Ouro pesa 20 quilos.
gold weighs 20 kilograms
'Gold weighs 20 kilograms.'

b. Criança pesa 20 kg nesta idade.
child weighs 20 kg in-this age
'Children weigh 20 kg at this age.'

(68) a. *Ouro realça um o outro.
gold enhances one the other
'Gold enhances each other.'

b. Criança briga uma com a outra.
child fights one with the other
'Children fight with one another.'

In section 5.2, we argue against an analysis of bare singulars in BP as names of kinds. We claim that bare singulars are indefinites that introduce a variable in the logical form of the sentences they belong to, such as it has been proposed for English bare plurals by many authors (see Wilkinson, 1991; Diesing, 1992 and Krifka *et al.*, 1995, among others). We will claim that bare singulars in BP are predicates and have a mass denotation.

5.1.2. Bare Singulars as DPs with no Number Projection

Schmitt & Munn extend the *Free Agr Parameter* (Bobaljik, 1995) to the nominal domain and assume that agreement and number may either be projected as separate syntactic heads or as a single 'fused' head. The DP in Romance languages, and therefore in BP, is claimed to have both Number and Agreement Projections which may or may not occur independently. Bare singulars in BP are analysed as DPs with a null D and without a number projection.

A detailed presentation of Schmitt & Munn's arguments in favour of the analysis presented above goes beyond the scope of this paper and we refer the reader to the authors' papers. We will, nonetheless, discuss their analysis as far as number is concerned for it is relevant to the points we make in this paper.

Based on evidence such as discourse anaphora and aspectual interpretations, Schmitt & Munn claim that bare singulars are unspecified for

number.[15] In generic contexts, a singular pronoun cannot refer to a bare singular. Instead the plural pronoun must be used so that the discourse anaphora in (69) is only possible with a plural pronoun. This restriction only holds in generic contexts. In existential contexts anaphora is possible with either singular or plural pronouns (see (70)).

(69) Maria detesta coelho porque *∅/*ele/eles sempre roubou/roubam suas cenouras
Maria hates rabbit because *∅/*it always stole-SG/stole-PL her carrots
'Maria hates rabbits because they have always stolen her carrots.'

(70) Tem criança na sala. E ela está ouvindo/elas estão ouvindo.
has child in-the room. And she is listening/they are listening
'There are children in the living room. And they are listening (to us).'

Evidence for lack of number in bare singulars also comes from aspectual interpretations of sentences. It is known that *quantized objects* trigger *terminative readings* in verbs like *write*, while *non-quantized objects* trigger *durative readings* (see Dowty, 1979). However, only durative readings are allowed for bare singulars as shown by the contrast in grammaticality between (71) and (72).

(71) a. Eu escrevi carta por duas horas.
I wrote letter for two hours
'I wrote letters for two hours.'

(72) *Eu escrevi carta em duas horas.
I wrote letter in two hours
'I wrote letters in two hours.'

Syntactically, lack of number in BP bare singulars is claimed to stem from the structure of the DP. BP, like other Romance languages, has a split Agr, therefore allowing for the independent occurrence of either number and/or agreement. Bare singulars, under this analysis, are DPs with a null D and without a number projection.

In what follows, we will build on Schmitt & Munn's claim that bare singulars are unspecified for number in BP and will develop a semantic interpretation for 'being unspecified for number'. We claim that 'being unspecified for number' means that bare singulars in BP denote unsorted mass.

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[15] Schmitt & Munn (2002) also mention the licensing of the adjective *diferente* ('different') and of binominal *each* as further evidence for the lack of number in bare singulars. We refer the reader to their paper.

5.2. Bare Nominals and Number in BP

As we have already mentioned, according to Chierchia 1998, a mass term is a term whose denotation is neutral in respect to singular or plural in the sense that the term contains both atomic and plural entities in its denotation. We will show that the denotations of bare singulars in BP are not only number-neutral but also pre-sortal – they do not encompass only full-fledged individuals. That is they are mass in a stronger sense than Chierchia's.

Number neutrality of bare singulars has been pointed out by Schmitt & Munn (1999, 2002), as mentioned above (see also Müller, 2002). It manifests itself in a number of phenomena. Some of them have already been pointed out in our presentation of Schmitt & Munn's analysis. We will add some extra evidence and stress the fact that there is a correspondence between the lack of syntactic number and the lack of semantic number. Firstly, bare singulars co--occur with *suficiente* ('enough') (73) and with mass 'classifiers' (74). These have been claimed in the literature to be properties of mass nouns (see Bunt 1985). The examples also show that canonical mass nouns behave in exactly the same way.

(73) Eu já comprei livro/ prata suficiente por hoje.
I already bought book/silver enough for today
'I've already bought enough books/silver for today.'

(74) Eu vendi 10 quilos de livro/ prata hoje.
I sold 10 kilos of book/ silver today
'I sold 10 kilos of books/ silver today.'

Secondly, bare singulars do not express semantic number. They also do not have a built-in mode of dividing reference. In sentences (75) and (76), the number of magazines or speeches is left totally unspecified. It can range from parts of magazines and speeches to a discrete number of them.

(75) Jorge sempre lê revista depois do jantar.
Jorge always reads magazine after PREP-the dinner
'Jorge always reads magazines after dinner.'

(76) Os secretários de prefeito escrevem discurso todo dia.
the secretaries of mayor write speech every day
'Mayor secretaries write speeches everyday.'

The same is not true for bare plurals in BP. Bare plurals behave like count nouns. Sentence (77) is false if Jorge always reads less than two magazines after dinner. And sentence (78) is false if mayor secretaries write less than two speeches every day.

(77) Jorge sempre lê revistas depois do jantar.
Jorge always reads magazines after PREP-the dinner
'Jorge always reads magazines after dinner.'

(78) Os secretários de prefeito escrevem discursos todo dia.
the secretaries of mayor write speeches every day
'Mayor secretaries write speeches every day.'

Another illustration of the difference in number and countability between bare singulars and bare plurals in BP comes from appropriate answers to question (79) with a bare singular and question (80) with a bare plural. Either a singular or a plural DP (79b) are appropriate answers to the bare singular question, whereas only a plural DP is an appropriate answer to the bare plural question (see (80a-b).[16] The contrast in the acceptance of the negative answers (compare (79c) to (80c)) also shows that bare plurals are non-atomic. Note that it does not make sense in BP to deny that one *tem filho* ('has child') when one has only one child. On the other hand, it does make sense to deny that one *tem filhos* ('has children') when one has only one child.

(79) a. Ela tem filho?
she has son?
'Does she have children?'

b. Sim, ela tem um/ dois filhos.
yes, she has one/ two sons
'Yes, she has two children.'

c. *Não, ela só tem um.
no, she only has one
'No, she has only one.'

(80) a. Ela tem filhos?
she has sons?
'Does she have children?'

b. Sim, ela tem *um filho/dois filhos.
yes, she has one son/ two sons
'Yes, she has one child/ two children.'

[16] We would like to point out that in what concerns the answers to (80a) this is not a straightforward matter as some speakers accept (80b), *ela tem um filho* (she has one son) without an explicit *sim* (yes). However, in case it is explicit, the answer becomes unacceptable.

c. Não, ela só tem um
no, she only has one
'No, she has only one.'

Thirdly, bare singulars are not able to provide a domain for *cada* ('each') – a distributive quantifier that must have atomic individuals as its share (Negrão 2001). Bare plurals, on the other hand, are OK as a share for *cada*. Compare the indefinite singular (81a), the bare singular (81b), and the bare plural (81c) sentences. Only the bare singular sentence is ungrammatical with *cada*.

(81) a. Cada aluno deverá ler um livro de lingüística.
each student must read a book of Linguistics
'Each student must read a Linguistics book.'

b. *Cada aluno deverá ler livro de lingüística.
each student must read book of Linguistics
'Each student must read Linguistic book.'

c. Cada aluno deverá ler livros de lingüística.
each student must read books of Linguistics
'Each student must read Linguistics books.'

As we have seen above, Schmitt & Munn (1999, 2002) argue that bare singulars in BP are not mass. They base this claim on contrasts such as (13a--b) and (14a-b) repeated bellow as (82a-b) and (83a-b). Nonetheless, if you make the examples more symmetrical such as in (84a) and (84b), the difference fades away. We claim that what is going on in examples (82)-(83) is that the context provides a sortal classifier for the bare nominals, and that – out of the blue – it is harder to find a suitable classifier for 'canonical' mass nouns such as *gold*. [17]

(82) a. *Ouro pesa 20 quilos.
gold weighs 20 kilograms
'Gold weighs 20 kilograms.'

b. Criança pesa 20 kg nesta idade.
child weighs 20 kg in-this age
'Children weigh 20 kg at this age.'

(83) a. ?Ouro realça um o outro.
gold enhances one the other
'Gold enhances each other.'

[17] See Muller (2002) for a proposal that DPs in BP contain a Classifier Phrase whose head may be filled by contextually provided elements.

b. Criança briga uma com a outra.
child fights one with the other
'Children fight with one another.'

(84) a. Ouro neste banco pesa 1 quilo.[18]
gold in-this bank weighs 1 kilogram
'Gold bars weigh 1 kg at this bank.'

b. Criança nesta cidade pesa 20 quilos.
child in-this city weighs 20 kilograms
'Children weigh 20 kilograms in this city.'

We may conclude that the denotation of bare singulars in BP is pre-sortal. In this sense it is both number neutral and mass in a stronger sense than Chierchia's. Mass nouns denote pre-sorted stuff in Link's (1983) sense. Recall that Chierchia's mass nouns are a neutralisation between singular and plural. His mass denotations are already sorted and contain both atoms and pluralities. In a syntactic sense, this fits well Schmitt & Munn's proposal that bare singulars in BP lack a number projection.

One must not be hasty though and conclude that nothing resembling the count/ mass distinction may be found in the language. What we predict is that there won't be any syntactic or morphological differences between mass nouns and count bare singulars, if that distinction proves to exist, it must be located in the lexicon.

As for bare plurals in BP, we may also conclude that they are count and denote pluralities.

6. Chierchia's Ontology Revisited

Our investigation about the interpretation of BNs in Portuguese has shown that the denotations of bare nominals may vary across languages. Bare nominals may denote unsorted mass (bare singulars in BP), atomic entities (possibly count singular NPs in English as proposed by Chierchia, 1998), atomic plus plural entities (bare plurals in EP), and just pluralities (bare plurals in BP). We are then drawn to the following conclusions:

(i) Bare argumental nouns do not necessarily have the same denotations across languages.
(ii) The denotation of count common nouns and NPs in languages that have count/mass, singular/plural distinctions is not necessarily atomic.

[18] Some speakers still do not accept this sentence. The ones that do though implicitly insert some classifier such as *bars of* (*gold*).

(iii) Plural marking does not have the same interpretation across languages. Plural NPs may or may not have atoms in their denotations.

(iv) There is a difference between sorted and unsorted denotations that goes beyond their being unmarked for number.

With these points in mind, let us now revisit Chierchia's ontology and proposal of a semantic parameter. First, remember that Chierchia's domain of discourse contains both atomic and plural entities as in (85) repeated below. Operations on this domain by singular and plural operators may be able to yield the count denotations of bare plurals that we found in both varieties of Portuguese.

(85)

{a,b,c} .....

{a,b} {a,c} {a,b} .....

a b c .....

Second, Chierchia's domain of discourse does not contain 'stuff'. There is no way of representing matter that is not sorted yet. In Chierchia's model, the difference between count and mass is actually a difference between having just atoms or having both atoms and pluralities as denotations. What we found about the denotation of bare singulars in BP indicates that the domain of discourse also contains non-individuated matter. We are then led to the conclusion that an ontology for natural languages needs to posit the existence of unsorted 'stuff' in the domain of discourse such as it has been proposed in the literature by Link (1985) and others (see Schubert and Pelletier, 1987, ter Meulen, 1980).

Third, Chierchia's model predicts that bare arguments in generic contexts of [+pred] languages will be shifted to kinds. But we have seen that bare singulars in BP and bare plurals in EP behave like heimian indefinites, that is, they remain predicative and are ungrammatical in exactly those contexts that demand a kind-reading of the NP. Therefore, as far as our data is concerned, the neo-carlsonian view of bare nouns does not fare well for both varieties of Portuguese.

This discussion leads to the conclusion that if one wants to retain the notion of a semantic parameter for bare nouns, Chierchia's proposal needs to be recast. The notion of NPs as being either argumental [+arg] or predicative [+pred] does not seem to play any role in the setting of a semantic parameter, and one could maintain that all common nouns and NPs denote predicates.

What seems to be relevant for the semantics and morphosyntax of bare nominals is the kind of denotations they have. Maybe a semantics parameter could be cast in these terms. One could predict, for example, that for a language where common nouns denote atoms, bare singulars will be

disallowed and bare arguments, if they exist in the language, will be bare plurals. These languages will show mass/count distinction and singular/plural morphology. Tentatively, this would be the case of EP and other Romance languages.

One could also predict that, for languages whose common nouns have unsorted/mass denotations, that they may or may not have count/mass distinction. One would also predict that, for these languages, singular/plural morphology would be optional and only needed when one wanted to express that necessarily more than one entity or sub-kind is being referred to. This would account for the behaviour of bare nouns in BP.

7. Concluding Remarks

The discussion and the data on the two varieties of Portuguese led us to the conclusion that, although the notion of a semantic parameter seems to be a very productive working hypothesis, the NMP as proposed by Chierchia (1998) does not work.

First, the features [+/-arg, +/-pred] do not seem relevant for the behaviour of bare nominals since both European and Brazilian Portuguese data show that BNs may be argumental without denoting kinds – they are indefinites bound by some generic unselective operator. Second, Chierchia's ontology contemplates only atoms and pluralities. We have also shown that, in order to describe the behaviour of bare singulars in Brazilian Portuguese, one needs to posit the existence of pre-sorted 'stuff' in the ontology. Also, we have seen that count nouns do not always have an atoms-only denotation.

Based on the behaviour of bare nominals in BP and EP, we put forward two claims. First, we claim that the denotation of common nouns and NPs may vary from one language to another and that this variation is responsible for some of the typological differences regarding the use of bare nominals across languages. We also claim that an ontology for natural languages must encompass pre-sorted 'stuff'.

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