

Bare singular and bare mass nouns in Brazilian Portuguese: First results of an empirical survey

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Abstract

The paper investigates the behavior of Bare Singulars (BS) and Bare Mass (BM) nouns in Brazilian Portuguese (BrP) in two acceptability experiments. The traditional view on the BS (Munn & Schmitt, 2005) argues that its syntax and semantics differs from that of BM nouns, because they behave differently when combined with predicates of individuation, reflexives and reciprocals. Individuating predicates select for atomic individuals, and mass nouns do not denote atoms in a semi-lattice structure, is the explanation. Relying on Basso (2007), two experiments were conducted to verify the hypothesis predicted by the traditional view. Behind our enterprise is the intuition that BS are in some sense massive (Camacho & Pezatti, 1996). The experiments were applied to 200 speakers. The predictions of the traditional view are not fulfilled: BM nouns are acceptable by more than a half of the speakers, and some BS sentences are unacceptable. The second experiment evaluated whether the distribution of acceptability was due to natural atomicity (Rothstein, 2008). Although there seems to be some influence, the results are not conclusive.

Compared to French, English and German¹, the determiner system in Brazilian Portuguese (BrP, from now on) may be said to be completely overt because, besides quantificational determiners, type <<e,t>>, the determiner

¹ For English, the traditional reference is Carlson (1977); for French, and German, Schaden (2009).

phrase, of type e, ranges from overtly definite and indefinite phrases, both singular and plural, to a complete system of bare noun phrases in argument position: bare singulars (1a), bare plurals (1b) and bare mass, in (1c):

- (1) a. Minhoca cava buraco grande.
 worm digs hole big
 b. Minhocas cavam buracos grandes.
 worms dig big holes
 c. Leite faz bem pra saúde.²
 Milk makes well for health
 ‘Milk is healthy’.

This paper investigates the behavior of the Bare Singular (BS, from now on), (1a), in comparison to bare mass nouns (BM), (1c), in contexts used by the here labeled “traditional view” (from Munn & Schmitt, 1999 on) to support the claim that the BS and the BM are syntactically and semantically distinct. This claim relies on one empirical fact: only the BS may combine with individuating predicates – i.e. predicates that select for an atomic individual –, mainly distributive predicates like ‘*pesar 20 kilos*’ (to weigh 20 kilos), reciprocals and reflexives. This view ignores the intuition that the BS and the BM nouns are alike. In fact, the similarities between the BS and the BM in BrP seem to be stronger than the ones between the Bare Plural and the Bare Mass in English, the existence of which were the point of departure of Link’s seminal analysis (1983). This intuition clearly underlies Camacho & Pezatti (1996) functionalist description of the nominal domain in BrP. It also finds support in the syntactic distribution of the BS and the BM, which have gone unnoticed in the literature.³ In this paper, we closely investigate the pertinence of the generalization that only BSs combine with individuating predicates. In the traditional view BSs are number neutral, i.e. they denote both atoms and pluralities. This explains why BSs phrases may be resumed anaphorically by a singular or a plural pronoun. Given Chierchia’s proposal for the denotation of mass nouns – they denote both atoms and pluralities –, one expects that the BS and the BM behave alike. But, as shown by Munn & Schmitt, they don’t, because only the BS is a count noun, and this justifies going back to Link’s ontological distinction between *stuff-things*, which are atom-less, and *countable/atomic things*, which come into units.⁴

However, the predictions raised by the traditional view do not find empirical support: both experiments show that speakers reject sentences

² BrP also has definite mass noun phrases:

- (1) O leite faz bem pra saúde.
 The milk makes well for health.
 Milk is healthy.

³ Pires de Oliveira & Rothstein (in preparation).

⁴ Following Link (1982), the nominal domain is understood to be structure as a semi-lattice.

where the BS is combined with individuating predicates, and they accept sentences where a bare mass noun is combined with this same type of predicate. This empirical finding jeopardizes the generalization the traditional view wants to explain while it shows that the explanation for the contrast between BS and BM, which does exist, as the experiments also show, cannot be described as between atomic and non-atomic predicates. If this were the case, the traditional view predictions should be confirmed, but they were not. Since in the first experiment, most of the examples were of non-prototypical mass and count nouns, because our intuition was that these nouns would contradict the traditional view, we decided to run a second experiment where we also investigate whether the relevant parameter was natural versus non-natural atomicity. This last hypothesis was not confirmed.

Experiments of acceptability are still not very common in the formal tradition in linguistics, but there are increasingly more psycholinguistic experiments about grammatical predictions.⁵ We take for granted the validity of acceptability experiments.

The first section presents the evidences supporting the traditional view and our own judgments of grammaticality of non prototypical examples of mass and count nouns, for instance ‘mobília’ (furniture) and ‘cerca’ (fence). The former is a naturally atomic mass noun, whereas the later is a non-naturally atomic count noun (Rothstein’s 2008). In the second section, we introduce the general design of the experiments. The third section is devoted to the description of the first empirical test. In section 4, we present the second empirical experiment. Both experiments were applied to 200 students. Finally, we conclude that the predictions of the traditional view do not find empirical support, and that the hypothesis that speakers’ judgments were biased by natural atomicity, analyzed in the second experiment, was inconclusive.

1. A criticism of the Tradicional View

The traditional view argues that the bare singular does not behave like bare mass nouns in contexts which ask for individuation, as with reciprocals, reflexives, and individuating predicates such as ‘*pesar X kilos (nessa idade)*’ (to weigh X kilos (in this age)). That the bare mass noun is incompatible with any operation of individuation is expected under the traditional view, because mass nouns do not have atoms. It is also expected that the BS, because it is countable, though number neutral, does accept atomization. Sentence (2) is fine, because ‘*criança*’ (child) is countable, whereas sentence (3) is ungrammatical, because ‘*ouro*’ (gold) cannot be individuated, since it has no atoms (Munn & Schmitt, 1999, 2005; Schmitt & Munn, 2002; Müller & Paraguassu, 2006; Paraguassu & Müller, 2008):

⁵ See, for instance, Featherston & Stenefeld (2007), and Weskott & Fanselow (2008).

- (2) Criança (nessa idade) pesa 20 kg.
 Child (in-this age) weighs 20 kilos.
 ‘Children weigh 20 kilos at this age.’
- (3) * Ouro pesa duas gramas
 Gold weighs two grams.

The same contrast appears when the BS and the BM nouns are combined with other predicates that select for atoms, as exemplified below (all the examples are from Munn & Schmitt (2005) and Schmitt & Munn (2002)):

- (4) Elefante cai um atrás do outro.
 Elephant falls one behind of-the other.
 ‘Elephants fall one after the other’
- (5) * Ouro cai um atrás do outro.
 Gold falls one behind of-the other.
 ‘Gold falls one after the other’.

Moreover, both reflexives and reciprocals are fine with the countable bare singular, but not with bare mass nouns (Schmitt & Munn, 2002), because they ask for atomic individuals:

- (6) Criança briga uma com a outra.
 Child fights one with the other.
 ‘Children fight with one another.’
- (7) * Ouro realça um o outro.
 Gold enhances one the other.
 ‘Gold enhances each other.’
- (8) Criança se lava sozinha.
 Child herself washes alone.
 ‘Children wash themselves alone.’

However, the above examples are prototypical mass and count nouns: ‘ouro’ (gold), ‘criança’ (child), and ‘elefante’ (elephant), respectively. But, as authors like Gillon (1992) and Chierchia (1998) argue, one should be careful to rely on the idea that only countable nouns are atomic for several reasons: (i) there are atomic mass nouns, the most quoted example is ‘furniture’ in English; and (ii) languages differ with respect to the distinction between mass and count nouns – from a prosaic perspective, in English ‘lentils’ is countable, but ‘lentilha’ (lentils) in BrP is mass; from a broader one, there may be languages, Chinese is often quoted as such a language, where this distinction

is not given⁶. For Chierchia mass nouns have atoms, although they may be vague. Coming from the countable side, Rothstein (2008) argues that there are count nouns which are not naturally atomic – whose atomicity depends on contextual parameters –, ‘fence’ (‘cerca’), for instance.

Rothstein (2008) distinguishes three notions of atoms: natural atomicity, semantic atomicity and formal atomicity. Natural atomicity should be language independent because it relies on the fact that “things” in the world come clearly into units, like boys or furniture. This criterion does not coincide with the distinction between mass and count nouns: there are mass nouns – ‘mobília’ (furniture), for instance – that are naturally atomic, though massive, and count nouns like ‘cerca’ (fence) that are not naturally atomic, though countable.

Our suspicion is that the generalization raised by the traditional view arises because the examples chosen are all prototypical nouns, i.e. mass nouns without atoms and atomic count nouns. A new picture emerges when individuating predicates are combined with non prototypical mass and count nouns. According to our own judgments of acceptability, the following examples are fine:

- (9) Móbilía (nesta loja) pesa 20 kilos.
 Furniture (in+this store) weighs 20 kilos.
 ‘Furniture (in this store) weighs 20 kilos’.
- (10) Móbilía (dessa marca) combina uma na outra.
 Furniture (of+this trend) fits one in+the other.
 ‘Furniture (of this trend) fits each other’.

On the other hand, non-atomic count nouns like ‘cerca’ (fence) and ‘reta’ (line) do not easily combine with reciprocals and reflexives:

- (11) ?? Cerca (nesse terreno) mede 3 metros.
 Fence (in+this land) measures 3 meters.
- (12) ?? Reta se encontra no horizonte.
 Line each other meets in+the horizon.

Thus, our judgments do not support the traditional view, since at least some bare count nouns do not combine with individuating predicates, and some mass nouns combine with this type of predicate.

⁶ Cheng & Sybesma (1999) argue, against Chierchia (1998), that Chinese has the contrast count vs mass marked by the choice of classifiers. We will not deal with this issue here.

The grammaticality of sentences like (9) and (10) and the unacceptability of (11) and (12) motivated our first experiment. The aim of this experiment was to find more reliable support to our intuitions, avoiding theoretically biased judgments. With the aid of psycholinguistic experiments, one may verify empirical predictions. In the next section, we present a brief account of experiments of acceptability with the warning that they pave our way to a time reaction experiment which we plan to perform.

2. Empirical experiments of acceptability

Linguists in the formal tradition make generalizations about languages, and it should be possible to verify them empirically. The traditional view predicts that BSs combined with individuating predicates are grammatical sequences, whereas BMs with the same predicates generate ungrammatical sequences. We propose to verify this claim by checking the speakers' intuition of acceptability of some target sentences. If the traditional hypothesis is right, we should see the predicted pattern emerging.

We performed two acceptability experiments. In the first test, we construed sentences that were pragmatically adequate. Thus, the sentences reproduced expected state of affairs, and supplied important contextual restrictions, which were already in the sentences analyzed by the traditional view. Notice that one of the sentences discussed in the traditional view, 'Criança nessa idade pesa 20 kg' (Child in this age weighs 20 kg), has a contextual restriction 'nessa idade' (in this age), which helps the speakers attributing a distributive reading to the predicate 'pesa 20 kg' (weighs 20 kg). The second test controlled the number of syllabi, and sentence length, without paying attention to pragmatic factors, forcing the speakers to rely only on their grammatical judgments. A number of criticisms may be raised to both experiments, and we will comment some of them.

For both experiments we used the same criteria to distinguish mass from countable nouns: the existence of semantic atoms. According to Rothstein (2008), only countable nouns can be pluralized and modified by numeral determiners, because they have semantic atoms. This supplies the linguistic criterion used in this paper to distinguish between mass and count nouns: 'cerca' (fence) in Brazilian Portuguese is countable because it may be pluralized as shown in (13a) and it may easily combine with numerals, (13b):

- (13) a. Cercas são caras.
 fences are expensive
 b. Desenhei duas cercas hoje.
 I drew two fences today

Mass nouns, because they do not have semantic atoms, cannot be pluralized nor combined with numerals:

- (14) a. ?? Móveis são caras.
 furnitures are expensive
 b. ?? Comprei duas móveis hoje.
 I bought two furnitures today

The same criterion underlies the traditional view: bare singulars are countable, because they are derived from countable nouns which denote atoms. If something has no atoms, as ‘ouro’ (gold), it cannot combine with a numeral

In both experiments, the predicates were of the type used by Munn & Schmitt – distributive predicates, in (15a), reciprocal exemplified in (15b), and reflexives as in (15c). Sentence (15a), and (15b) are in experiment 1; (15c) is in experiment 1 and 2:

- (15) a. Nessa idade, criança pesa vinte quilogramas. (Distributive)
 in this age, child weighs twenty kilograms
 b. Cerca atravessa uma na outra. (Reciprocal)
 fence crosses one with in+the other
 c. Cabelo se enrosca. (Reflexive)
 hair itself curls

In both experiments we consider the contrast between naturally and non-naturally atomic nouns. In experiment 1 the sentences were mainly construed with non-prototypical mass and count nouns, precisely because, according to our intuition, these were the cases where the traditional view would fail. In order to verify whether natural atomicity was playing a role in the evaluations of the grammaticality of the target sentences, we designed the second experiment. In both experiments, the target sentences, i.e. sentences the judgments of which were our object of study – 8 in Experiment 1 and 12 in Experiment 2 –, were combined with distracting sentences of which 2 were control sentences, a highly acceptable sentence, and a highly unacceptable one. Control sentences were used to give us patterns of acceptability and unacceptability. Materials

3. Experiment 1

3.1 Method

Participants

The sample comprises 200 undergraduate students from Universidade Federal de Santa Catarina and Instituto Federal de Santa Catarina, none of them from Letters. The data were collected in a number of sessions, in the student’s classes, and their participation was volunteer and anonymous.

Materials

Experiment 1 was originally construed with 26 target sentences – 13 with countable nouns (C), and 13 with mass nouns (M) – (listed below) randomly separated in the 4 different lists. There were both non natural atomic (NNA) count nouns and naturally atomic (NA) ones.

- (16) a. Móvel encosta um no outro. (M-NA)
furniture abuts one with each other
- b. Nessa loja, areia pesa vinte quilos. (M-NNA)
at this store, sand weighs twenty kilos
- c. Nessa loja, ouro encaixa um no outro. (M-NNA)
at this store, gold nests one with each other
- d. Nessa loja, móvel custa R\$ 100,00. (M-NA)
at this store, furniture costs R\$ 100,00
- e. Bijuteria enrosca uma na outra. (M-NA)
jewelry twines one with each other
- f. Móvel custa R\$ 200,00. (M-NA)
furniture costs R\$ 200,00
- g. Nessa loja, bijuteria custa R\$ 1,99. (M-NA)
at this store, jewelry costs R\$ 1,99
- h. Cabelo se embarça. (M-NA)
hair tangles itself
- i. Nessa mina, ouro pesa vinte quilogramas. (M-NNA)
at this mine, gold weighs twenty kilograms
- j. Metal se encaixa um no outro. (M-NNA)
metal nests one with each other
- k. Móvel encaixa uma na outra. (M-NA)
furniture nests one with each other
- l. Nessa joalheria, ouro pesa vinte gramas. (M-NNA)
at this jeweler shop, gold weighs twenty grams
- m. Cabelo se enrosca. (M-NA)
hair curls itself
- n. Trilho mede dois quilômetros. (C-NNA)
rail measures two kilometers
- o. Caco raspa um no outro. (C-NNA)
shard scrapes one with each other
- p. Linha enrosca uma na outra. (C-NNA)
thread curls one with each other
- q. Cerca atravessa uma na outra. (C-NNA)
fence crosses one with each other
- r. Carro bate um no outro. (C-NA)
car hits one with each other
- s. Reta se cruza uma com outra. (C-NNA)
straight crosses one with each other

- t. Elástico se amarra um no outro (C-NNA)
elastic ties one in the another
- u. Nessa região, cerca mede um metro. (C-NNA)
at this region, fence measures one meter
- v. Trilho atravessa um no outro. (C-NNA)
rail crosses one in the another
- x. Elástico mede vinte centímetros. (C-NNA)
elastic measures twenty centimeters
- w. Nessa idade, criança pesa vinte quilogramas. (C-NA)
at this age, child weighs twenty kilograms
- y. Telhado mede cinco metros quadrados. (C-NNA)
roof measures five square meters
- z. Território faz fronteira um com outro. (C-NNA)
territory makes frontier one with the other

The sentences were construed with individuating predicates – examples (n), (u), (x), (w), (y) –, and reciprocals (o), (p), (q), (r), (s), (t), (v), (z). We controlled two theoretical variables: the count versus mass distinction, and the natural versus non-natural atomicity.

For the statistic analysis only 8 sentences were considered, because the original experiment was not well balanced. There were more sentences with the parameter count versus mass (13 of each one), than with the parameter natural (NA) versus non natural atomic (NNA). Moreover, there were more non-natural atomic sentences: 10 naturally atomic (2 countable and 8 mass), and 16 non-naturally atomic (11 countable and 5 mass).⁷ These failures motivated the second experiment.

The experiment aimed at verifying our intuition that the traditional view would fail with non prototypical mass or count nouns, a prediction that was confirmed. Indeed the acceptability of the target sentences decrease with non-prototypical nouns.

Procedures

In this first experiment, the 26 sentences were randomly combined with 12 distracting sentences, of which 2 were control sentences, the grammatical one is in (17a), and the ungrammatical one, (17b). They were randomly separated in the 4 different lists: two lists with 6 target sentences – Lists 1 and 2 –, and two with 7 target sentences – Lists 3 and 4. Procedures

- (17) a. O menino está doente.
the boy is sick

⁷ The problem was raised during the presentation of the results of the first experiment in the Workshop on Bare Nouns and Indefinites, Florianópolis 2009, and motivated the second experiment. We thank the audience.

- b. O quadro pintou.
the picture painted

For the statistic analyses the same number of NA and NNA sentences is required in order to verify whether this variable is relevant. We considered 4 sentences from each domain. Below is the list of the 8 target sentences statistically analyzed. There were 4 mass sentences and 4 count sentences, 4 non-naturally atomic and 4 naturally atomic sentences:

- (18) a. Cabelo se enrosca. [M-NA]
hair itself curls
b. Móvelia custa duzentos reais. [M-NA]
furniture costs two hundred reais
c. Bijuteria enrosca uma na outra. [M-NA]
jewelry twists one in+the other
d. Reta se cruza uma com a outra. [C-NNA]
line itself crosses one with the other
e. Trilho atravessa um no outro. [C-NNA]
rail crosses one in+the other
f. Cerca atravessa uma na outra. [C-NNA]
fence crosses one in+the other
g. Nessa loja, ouro encaixa um no outro. [M-NNA]
in this store, gold fits one in+the other
h. Nessa idade, criança pesa vinte quilogramas. [C-NA]
in this age, child weighs twenty kilograms

Each list was evaluated by 50 university students. None of the lists were evaluated by the same speaker. The speakers were asked to mark their very first impression about the “naturalness” of the sentence. The command was: does the sentence sound fine? The experiment design was inspired in Basso’s experiment (2007) for evaluating the acceptability of telic perfective sentences combined with ‘for X time’ adjuncts. Each speaker received a list of sentences, which were followed by a 15 cm line with a smiling face on one hedge and a sad face in the other, as exemplified in (19):

- (19) ☺ _____ ☹

Results and Analysis of the first experiment

Despite the many criticisms that may certainly be raised, we believe that the results are important enough for justifying a closer investigation into the parallels between bare mass and bare singular noun phrases.

The results from experiment 1 lead to two conclusions: 1. the traditional view makes incorrect predictions, and 2. natural atomicity seems to be the relevant feature. Table I shows the crossing between the feature count versus

mass and the informants' judgments. Although our line of evaluation was gradable, as can be seen in (19) above, only three areas were considered: 1. the area around the smile face, which was interpreted as indicating the speaker's acceptance of the sentence; 2. the evaluations in the area around the middle of the line which we considered undecided speakers – i.e. the speaker did not know whether the sentence was acceptable or not; and 3. the area around the sad face, treated as expressing the speaker's rejection of the sentence.

Since each sentence was evaluated by 50 speakers, we have the total amount of 400 evaluations, 200 for counting nouns, and 200 for mass nouns. It is important to notice from the beginning that in the last line of the table below we have the percentages of the total amounts of mass and count sentences. The percentages in the lines below the labels count and mass indicate half of the total amount. For instance, 15,8% of the speakers from the amount of 200 bare count sentences accepted the combination BS plus individuating predicate.

The first result is that bare mass and bare count noun phrases combined with individuating predicates are not very well accepted in general, independently of the mass versus count distinction. Table I below shows that bare singular sentences were accepted only by 15,8%, which is less than a half of the speakers who evaluated the sentence.

Very striking is the percentage of acceptance of bare mass sentences combined with individuating predicates, 22%. According to the traditional view, there should be a sharp contrast of the acceptability between combining individuating predicates with mass and with count nouns; the former should be ungrammatical, whereas the latter is grammatical. Surprisingly, the acceptability of mass nouns scored higher than its unacceptability: 22% against 19,5%.

According to the traditional view, mass nouns should be ungrammatical in such a context, so the prediction is a very high score of unacceptability, which was not found. But what is really not expected, according to the traditional view, is that count nouns are unacceptable: only 15,8% of the judgments favored count sentences as grammatical ones; in, 26,5% – that is, more than a half of the results – they were considered ungrammatical.

There is no explanation for this result within the traditional view. This result may be due to the fact that half of the count sentences were non-naturally atomic, so natural atomicity may be playing a role in their judgments. The data was analyzed by the software SPSS (*Statistical Package for the Social Sciences*) and by means of bivariate statistical comparison (*chi-square*).⁸

⁸ Thanks to prof. Marco Rocha (UFSC) we were able to analyze our results with more reliable statistic methods. The interpretation of the results is our own responsibility.

Table I: Crosstab between count/ mass vs. judgment of the first experiment

	Highly acceptable	Unacceptable	Undecided	Total
Count	63	106	31	200
%	15,8	26,5	7,8	50
Mass	88	78	34	200
%	22	19,5	8,5	50
Total	151	184	65	400
%	37,8	46	16,3	100

Chi-Square

Pearson Chi-square 0,014

Likelihood Ratio 0,014

The rate of the chi-square shows that the correlation between the features mass and count and the individuating predicates is not due to casualty. Thus, the distinction is significant for speakers.

Table II shows the crossing of the parameter of non-natural atomicity versus natural atomicity and their possibility of combining with individuating predicates. Atomic nouns combined with individuating predicates are highly accepted, 27,5% against 14,5% of unacceptability. This result suggests that our hypothesis that there is interference due to atomicity is confirmed. Non-atomic nouns with individuating predicates were considered highly unacceptable: 31,5%, against 10,3% of acceptance. This result also supports our prediction that the informants are paying attention to natural atomicity. The chi-square is also significant, showing that there is a relation between natural atomicity and acceptance judgments:

Table II: Crosstab between atomic/non-atomic vs. judgment of the first experiment

	Highly acceptable	Unacceptable	Undecided	Total
Atomic	110	58	32	200
%	27,5	14,5	8	50
Non-atomic	41	126	33	200
%	10,3	31,5	8,3	50
Total	151	184	65	400
%	37,8	46	16,3	100

Chi-Square

Pearson Chi-square 0

Likelihood Ratio 0

The results of the first experiment point against the predictions of the traditional view, since bare mass nouns combined with individuating predicates are accepted. Moreover, the rate of acceptability of count bare singulars with the same type of predicate is low, against the predictions of the

traditional view. Finally, it seems that the features natural versus non-natural atomicity play a role because acceptability judgments were manipulated by manipulating them.

4. Experiment 2

4.1 Method

Participants

The sample comprises 200 undergraduate students from Universidade Federal de Santa Catarina and Instituto Federal de Santa Catarina, none of them from Letters. The data were collected in a number of sessions, in the student's classes, and their participation was volunteer and anonymous.

Materials

We built 20 sentences of which 12 were target sentences, and 8 distracting one – two of which were control sentences. The sentences were randomly combined and then randomly separated in the 4 different lists, each with 11 sentences: 6 distracting sentences, and 3 target sentences.

Procedures

The sentences were controlled, reducing as much as possible the interference of other phenomena, in particular pragmatic inferences, forcing speakers to strongly rely on grammatical clues. The sentences did not care for reproducing local contextualization. In order to keep the speaker's attention to the grammar, we controlled formal features, such as number of prosodic syllabi and number of words.

We controlled the prosodic syllabi for both distracting and target sentences: 5 or 8 metric syllabi. Each sentence has the same number of words. For metrical counting, we assumed the tradition view on the prosody of BrP, according to which the tonic syllabus is the last but one:

(20) Ca/be/lo/sen/ros/ca.

Cabelo se enrosca.

hair curls itself

(21) Li/nha/cus/ta/trin/ta/cen/ta/vos.

Linha custa trinta centavos.

thread costs thirty cents

We controlled two theoretical variables: the count versus mass distinction, and the natural versus non-natural atomicity. From the 12 target sentences, 6 are built with mass nouns, and 6 with countable ones; 6 are naturally atomic,

and 6 are non-naturally atomic ones; these parameters were independently analyzed. Below is the list of the target sentences:

- (22) a. Lama se mistura. (M NNA)
mud itself mistures
- b. Criança se arranha. (C NA)
child herself scratches
- c. Cabelo se enrosca. (M NA)
hair itself curls
- d. Linha se embaraça. (C NNA)
thread itself embarrasses
- e. Ouro custa vinte reais. (M NNA)
gold costs twenty reais
- f. Cachorro custa trinta reais. (C NA)
dog costs thirty reais
- g. Faqueiro pesa doze quilos. (M NA)
cutlery weighs twelve kilos
- h. Linha custa trinta centavos. (C NNA)
thread costs thirty cents
- i. Água cai por cima da outra. (M NNA)
water falls for up of+the other
- j. Mulher briga uma com a outra. (C NA)
woman fights one with+the other
- k. Móvel encosta uma na outra. (M NA)
furniture leans one in+the other
- l. Cerca encaixa uma na outra. (C NNA)
fence fits one in+the other

The distracting sentences in experiment 2 were:

- (23) a. João gosta de dançar.
João likes to dance
- b. Cachorro dorme de lado.
dog sleeps aside
- c. Leite faz mal pra saúde.
milk is bad for health
- d. Carol é minha parceira.
Carol is my partner
- e. O sol está lá no alto.
the sun is above there
- f. O mar balança o barqueiro.
the sea rocks the boatman

The control sentences were:

- (24) a. Montanha desce do raio.
 mountain falls of+the lightning
 b. Maria riu de Gustavo.
 Maria laughed of Gustavo

There were four lists. Each list was evaluated by 50 university students. None of the lists were evaluated by the same speaker. The speakers were asked to mark their very first impression about the “naturalness” of the sentence. The command was: does the sentence sound fine? The experiment design was inspired in Basso’s experiment (2007) for evaluating the acceptability of telic perfective sentences combined with ‘for X time’ adjuncts. Each speaker received a list of sentences, which were followed by a 15 cm line with a smiling face on one hedge and a sad face in the other, as exemplified in (25):

(25) ☺ _____ ☹

Results and Analysis

Although our line of evaluation was gradable, as in (25) above, only three areas were considered: 1. the area around the smile face, which was interpreted as indicating the speaker’s acceptance of the sentence; 2. the evaluations in the area around the middle of the line which we considered undecided speakers – i.e. the speaker did not know whether the sentence was acceptable or not; and 3. the area around the sad face, treated as expressing the speaker’s rejection of the sentence.

Table III shows that the results found in the first experiment concerning the traditional view are confirmed. According to the traditional view we expect that the score of acceptability of mass sentences is very low, whereas count sentences should be highly acceptable independently of the feature of natural atomicity.

In the second experiment, each sentence was evaluated by 50 speakers. Since there were 12 target sentences, the total amount of evaluations is 600.⁹

The first result is that the rates of acceptability and unacceptability of the target sentences are very close, independently of the count feature, as can be seen in the last line of table III: from the total amount of target sentences only 34,7 were considered acceptable.

Unexpected for the traditional view, BM were accepted; the rate of rejection is only slightly greater: 20,7% of acceptability (from a universe of 300 evaluations), against 22,3% of unacceptable judgments. The prediction

⁹ Thanks to Prof. Marcos Rocha, the data was processed by the software SPSS (*Statistical Package for the Social Sciences*) and analyzed by means of bivariate statistical comparison (*chi-square*).

according to the traditional view is that the rate of unacceptability should be very high in particular given that the only clue is grammatical; the combination of bare mass with individuating predicates should be ungrammatical. Thus, the result in table III contradicts the expectations of the traditional view.

But the most striking result for the traditional view is that BSs had a low score of acceptability: only 14% of the speakers accepted them, against 27% who found them unacceptable. Also surprising is the comparison between the rate of acceptability of mass nouns, 20,7%, and that of count nouns, 14%: mass nouns are accepted by more people than count sentences are. These results go against the predictions of the traditional view. From the other side, the rate of unacceptability with mass nouns is lower, 22,3%, than that with count nouns, 27,1%; this is also an unexpected result

Thus, the results from the second experiment also contradict the predictions of the traditional view.

Table III: Crosstab between count/ mass vs. judgments of the second experiment

	Acceptable	Unacceptable	Undecided	Total
Mass	124	134	42	300
%	20,7	22,3	7	50%
Count	84	167	49	300
%	14	27,1	8,2	50%
Total	208	301	91	600
%	34,7	50,2	15,2	100%

Chi-quadrado

Pearson Chi-square 0,003

Likelihood Ratio 0,003

The next table shows the crossing between natural versus non-naturally atomic predicates, independently of the variable mass and count nouns: 'criança' (child) and 'mobília' (furniture) are both naturally atomic, whereas 'cerca' (fence) and 'ouro' (gold) are non-naturally atomic. Naturally atomic sentences are accepted by 38% of the speakers, and rejected by 48%. Thus they were more rejected than accepted, a very unexpected result given that individuating predicates ask for units, and naturally atomic things have natural units. But the results with non-naturally atomic sentences confirm our prediction, since non-naturally atomic are more rejected than accepted: the rate of acceptability is 31,3% and that of rejection 52,3%. These results do not allow us to confirm our prediction, because, although the non-naturally atomic sentences have a higher score of rejection with individuating predicates than the naturally atomic ones, we expected a greater acceptability of natural atomic sentences, independently of the mass and count distinction. We have no explanation for this fact yet.

Table IV also allows us to consider the results of crossing the two parameters, taking the natural versus non-natural atomicity as the perspective from which we look at the data. The acceptance of naturally atomic count sentences scores higher than its acceptance with naturally atomic mass ones: 22,3% against 15,7%. The rate of unacceptability reflects the same pattern: naturally atomic count sentences are less rejected than naturally atomic mass sentences, 22,3% against 25,7%. Thus, speakers' degree of acceptability increases when natural atomicity is combined with count nouns. The reverse is also true: speakers reject more when non-natural atomicity is combined with mass nouns.

Thus, speakers seem to be paying attention to the combination of natural and semantic atomicity. Non-naturally atomic count nouns show a higher score of acceptability than non-naturally atomic mass nouns: 19% against 12,3%, respectively. From the rejection perspective, we find that non-naturally atomic sentences have a greater rejection score with mass nouns, 30%, against 22,3% rejection of count nouns. Thus, count nouns are more acceptable independently of the feature of natural versus non-natural atomicity, an indication that disposition to have semantic atoms is the relevant feature; i.e. speakers' judgments are guided by semantic features.

The relevance of Chi-Square may be showing us that natural atomicity plays a role when the speaker cannot rely on semantic atomicity. This is the case with mass nouns, because they do not have semantic atoms. Thus, mass nouns which are naturally atomic show a higher score of acceptability; by contrast non-natural atomic mass nouns show the highest score of unacceptability.

Table IV: Crosstab between atomic/non-atomic combined with mass/count vs. judgment of the second experiment

		Acceptable	Unacceptable	Indefinite	Total
Naturally Atomic	Count	67	67	16	150
	%	22,3	22,3	5,3	50
	Mass	47	77	26	150
	%	15,7	25,7	8,7	50
Total		114	144	42	300
%		38	48	14	100
Non-naturally atomic	Count	57	67	26	150
	%	19	22,3	8,7	50
	Mass	37	90	23	150
	%	12,3	30	7,7	50
Total		94	157	49	300
%		31,3	52,3	16,3	100

Chi-Square for atomicity

Pearson Chi-square 0,037

Likelihood Ratio 0,036

Chi-Square for non-atomicity

Pearson Chi-square 0,002

Likelihood Ratio 0,002

5. Conclusions

The traditional view predicts that BS sentences are grammatical with individuating predicates, whereas BM sentences are ungrammatical, because mass nouns are atomic-less sums. These predictions were not corroborated by our experiments. Both experiments showed that BM sentences are acceptable to some degree. Moreover, their rate of acceptability is dependent of the parameter of natural atomicity: natural atomic BM predicates have a higher score of acceptability than the non-natural atomic mass predicates. This prediction is corroborated by experiment 2, since the rate of acceptability of BM that are naturally atomic is higher than that of BM with non-naturally atomic predicates: 15,7 versus 12,3 respectively. The rate of rejection of non-natural atomic mass predicates is the highest.

Results that contradict the traditional view predictions were also found with respect to the BS: the traditional view predicts that the BS is grammatical with individuating predicates, independently of any other feature. This is not true, since BS noun phrases combined with individuating predicates were rejected more than accepted in both experiments. The fact that speakers do not find natural to use bare singular nouns in individuating contexts may be an indication that they behave massively –as the intuition in Camacho & Pezatti (1996) – in the sense that they are more like name of properties. The access to the individuals is then some sort of last resort operation.. Moreover, this approach may explain why if the BS is naturally atomic, then the chance of its being acceptable is slightly higher than if it is a non-naturally count noun.

Thus, both experiments point towards the conclusion that we cannot take for granted that the combination of the BS and the BM nouns with individuating predicates shows that the BS does not behave alike the BM noun. In fact, the results point precisely in the opposite direction: both structures are not very easily accepted by speakers. What both experiments show is that speakers do not find natural to combine the BS and the BM with individuating predicates. In Experiment 2 we verified whether the relevant factor was natural versus non natural atomicity but the results turned out to be inconclusive. It is still not clear what factor is interfering in their rejection.

Our contribution is to reopen the debate concerning the relation between BS and BM in BrP, because the predictions of the traditional view are not fulfilled.

References

- Basso, R. M. (2007) *Telicidade e detelicização: semântica e pragmática do domínio tempo-aspectual*. Dissertação de mestrado. Universidade Estadual de Campinas.
- Beyssade, C. (2006) Les définis génériques en français: noms d'espèces ou sommes maximales. In *Noms nus et généricité* (C. Dobrovie-Sorin, editor), pp. 33-63. Saint-Denis: Presses Universitaires de Vincennes
- Camacho, R. G., Pezatti, E. G. (1996) As subcategorias nominais contável e não-contável. In *Gramática do Português Falado*, 1 (M. A. Kato, editor), pp. 155-183. Ed. Campinas/São Paulo: ED. UNICAMP/FAPESP, 1996, v. 5.
- Carlson, G. (1997) *Reference to Kinds in English*. PhD dissertation, University of Massachusetts, Amherst.
- Cheng, L. & Sybesma, R. (1999) Bare and not-so-bare nouns and the structure of NP, *Linguistic Inquiry*, **30**, 509-542.
- Chierchia, G. (1998) Reference to kinds across languages, *Natural Language Semantics*, **6**, 339-405.
- Featherston, S. & Sternefeld, W. (eds.) (2007) *Roots. Linguistics in search of its evidential base. Studies in Generative Grammar 96*. Berlin: Mouton de Gruyter.
- Gillon, B. (1992) Towards a common semantics for English count and mass nouns, *Linguistics and Philosophy*, **15**, 597-639.
- Link, G. (1983) The logical analysis of plurals and mass terms: a Lattice-theoretical approach. In *Meaning, Use and the Interpretation of Language* (R. Bäuerle, C. Schwarze & A. von Stechow, editors), pp. 303-323. Berlin: Walter de Gruyter.
- Müller, A. L. (2002) Genericity and the denotation of common nouns in Brazilian Portuguese. *DELTA. Documentação de Estudos em Linguística Teórica e Aplicada*, v. 18, n. 2, 287-308.
- Müller, A. L. & Paraguassu, N. (2006) The count-mass distinction in Natural Languages. In VI Workshop on Formal Linguistics (2006), Florianópolis. Caderno de programação e resumos. Florianópolis: UFSC, 2006, 1-24.
- Munn, A. & Schmitt, C. (1999) Against the nominal mapping parameter: Bare nouns in Brazilian Portuguese. In *Proceedings of NELS*, 29 (P. Tamanji, M. Hirotsu & N. Hall, editors), pp. 339-353.
- Munn, A. & Schmitt, C. (2005) Number and indefinites, *Língua*, **115**, 821-855.
- Paraguassu, N. & Müller, A. L. (2008) The default denotation of nouns in Brazilian Portuguese. Paper presented at 8 Workshop on Formal Linguistics in Curitiba.
- Rothstein, S. (2008) *Counting and the Mass-Count Distinction*. Manuscript.
- Schaden, G. (2009) Two ways of referring to Kinds in German. Genericity Conference, Paris.
- Schmitt, C. & Munn, A. (2002) The syntax and semantics of bare arguments in Brazilian Portuguese, *Linguistic Variation Yearbook*, 1-32.
- Weskott, T. & Fanselow, G. (2008) Variance and Informativity in Different Measures of Linguistic Acceptability. In *Proceedings of the 27th West Coast Conference on Formal Linguistics* (N. Abner & J. Bishop, editors), pp. 431-439. Somerville, MA: Cascadia Proceedings Project.

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