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Jewelry's missing "jewel": Containment, doublets, and gaps as probes into countability and the count/mass distinction

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Abstract
Nouns like *jewelry, kitchenware* or *furniture* are challenging for any theory of the count/mass distinction because while they are mass, they share with count nouns the property of being countable, i.e., measurement along a cardinality scale. The traditional view (Chierchia 1998a, 2010; Bale and Barner 2009) rests on the idea that these nouns are lexically specified or marked plural but enter the syntax into a mass frame thus preventing subsequent count properties such as numeral modification or overt plural marking. However, the root morphemes that participate in this class of mass nouns also participate in the class of count nouns giving rise to doublets: *jewel-s/ry, kitchen-s/ware*. Using data from English and Spanish, I show that object mass nouns are built on top of the same base (i.e., root+n) as count nouns, and argue that object mass marking and number-marking are in overlapping distribution. I provide a theory of the count/mass distinction that explains these properties and that can be extended to explain the variation reported within the object mass class. At a more general level, this proposal illuminates our understanding of the grammatical encoding of the count/mass distinction, countability and the locus of crosslinguisticic variation.

Keywords Morphosyntax · Mass/count distinction · Number · Countability · Object mass nouns

1 Introduction

Languages may manifest morpho-syntactic differences in the distribution of nominal expressions. For example, expressions such as *chair, jewel* or *kitchen* can appear in the contexts in (1) whereas those expressions such as *blood* or *mud* in (2) cannot.

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(1) a. Johnny saw every chair/jewel/kitchen ...
b. and Moira only saw this one. *one* = chair/jewel/kitchen

(2) a. * Johnny saw every blood/mud ...
b. * and Moira only saw this one. intended: *one* = blood/mud

The expressions in (1) can occur with the universal determiner *every* and serve as the antecedent for the pronominal form *one*. However, those expressions in (2) are ungrammatical with said determiner and cannot be the antecedent of *one* (e.g., Bale and Gillon 2020). The nominal expressions in (1) are generally referred to as count NPs, and those in (2) are generally referred to as mass NPs.

Mass NPs, like those in (2), are unmarked (for number), but there is a subclass of mass NPs that must be plural-marked and lacks an unmarked counterpart. These include *dregs*, *suds* or *fumes* in (3).

(3) a. these/those/*this dregs
b. * every dreg(s)
c. * these dregs and those ones

The determiners in (3a) must agree in the plural form; yet, they are ungrammatical with *every* in (3b) and cannot be understood as antecedents for *one* in (3c).

In terms of the semantic properties, what largely distinguishes between the two classes of nouns is the asymmetry in (4), as observed by Bale and Barner (2009). For instance, (plural) count NPs like *jewel* can be measured in terms of cardinality under comparatives, while unmarked and plural mass NPs like *blood* or *dregs* cannot.[1]

(4) a. Johnny saw more jewels than Moira did. CARDINALITY, #VOLUME
b. Johnny saw more blood than Moira did. VOLUME, #CARDINALITY
c. Johnny saw more dregs than Moira did. VOLUME, #CARDINALITY

I will refer to the expressions that must be measured in terms of cardinality as 'countable'. In contrast, I will use the term 'non-countable' for those expressions that cannot be measured in terms of cardinality (i.e., the individuals they denote cannot be counted and must be measured in terms of a different dimension).

Expressions such as *furniture, jewelry* or *kitchenware* constitute an interesting case. They are mass NPs as illustrated by their ungrammaticality with *every* and as antecedents for *one*, in (5); but, unlike the other mass nouns, they are also countable: *more jewelry* in (6) is understood as 'larger number of (individual) pieces of jewelry'.

(5) a. * Johnny saw every jewelry ...
b. * and Moira only saw this one. intended: *one* = jewelry

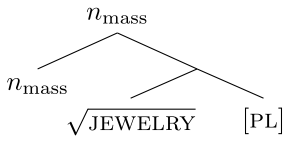
(6) Johnny saw more jewelry than Moira did. CARDINALITY, #VOLUME

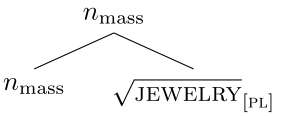
[1] Singular count NPs are not acceptable with comparative expressions due to independent semantic factors, i.e., non-cumulativity (e.g., Quine 1960; Cheng 1973; Link 1983; Bach 1986b; Krifka 1989; Schwarzschild 2006), but they can still be measured in terms of cardinality when modified by numerals: *one jewel*. In fact, in many languages, numerals require that the NP be singular (e.g., Ionin and Matushansky 2018; Pancheva 2023).

These NPs that are both countable and mass are typically known as 'object' mass nouns.[2] It is this hybridity in their properties that has made object mass nouns a challenging class for theories of the count/mass distinction.

The traditional view, going back to Chierchia (1998a), and subsequent work by Chierchia (2010), Bale and Barner (2009), Cowper and Hall (2009, 2012, 2014), Rothstein (2010), Smith (2021), is based on the following assumptions: (i) object mass nouns are listed in the lexicon with the same underlying form that they surface with, e.g., (7a); and (ii) these forms are lexically plural, which ensures a countable denotation, but enter the syntax in a mass frame as in (7b).[3] This mass syntax prevents subsequent count properties including, but not limited to, the illustrated compatibility with certain count determiners, such as *every*.

(7) a. $\sqrt{\text{JEWELRY}}$ is mapped to the surface form *jewelry* $\sqrt{\text{FURNITURE}}$ is mapped to the surface form *furniture*

b. 



However, the traditional view misses an important empirical generalization regarding the classes of roots found in object mass NPs: the root morphemes found in the class of object mass NPs are coextensive with those found in the class of count NPs, giving rise to doublets, e.g., (8) from English.

(8) a. jewel-s
jewel-ry

b. word-s
word-age

c. table-s
table-ware

d. carpet-s
carpet-ing

The examples in (8) illustrate that the same $\sqrt{\text{ROOT}}$ is used for both the count noun form and for the object mass counterpart. Where the two forms differ is in the subsequent morphological marking on the shared nominalized root: count noun forms are marked for number, realized as *-s* if plural but null if singular; object mass nouns are 'object'-marked (e.g., *-age, -ery, -ware*) where one would have expected

[2]The label 'object' makes reference to the idea that these expressions, like count nouns, denote object-concepts as opposed to substance-concepts, in the sense of Soja et al. (1991): discrete individuals with clearly distinguishable boundaries. Given their hybridity, they are also referred to as 'fake' mass nouns (e.g., Chierchia 1998a,b, 2021).

[3]The label *mass* in (7b) is used purely pretheoretically. The trees are meant to reflect the different implementations of this idea in the works cited in the text: [PL] acts as a modifier of the constituent that contains the root (e.g., Cowper and Hall 2009, 2012, 2014) or the root comes specified as plural from the lexicon (e.g., Chierchia 1998a, 2010; Bale and Barner 2009).

the number morpheme to surface. This morphosyntactic complexity is not limited to English, but it is also reported for Dutch (De Belder 2013), and French and Hebrew (Cohen 2020).

Relatedly, despite sharing the same nominalized root (e.g., *jewel-, carpet-*), number-marking and object-marking seem to have a different semantic effect on the constituent they attach: the plural-marked form of (8a) is understood as a plurality of individual jewels, whereas the object-marked form is understood as a different type of plurality, namely a collection of jewel-related items. What is more, some object mass nouns may be understood in two different ways (Lieber 2004, 2016; Alexiadou 2015; Cohen 2020): i) a collective understanding, and ii) an eventive one, such as 'the result of doing X' or 'the result of being an X'. This is the case of *carpeting* in *the carpeting*, for example, illustrated in (9).

(9) *the carpeting*
   a. the collection of carpet-like items. (*collective*)
   b. the result of covering a surface with a carpet. (*eventive*)

Crosslinguistically, languages might differ in the ways that they instantiate this class of nouns. In fact, Chierchia (2010, 2021) reports that there are languages that have a count/mass distinction, but lack an object mass subclass. Under the traditional view, these crosslinguistic differences must be lexical: where languages differ is in the set of roots that are part of their inventory. While this might not be a fatal argument by itself for the traditional view, there are languages where such variation cannot be deemed lexical. For example, the counterpart of this subclass of nouns in Czech is not plural marked, but collective marked; and, it allows (complex) numeral modification, as opposed to English (Grimm and Docekal 2021).

I consider that these observations present strong challenges for the traditional view and that an alternative explanation is in order. In particular, we must explain why object mass nouns have a large degree of overlap with count nouns, but have a mass distribution otherwise. In addition, we must explain the variation we observe across languages (e.g., impossibility of numeral modification in some, such as English, but not in others, such as Czech).

In this paper, I argue that object mass nouns are morphosyntactically complex and fall under the umbrella of productive nominalization processes (e.g., Lieber 2004, 2016; De Belder 2013; Alexiadou 2015; Cohen 2020). More specifically, I will motivate the novel generalization in (10), on the basis of English and Spanish data.

(10) *Countable Base Generalization*
Object mass nouns are built on top of the same countable base (e.g., root+categorizer) as count nouns.

Based on (10), I propose the hypothesis in (11). In a nutshell, like Bobaljik's (2012, p.4) original formulation of containment, the central claim of this hypothesis is as follows: just like only (12a) is a possible representation of count nouns, so is (13a) for object mass nouns; but (13b) is not.

(11) The representation of object mass (and count nouns) properly contains a countable base.

(12) a. $[[\underbrace{\sqrt{\text{ROOT}}\ \text{COUNTABLE}}_{jewel}]\ \underbrace{\text{SG/PL}}_{\text{-Ø/-s}}\ ]$

b. * $[\underbrace{\sqrt{\text{ROOT}}}_{jewel}\ \underbrace{\text{SG/PL}}_{\text{-Ø/-s}}\ ]$

(13) a. $[[\underbrace{\sqrt{\text{ROOT}}\ \text{COUNTABLE}}_{jewel}]\ \underbrace{\text{OBJECT MASS}}_{\text{-ery}}\ ]$

b. * $[\underbrace{\sqrt{\text{ROOT}}}_{jewel}\ \underbrace{\text{OBJECT MASS}}_{\text{-ery}}\ ]$

A conclusion that we extract from the generalization and the schematic underlying representations in (12a) and (13a) is that SG/PL and OBJECT MASS morphemes occupy the same position in the structure. This leads to hypothesizing that object mass-marking and number-marking are in overlapping distribution. That is, both terminals require that their complement is a countable base. This hypothesis would explain why object mass nouns are never number-marked; and, it is consistent with the idea that count NPs are just a subset of the NPs that are countable.

The goal of the paper is to argue that the characteristic properties of object mass nouns, as both mass and countable expressions, follow from the containment hypothesis in (11). However, in order to be able to do so, we must first describe the properties of the other relevant subclasses of (mass and count) nouns and develop a general theory of the count/mass distinction. This will set the baseline for the object mass noun cases under investigation. In particular, I argue that the OBJECT MASS piece in (13a) is not [PL], but a [COLL(ECTIVE)] feature (e.g., De Belder 2013; Alexiadou 2015; Lieber 2016) which, (at least) in languages like English and Spanish, is located in an outer categorizing head. I will also argue that the location of this feature may be subject to variation, very much like [PL] (Ghomeshi 2003; Acquaviva 2008; Wiltschko 2008, 2021; Alexiadou 2011; Kramer 2016). It is this difference that distinguishes English/Spanish-type languages from Czech.

At a more general level, this investigation raises questions about the encoding of the count-mass distinction and countability. In particular, it will shed light on the following architectural issues: what makes an NP count as opposed to mass? What makes countable NPs, both count and mass, form a natural class? What determines variation?

2 Data management

Most of the data in this article come from English and Spanish. Unless otherwise noted in the text, uncited data report the judgments of 14 adult native English speakers and 18 adult native Spanish speakers, including the author. All the native English speakers, five of whom were linguists, spoke different varieties of North American English listed here: Canada (x2), California (x7), Nebraska, New Jersey, Oklahoma, Ohio, and Wisconsin. There was a total of 6 women and 8 men; all had a college degree and 7/14 held PhDs. The average age of the group was 38 years old (30–48). The

native Spanish speakers, none of whom were linguists except the author, spoke different varieties of Iberian and American Spanishes. The Iberian Spanishes included Córdoba (x2), Madrid (x3), Tarragona, and Valladolid (x7). The American Spanishes included Mexican (Mexico City, Santiago, and Mexicali, x3) and Peruvian (Lima, x2). There was a total of 9 women and 9 men; all of them had a college degree; only 5/18 had a post-BA education, and 4 of them held PhDs. The average age of the group was 44 years old (30–67).

Data elicitations, carried out both in-person and over email, conformed to the general principles for conducting fieldwork (Matthewson 2004; Bochnak and Matthewson 2015, 2020; Kibrik 2017; Gribanova 2022). The main method of elicitation consisted of grammaticality and felicity judgments. These judgment tasks typically involved a binary evaluation (acceptable vs. not acceptable, or acceptable in context vs. not acceptable in context). For sentences that required a judgement about interpretation verbal or written presentation of the relevant discourse context was provided. Evaluation on a Likert scale from 1 to 7 was used when more fine-grained judgments were needed.

Data and insights from other languages come from a selection of documents including published journal articles, conference proceedings, edited volumes, and descriptive grammars. The sources for these are appropriately cited in text or next to the relevant example(s).

3 Determining the different classes

3.1 Diagnostics for the count/mass distinction

As the examples in (14) show, there is a difference between NPs like *jewel* and *blood* when it comes to number-marking:[4] only the former have a singular/plural distinction.[5] NPs like *jewelry* pattern with *blood* in this respect. Plural mass nouns like

[4]I will use the following three diagnostics to determine whether a noun is count or mass (e.g., Pelletier 1975; Bunt 1979, 1985; Doetjes 1997, 2021; Chierchia 1998a, 2010, 2021; Deal 2017, among others).

(i) a. Number marking: Does the noun make a singular/plural distinction?
b. Modification: Can the noun be modified by cardinal numerals?
c. Determiners: Can the noun occur with certain determiners (e.g., *every*, *several*)?

An additional one that will not be discussed is concerned with ellipsis options, including *one*-substitution. For details, see Bloomfield (1933), Harley (2005), Bale and Gillon (2020), Toquero-Pérez (2024a).

[5]Some expressions like *water*, *tea*, *wine*, whose roots are generally found in mass syntactic contexts, may be 'shifted' into a count form. In such an environment, these nouns have a singular/plural distinction and can be modified by cardinal numerals, like ordinary notional count nouns. When this happens as in (i), however, they are understood as a container or a type, and not as a substance. I take this to be the result of imposing a count syntax on the relevant root (Borer 2005a; Mathieu 2012; Deal 2017). Thus, in this regard they are no different from NPs like *jewel(s)*.

(i) Johnny ordered these wines / one wine for the table.

An anonymous reviewer wonders whether the same container or type understanding is available for other notional mass nouns like *blood* or *mud*. The answer for English and Spanish seems to be negative (cp.

fumes have a plural-marked form, but lack an unmarked counterpart. These patterns are replicated in (15) for Spanish.[6]

(14) a. Johnny saw this jewel / these jewel-s.
b. Johnny saw this blood / *these blood-s.
c. Johnny saw this jewelry / *these jewelri-es.
d. Johnny saw these fume-s / *this fume.

(15) a. Johnny vio esta joya / esta-s joya-s. = (14a)
Johnny saw this.F jewel this.F-PL jewel-PL
b. Johnny vio esta sangre / *esta-s sangre-s. = (14b)
Johnny saw this.F blood this.F-PL blood-PL
c. Johnny vio esta joyería / *esta-s joyería-s. = (14c)
Johnny saw this.F jewelry this.F-PL jewelry-PL
d. Johnny vio esto-s vívere-s / *este vívere.
Johnny saw this.M-PL provision-PL this.M provision
'Johnny saw these provisions / *this provision.'

A note is in order here. Unavailability of number-marking in object mass nouns is not restricted to those ending in *-ery*. Additional examples are given in (16).

(16) a. This furniture, This footwear, This equipment
*These furniture-s, *These footwear-s, *These equipment-s
b.

El	mobiliario,	el	follaje,	el	profesorado
the.M	furniture	the.M	foliage	the.M	faculty
*Lo-s	mobiliario-s,	*lo-s	follaje-s,	*lo-s	profesorado-s
the.M-PL	furniture-PL	the.M-PL	foliage-PL	the.M-PL	faculty-PL

Besides, there seems to be a correlation (at least in both languages) between the availability of number-marking on the noun and the possibility of cardinal numeral

Nez Perce or Yudja). For example, even those speakers in the medical field seem to reject (14b) and (ii) as grammatical.

(ii) [A patient has lost a lot of blood and needs a large transfusion but bags only hold 500ml each]
*Bring me all the bloods / every blood in the fridge.

[6] I am not claiming that having a particular exponent is determining evidence for a nominal expression to belong to the class of object mass nouns. To determine whether they do, one must consider the syntactic environment in which the expressions occur. For instance, *-ment* in *several development-s* cannot be an object mass exponent given the presence of plural-marking and the plural-count determiner *several*. Similarly, nouns ending in *-ería* '-ery' in Spanish can have a count interpretation when understood as a location. For example, *joyería* in (i) picks out the store where jewelry is sold. Given these syntactic differences, we can assume that the underlying structures must be different from the ones involved in object mass nouns, despite the fact that the same vocabulary item *-ment* or *-ería* is inserted (De Belder 2013; Lieber 2016).

(i) La joyería / la-s (dos) joyería-s de la calle Serrano de Madrid
the.F jewelry the.F-PL two jewelry-PL of the street Serrano of Madrid
'The (two) jewelry store(s) in Calle Serrano in Madrid'

modification. That is, only the NPs that make a singular/plural distinction can be modified by cardinal numerals. This is illustrated in (17) for English and (18) for Spanish. In both languages, numerals higher than '1' require the noun to be plural-marked.

(17) a. Johnny saw one jewel / two jewel-s.
b. * Johnny saw one blood / two blood-s.
c. * Johnny saw one jewelry / two jewelri-es.
d. * Johnny saw one fume(s) / two fume-s.

(18) a. Johnny vio una joya / dos joya-s. = (17a)
Johnny saw one.F jewel two jewel-PL
b. * Johnny vio una sangre / dos sangre-s. = (17b)
Johnny saw one.F blood two blood-PL
c. * Johnny vio una joyería / dos joyería-s. = (17c)
Johnny saw this.F jewelry two jewelry-PL
d. * Johnny vio un vívere(-s) / dos vívere-s.
Johnny saw one.M provision-PL two provision-PL
'Johnny saw one provision / two provisions.'

The last distributional difference that I will describe is related to the choice of determiner. Some determiners are sensitive to whether the noun is count (and singular-marked or plural-marked) as opposed to mass (e.g., Chierchia 1998a, 2021; Borer 2005a; Gillon 2012; Cowper and Hall 2014; Bale 2016; Bale and Gillon 2020). English *each* and *every* are only compatible with singular count nouns, shown in (19), whereas others such as *several* are only compatible with plural count nouns, shown in (20).

(19) a. Johnny saw each/every jewel.
b. * Johnny saw each/every jewels.
c. * Johnny saw each/every blood.
d. * Johnny saw each/every jewelry.

(20) a. * Johnny saw several jewel.
b. Johnny saw several jewel-s.
c. * Johnny saw several blood.
d. * Johnny saw several jewelry.

For *several*, it is not enough that the noun is plural-marked; it must also be count. This is supported by the data point in (21): a plural mass noun like *fumes* or *dregs*, which triggers plural agreement on the determiner as in (3a), is ungrammatical with *several*.

(21) * Johnny saw several fume-s.

There are also determiners like *which* that seem to require the noun to be count, regardless of number-marking. This is shown in (22).[7]

(22) a. Which jewel(s) did Johnny see?
b. * Which blood/dregs did Johnny see?
c. ?/* Which jewelry/furniture did Johnny see?

These types of determiner-noun pairings are also observed in Spanish: *cada* 'each' in (23) is only compatible with singular count nouns; *vari-o/a-s* 'several-M/F-PL' in (24) is only compatible with plural count nouns; and indefinite *algún* 'some/a few' in (25) is compatible with count nouns, regardless of their number-marking.[8,9]

[7] An anonymous reviewer reports that (22c) is not ungrammatical for them. Thus, the '?/*' marker. None of the English speakers consulted for this research accepted cases like (22c). In fact, these speakers were also consistent with their judgments when *which* introduced a relative clause, as in (i), and appeared in sluicing or ellipsis contexts, as in (ii).

(i) a. * John talked about the jewelry/furniture/footwear which was expensive.
b. John talked about the jewelry/furniture/footwear that was expensive.

(ii) a. * I know John bought jewelry/furniture/footwear, I just don't know which.
b. I know John's jewelry/furniture/footwear is here, I just don't know what/*which is his.

It is possible that for those who accept (22c), like the reviewer, and potentially (i) and (ii), *which* is not lexicalizing a count determiner, but a countable determiner: *which*+{count NP, object mass NP}.

[8] *Cada* is gender invariant, i.e., it does not mark overt gender agreement, and determiner *varios* lacks a counterpart unmarked for number. *Algún* may be translated as 'a/some' when occurring with singular count nouns, but the most idiomatic translation in the plural is 'a few' (see Gutiérrez-Rexach 2001; Martí 2008, 2015).

[9] I have kept using the object mass noun *jewelry* in English and in Spanish to establish a consistent minimal pair with the count noun counterpart *jewel*, but these are to be taken as representative examples of the whole class. In addition, this is so because in Spanish the object mass noun may have a different gender than the count noun counterpart, a point I will come back to later on. As far as I understand, there are no distributional differences between *furniture, jewelry, baggage, carpeting* regarding the properties being surveyed here. To illustrate that this is also the case in Spanish, examples with the pairs *mueble* 'furniture piece' and *mobiliario* 'furniture' are given in (i)–(ii).

(i) Number marking and cardinal numeral modification:
a. Johnny compró un mueble / dos mueble-s.
Johnny bought one.M furniture.CT two furniture.CT-PL
'Johnny bought one furniture piece / two furniture pieces.'
b. * Johnny compró un mobiliario / dos mobiliario-s.
Johnny bought one.M furniture two furniture-PL
'Johnny bought one furniture / two furnitures.'

(ii) Determiner choice
a. cada mueble/ *mueble-s/ *mobiliario (*singular count D*)
each furniture.CT furniture.CT-PL furniture
b. vario-s mueble-s/ *mueble/ *mobiliario (*plural count D*)
several.M-PL furniture.CT-PL furniture.CT furniture
c. algún mueble/ *mobiliario (*count D*)
some.M furniture.CT furniture
alguno-s mueble-s/ *mobiliario
some.M-PL furniture.CT-PL furniture

(23) a. Johnny vio cada joya.
Johnny saw each jewel

b. * Johnny vio cada joya-s.
Johnny saw each jewel-PL

c. * Johnny vio cada sangre.
Johnny saw each blood

d. * Johnny vio cada joyería.
Johnny saw each jewelry

e. * Johnny vio cada vívere-s.
Johnny saw each provision-PL
Lit. 'Johnny saw each provisions'

(24) a. * Johnny vio varia-s joya.
Johnny saw several.F-PL jewel

b. Johnny vio varia-s joya-s.
Johnny saw several.F-PL jewel-PL

c. * Johnny vio varia-s sangre.
Johnny saw several.F-PL blood

d. * Johnny vio varia-s joyería.
Johnny saw several.F-PL jewelry

e. * Johnny vio vario-s vívere-s.
Johnny saw several.M-PL provision-PL
Lit. 'Johnny saw several provisions'

(25) a. Johnny vio alguna joya.
Johnny saw a.F jewel
'Johnny saw a jewel'

b. Johnny vio alguna-s joya-s.
Johnny saw a.F-PL jewel-PL
'Johnny saw a few jewels'

c. * Johnny vio alguna sangre.
Johnny saw a.F blood
Int.: 'Johnny saw a blood'

d. * Johnny vio alguna joyería.
Johnny saw a.F jewelry
Int.: 'Johnny saw a jewelry'

e. * Johnny vio alguno-s vívere-s.
Johnny saw a.M-PL provision-PL
Int.: 'Johnny saw a few provisions'

The data discussed so far have served (i) to group nouns into two categories (i.e., count and mass) and (ii) to confirm that nouns like *furniture, jewelry* or *footwear* belong to the mass category. The properties described are summarized in Table 1.

Table 1 Morpho-syntactic properties of mass & count nouns (English & Spanish)

	Unmarked mass	Plural mass	Object mass	Count
SG/PL distinction	*	*	*	✓
Modification by numerals	*	*	*	✓
Compatible with *each/every, cada*	*	*	*	✓
Compatible with *several, varios*	*	*	*	✓
Compatible with *which, algun(os)*	*	*	*	✓

In the next section, I show how modification by dimensional adjectives (e.g., size/shape) can be used as a countability diagnostic: only count nouns and object mass nouns allow said modification.

3.2 Size adjectives as countability markers

In addition to the interpretation of the noun under comparison (e.g., Bale and Barner 2009), size adjective modification has been proposed as a reliable diagnostic for determining whether the expression is countable or non-countable (Schwarzschild 2011; Deal 2016, 2017). The generalization that arises from this work is as follows: only countable expressions can be modified by dimensional adjectives.

This is first shown for the non-countable expressions: unmarked mass and plural mass nouns. As illustrated in (26) for English and (27) for Spanish, these nouns are unacceptable with adjectives like *small* or *large*.[10]

(26) a. * The small blood.
* The blood is small.

b. * The large fumes.
* The fumes are large.

(27) a. * La sangre pequeña
The.F blood small.F
'The small blood'
* La sangre es pequeña
the.F blood is small.F
'The blood is small.'

b. * Lo-s vívere-s grande-s,
The.M-PL provision-PL big.M-PL
Lit.: 'The large provisions'
* Lo-s vívere-s son grande-s
the.M-PL provision-PL are big.M-PL
'The provisions are large.'

On the contrary, object mass nouns and count nouns, which are both measured in terms of cardinality, also allow size adjective modification. The relevant English data is in (28), and the Spanish counterparts are in (29).

[10] In Spanish, adjectives must agree in gender, and also number in the case of plural nouns, with the noun.

Table 2 Countable and non-countable noun classes (English & Spanish)

	Non-countable		Countable	
	Unmarked mass	Plural mass	object mass	count
Cardinality measurement	*	*	✓	✓
Size adjective modification	*	*	✓	✓

(28) a. the small jewel/chair
The jewel/chair is small.

b. the small jewel-s/chair-s
The jewel-s/chair-s are small.

c. the small jewelry/furniture
The jewelry/furniture is small.

(29) a. la joya/ piel pequeña
the.F jewel fur small.F
'the small jewel/fur'
La joya/ piel es pequeña.
the.F jewel fur is small.F
'The jewel/fur is small.'

b. la-s joya-s/ piele-s pequeña-s
the.F-PL jewel-PL fur-PL small.F-PL
'the small jewels/furs'
La-s joya-s/ piele-s son pequeña-s.
the.F-PL jewel-PL fur-PL are small.F-PL
'The jewels/furs are small.'

c. La joyería/ peletería pequeña.
The.F jewelry furriery small.F
'The small jewelry/furriery.'
La joyería/ peletería es pequeña
the.F jewelry furriery is small.F
'The jewelry/furriery is small.'

The distribution of count and mass nouns regarding their countability properties is given in Table 2. A generalization that can be drawn from this table is that being count entails being countable, whereas being mass does not entail being non-countable.

4 Object mass nouns: Morphosyntactic complexity

Now that the count/mass and the countable/non-countable distinctions have been established, we can start to dive deep into the object mass class. In this section, I concentrate on the morphemes that participate in the object mass class and compare these morphese with those found in the count class. By doing so, we will notice two relevant patterns, one regarding the types of roots found across the two classes of nouns and another regarding the distribution of object-mass and number markers.

Table 3 Count and object mass noun doublets in English

a.	Singular count	Object mass (*-ware*)	b.	Singular count	Object mass (*-wear*)
	kitchen	kitchen-ware		foot	foot-wear
	table	table-ware		beach	beach-wear
	gift	gift-ware		day	day-wear
	dish	dish-ware		neck	neck-wear
c.	Singular count	Object mass (*-age*)	d.	Singular count	Object mass (*-ing*)
	bag	bagg-age		light	light-ing
	lug	lug-age		carpet	carpet-ing
	word	word-age		bed	bedd-ing
	sign	sign-age		pipe	pipe-ing
e.	Singular count	Object mass (*-(e)ry*)			
	jewel	jewel-ry			
	drape	drape-ry			
	gadget	gadget-ry			
	image	image-ry			

4.1 Count and object mass doublets

A close examination of the object mass data shows that a significant number of them, if not all, is morphologically complex. First of all, the root morphemes that participate in the class of object mass nouns also participate in the class of count nouns giving rise to doublets like the ones in Table 3 for English, and Table 4 for Spanish. In every set of examples, the count member of the doublet is in the singular (e.g., unmarked) form, to avoid any potential suppletion on the root triggered by plural-marking. The English data have been organized by the morphemes identified in Cohen (2020).[11]

Looking at the data in these examples, we observe that the same root morpheme that is found in a count noun is also found in the object mass noun counterpart. This is true regardless of how the object mass marker is spelled out. In some cases, the root has undergone allomorphy in the presence of the object mass affix. This is illustrated by pairs such as the following in Spanish: *mueble* 'furniture piece' (singular count) vs. *mobil-iario* 'furniture' (object mass); *cubierto* 'silverware piece' (singular count) vs. *cubert-ería* 'silverware' (object mass).

Looking at the count forms, being singular, the number marker is not overt. On the surface, we could represent the forms in these tables as in (30), where 'Ø' indicates that singular marking is null. In Spanish, the root is separated from the number markers by the vowels *-a/-o/-e* (e.g., Roca 1989; Harris 1991). These vowels are declension

[11] Some object mass morphemes in Spanish, namely *-aje, -ería*, are more productive than others such as *-(i)ario*. The same seems to be true for English: *-wear, -ware* vs. *-age* or *-ure*.

Table 4 Count and object mass noun doublets in Spanish

a.	Singular count	Object mass (*-mento*)	b.	Singular count	Object mass (*-ería*)
	arma 'weapon'	arma-mento 'weaponry'		joya 'jewel'	joy-ería 'jewelry'
	carga 'load'	carga-mento 'collection of goods'		chiquillo 'little kid'	chiquill-ería 'collection of little kids'
	línea 'line/boundary'	linea-mento 'lineation'		cubierto 'silverware piece'	cubert-ería 'silverware'
c.	Singular count	Object mass (*-aje*)	d.	Singular count	Object mass (*-ado/a*)
	hoja 'leaf'	foll-aje 'foliage'		profesor 'teacher'	profesor-ado 'faculty'
	peón 'laborer'	peon-aje 'collection of laborers'		alcantarilla 'sewer'	alcantarill-ado 'sewerage'
	equipo 'outfit/utensil'	equip-aje 'baggage'		vaca 'cow'	vac-ada 'collection of cows'
e.	Singular count	Object mass (*-iario*)			
	mueble 'furniture piece'	mobil-iario 'furniture'			

class markers, and they are generally associated with category-defining *n*-heads (e.g., Oltra-Massuet and Arregi 2005; Embick 2010; Kramer 2015; Kučerová 2018).[12]

(30) a. kitchen-Ø, foot-Ø, jewel-Ø

b. arm-a-Ø, equip-o-Ø, muebl-e-Ø
weapon-CLS2-SG equip-CLS1-SG funiture-CLS3-SG

Assuming that roots must appear with a categorizing element (Marantz 1997; Harley and Noyer 1998; Arad 2003; Embick 2010; Harley 2014; Merchant 2019), which may or not be associated with some exponent, and that number-marking on these nouns is more peripheral to the root than the categorizer, illustrated by the declension class markers in (30b), (e.g., Ritter 1991; Cowper 2005; Picallo 2008), we can decompose these count expressions into the sequence of morphemes in (31).

(31) $\sqrt{\text{ROOT}}\text{-}n_{\text{COUNTABLE}}\text{-SG/PL}$.

I will refer to the grouping of the root and the *n* morphemes in (31) as the 'countable base.' Descriptively, we can take this to mean that the root has been marked countable and has been assigned a countable meaning, i.e., a predicate that is true of atoms and their sums (e.g., Bunt 1979, 1985; Krifka 1989; Chierchia 1998a, 2010, 2021; Bale and Barner 2009; Rothstein 2010, 2017). Number (e.g., SG or PL) is then added to that countable base.

That said, and given the already observed similarities, we can hypothesize there to be a parallelism with their object mass counterparts: the same countable base to

[12] By "associated with," I am not claiming, and neither does the literature cited in the text, that declension class markers expone the category feature *n*. Instead, I am taking the view that declension class markers correspond to abstract morphemes, e.g., CLS or THV, that are adjoined to *n* post-syntactically.

which Number attaches serves as the base to which the object mass morpheme also attaches. This is schematically represented in (32).

(32) $\sqrt{\text{ROOT}}$-$n_{\text{COUNTABLE}}$-OBJECT MASS.

Like SG/PL in (31), OBJECT MASS is not directly attached to the root but to the countable base. However, at this point, this is just a hypothesized representation. It may be the case that OBJECT MASS is directly attached to the root instead, instantiating the categorizing head: $\sqrt{\text{ROOT}}$-$n_{\text{OBJECT MASS}}$. Given that the two hypothesized representations locate OBJECT MASS in a different position with respect to the root and other morphemes, they make different predictions regarding morpheme ordering: if OBJECT MASS attaches to the countable base, just like Number does, its vocabulary items will follow vocabulary items associated with *n*; but, if OBJECT MASS attaches to the root directly, unlike Number, its vocabulary items will never follow those vocabulary items associated with *n*.[13] I test these hypotheses next, showing that only (32) is supported.

4.2 OBJECT MASS attaches to the countable base

The difficulty of adjudicating between the two hypotheses is driven by the fact that in many cases, in particular in English, there is no overt realization associated with *n* that intervenes between the root and other markers. I present evidence from two empirical domains that suggest that OBJECT MASS is not directly attached to the root and in fact parallels the position of SG/PL: declension class markers in Spanish, and diminutives in English.[14]

In Spanish, all nominalized roots are marked for a certain declension class. As we already observed in (30b), this marker appears between the root and number morphology. Following Kramer (2015), we can assume the following three declension classes: Class 1, nouns ending in *-o*; Class 2, nouns ending in *-a*; and Class 3, nouns ending in *-e*. Many nouns of Class 3 do not have an overt exponent in the singular form, but *-e* always shows up in the plural; see Table 5.[15]

[13] I would like to thank an anonymous reviewer for wondering whether (32) could be independently motivated and whether the alternative could be ruled out.

[14] Hedde Zeijlstra (p.c.) says that this argument is a bit weak. In particular, Zeijlstra claims that it is unclear whether there are actually any overt instantiations of category *n* features, and that class markers or diminutives may be introduced by their own node above *n*. Following Picallo (2008), we can call this node Class: (i).

(i) [[Root $n_{\text{COUNTABLE}}$]$_{n\text{P}}$ Class]$_{\text{ClassP}}$

Suppose we take (i) to be the countable base, the morpheme order predictions remain intact, which I take as strong evidence in favor of the argument being made in this section:

(ii) a. if OBJECT MASS attaches to the base, it will follow overt realizations of Class; but,
b. if it is directly attached to the root (or root+*n*), it will never follow overt realizations of Class.

I want to thank H. Zeijlstra for this discussion.

[15] Unlike *-a*/*-o* agreement markers on adjectives or determiners, these exponents are not gender exponents. For more information about declension classes in Spanish, see Roca (1989), Harris (1991), Kramer (2015).

Table 5 Noun classes in Spanish with examples

Class 1		Class 2		Class 3	
SG	PL	SG	PL	SG	PL
man-o-Ø	man-o-s	dí-a-Ø	dí-a-s	lápiz-Ø-Ø	lápic-e-s
hand-CLS1-SG	hand-CLS1-PL	day-CLS2-SG	day-CLS2-PL	pencil-CLS3-SG	pencil-CLS3-PL
'hand'	'hands'	'day'	'days'	'pencil'	'pencils'

As already mentioned, in order to account for this surface position, declension class markers have been associated with the *n* node (e.g., Oltra-Massuet and Arregi 2005; Embick 2010; Kramer 2015; Kučerová 2018). In morphologically complex nouns, declension class exponents adjacent to the root are typically null when the vocabulary item realizing the following morpheme starts with a vowel; but they are overt if the following vocabulary item starts with a consonant. An example is in (33) with the augmentative *-az-* (roughly meaning 'large' or 'big') and the diminutive *-cit-* (roughly meaning 'small' or 'little'): in (33a), the class marker *-e* is null in the presence of the vowel-initial augmentative *-az-*, but it must be overt in (33b) when the diminutive starts with a consonant.[16]

(33) a. flor-Ø, flor-aza, *flor-e-aza
flower-CLS3 flower-AUG.F flower-CLS3-AUG.F
'flower, big flower'

b. flor-Ø, *flor-cita, flor-e-cita
flower-CLS3 flower-DIM.F flower-CLS3-DIM.F
'flower, little flower'

That said, we can use the distribution of root adjacent declension class markers to probe whether OBJECT MASS is attached to the countable base or directly to the root. More precisely, if attached to the base, we expect two things: (i) the declension class marker will be overt as long as the vocabulary item for OBJECT MASS starts with a consonant; and (ii) the overt class marker will surface between the root and the vocabulary item for OBJECT MASS. If instead OBJECT MASS is directly attached to the root, we expect no class marker to be ever realized between the root and OBJECT MASS.

The only OBJECT MASS exponent in Table 4 that begins with a consonant is *-mento*. The rest all incorporate an initial vowel (e.g., */a/* in *-aje* or */e/* in *-ería*). As the examples in (34) show, the class marker *-a* separates the root from the object marker *-mento*, just like it separates the root from the plural marker in count nouns.

[16] Like adjectives in the language, diminutives and augmentatives are overtly marked for gender: *-a* if the gender of the noun is feminine or *-o* if masculine: (i)

(i) la man-o, la man-it-a/*o, la man-az-a/*o
the.F hand-CLS1 the.F man-DIM-F/M the.F man-AUG-F/M
'the hand, the little hand, the big hand'

(34) a. arm-a(-s), arm-a-mento
weapon-CLS2-PL weapon-CLS2-OBJ.MASS.CLS1

b. carg-a(-s) carg-a-mento
load-CLS2-PL load-CLS2-OBJ.MASS.CLS1

c. líne-a(-s) line-a-mento
line-CLS2-PL line-CLS2-OBJ.MASS.CLS1

The data in (34) are only consistent with the hypothesized representation in (32): *-a* is an exponent associated with *n* and *-mento* realizes OBJECT MASS. What is more, plural marking and the object mass marker surface on the same position with respect to the class marker and the root; this result is expected under countable base attachment, but not under direct attachment. We can therefore generalize that the other instances of object mass nouns are no different at an abstract level. They only differ on whether the class marker associated with *n* is overt or not—a situation which is not surprising given the observations from Class 3 in Table 5.

In the case of English, we cannot rely on declension class markers, because there are none. However, we can make use of diminutive formation strategies. Diminutives in English (e.g., *-ie/-y, -let, -ling*) must appear between the root and the plural-marker as shown in (35).

(35) a. dog-s, dogg-ie-s, *dog-s-ie

b. pig-s, pigg-ie-s, pig-let-s, *pig-s-let/-ie

Regarding their surface position, diminutives are similar to declension class markers, and in fact they have also been associated with *n*-nodes (e.g., Wiltschko 2006; Ott 2011; Fábregas 2013; Kramer 2015; Gouskova and Bobaljik 2022). If OBJECT MASS attaches to the base, we expect it to be realized following the diminutive—just like the realization of PL in (35). If OBJECT MASS directly attaches to the root, that same order is not expected to be grammatical. The relevant examples are in (36).[17]

(36) a. dog-ware, dogg-ie-ware, *dog-war-ie

b. pig-wear, pig-let-wear, *pig-wear-let

c. pig-wear, pigg-ie-wear, *pig-wear-ie

The data in (36) show that diminutives and object mass markers can co-occur in the same expression; and in fact, when they do, the diminutive must surface between the root and the object mass marker. Deviating from this ordering is judged ungrammatical. This is expected if the diminutive, associated with *n*, is closer to the root than OBJECT MASS realized as *-ware/-wear*.

[17] An example of *doggiware* found online is given in (i). I would like to thank Ruth Kramer (p.c.) for example (36b).

(i) So im getting a new pup in a few weeks time and i was wondering if there are any PJ doggieware sites. i think a sausage dog in a mookie shirt would be awesome!
(https://community.pearljam.com/discussion/81493/pj-apparel-for-dogs)

4.3 The generalization

The observations from doublets, class markers, and diminutives support the structural descriptions in (37), for both count and object mass nouns. I take these descriptions as evidence for the generalization in (10) repeated below:

(37) a. $[[\underbrace{\sqrt{\text{ROOT}}\ n_{\text{COUNTABLE}}}_{\textit{jewel}}]\ \underbrace{\alpha[\text{OBJECT MASS}]}_{\textit{-ery}}\ ]$ (to be slightly updated)

b. $[[\underbrace{\sqrt{\text{ROOT}}\ n_{\text{COUNTABLE}}}_{\textit{jewel}}]\ \underbrace{\text{Number}[\text{SG/PL}]}_{\textit{-Ø/-s}}\ ]$

(10) *The Countable Base Generalization*
Object mass nouns are built on top of the same countable base (e.g., root+categorizer) as count nouns.

The insight behind the generalization is that the grammatical representation of object mass nouns has a nominal core consisting of a root and a categorizer that makes the root countable. This core is the exact same one that count nouns are built on. Where the two expressions differ is in the extra piece of structure: count nouns have a terminal node Number, which may be specified as either [SG] or [PL]; but object mass nouns do not have Number. Instead, they have a terminal node, whose category I am representing with 'α' for the moment, that encodes [OBJECT MASS].[18]

There is a potential caveat to this generalization, regarding doublets. Despite the fact that doublets are common and productive, it is not the case that every object

[18] An anonymous reviewer notes that the generalization is not fully accurate because of examples like (i):

(i) a. sucre, sucre-rie
sugar sugar-OBJ.MASS
'sugar, confectionery' (French)

b. suiker, suiker-goed
sugar sugar-OBJ.MASS
'sugar, confectionery' (Dutch)

c. silver, silver-ware

The reviewer claims that these examples have a mass and non-countable base (e.g., *silver, sugar*). I want to argue that these are seemingly counterexamples and that the base is actually countable. It is not uncommon for notional mass roots to enter the syntax into a count(able) frame. We already observed this in footnote 5 for expressions like *some beers, three wines, two waters*. Therefore, we can hypothesize that the roots in the expressions in (i) have undergone the same process: they have been paired with a countable categorizer. Evidence in support of this line of thinking is in (ii) where *silver* and *sugar* are understood as count(able) expressions (e.g., container, type), as shown by plural-marking and numeral modification.

(ii) a. How many silvers are you willing to trade for one gold? One silver is not going to be enough.

b. Two sugars, no milk please.

c. Fruit is rich in sugars.

d. Ajouter le-s trois sucre-s: vanillé, de canne et en poudre
add the-PL three sugar-PL vanilla of cane and in powder
'add the three sugars: vanilla, can and powdered.' (French)

This is also true for Dutch *suiker* 'sugar.' In fact, De Belder (2013, p.45: ex.83) illustrates that *suiker* may appear in a count(able) environment, directly modified by a numeral:

Table 6 Morphologically complex object mass nouns with no count noun counterpart

Singular count	Object mass	Root
–	*furniture*	$\sqrt{\text{FURN}}$
–	*cutlery*	$\sqrt{\text{CUT}}$
–	*equipment*	$\sqrt{\text{EQUIP}}$

mass noun has a count noun counterpart. For example, in English there are some well-known lexical gaps. There is no vocabulary item **furn*, **cutle,* or **equip* that means 'furniture piece,' 'cutting tool,' or 'equipment piece,' respectively. The lack of the count vocabulary item may thus be seen as a serious issue for the generalization.

However, two notes are in order. First, these gaps are not universal but rather language-specific. For example, in Spanish there are count noun expressions for *furniture* and *equipment*: *mueble* and a *equipo* in Table 4. That is, it is possible for a language to express the concept FURNITURE as a count noun. What is more, it is a well-known fact that languages may vary with respect to whether the same concept encoded by a root is expressed as a count or mass noun (e.g., Chierchia 1998a).[19] It is therefore possible that this very fine-grained variation is modulated by the morphosyntactic environment in which certain roots occur (e.g., Soja et al. 1991; Deal 2017).

Second, the fact that a prototypical object mass noun lacks a count noun counterpart does not entail that the former are morphologically simplex. In fact, vocabulary items like *furniture, cutlery,* and *equipment* can be decomposed into smaller parts. For example, the surface form *furniture* is related to expressions such as *furnish* (verb) and *furnishing* (gerund, noun): all three forms share a root $\sqrt{\text{FURN}}$. Similarly, in the case of *cutlery*, the noun is related to the expression *cutlet* (noun) which is also related to *cut* (noun, verb): all three vocabulary items are related by virtue of sharing the same root $\sqrt{\text{CUT}}$. The situation with *equipment* is the same: *equip* (verb) and *equipment* both share the same root $\sqrt{\text{EQUIP}}$. Therefore, it does not seem unreasonable to hypothesize that these object mass nouns are also morphologically complex, as summarized in Table 6.[20] What begs an explanation is why there is no singular/plural count vocabulary item.

5 The properties of [OBJECT MASS]

We have established that object mass nouns are morphologically complex. The question now is what the morpheme α[OBJECT MASS] is. In the following subsections, I

(iii) drie suiker-s: fructose, glucose en saccharose.
three sugars-PL fructose glucose and saccharose
'three sugars: fructose, glucose and saccharose.'

[19] For instance, as noted in Chierchia (1998a), the concept for HAIR is expressed as mass in English (*e.g., all the hair*) but as count in Italian (e.g., *tutt-i i capell-i* 'all-M-PL the.M.PL hair-M.PL').

[20] We can think about the relation between these forms in parallel to the relation that exists between *sing(s)*, *singer*, *sang* and *song*: they are not lexical primitives, but are all related to the root $\sqrt{\text{SING}}$ (Embick 2015, p.18).

show that (i) it must be different from the morpheme Number[PL]; and (ii) it has the properties of a nominalizer in the two languages under consideration.

5.1 [OBJECT MASS] is not [PL]

One of the challenges with object mass nouns is their resistance to take plural-marking. A possible hypothesis that is consistent with the generalization in (10), and the structural representations in (37), is that the α[OBJECT MASS] is itself Number[PL]. This is in line with the insights from the traditional view outlined in the introduction. Besides, this hypothesis is attractive on semantic grounds: it is generally assumed that these two classes of nouns denote atomic pluralities, i.e., sets of atoms and their sums (Gillon 1992; Chierchia 1998a, 2010, 2021; Bale and Barner 2009; Rothstein 2010, to name some examples).

However, it would be problematic and unmotivated to equate α[OBJECT MASS] in (37a) to Number[PL]. For starters, it is never exponed as [PL] and it never triggers plural agreement both DP-internally and externally. This is shown in (38) for English: the demonstratives must be unmarked for number and the verb must agree in third person singular with the object mass noun subject.

(38) a. this/*these furniture, this/*these jewelry
b. Furniture is/*are sold here, and jewelry is/*are sold there.

The same agreement patterns are observed in the Spanish examples in (39): the definite determiner must also be unmarked for number in (39a), and the (copula) verb must agree in third person singular with the object mass noun subject in (39b).

(39) a. el/ *lo-s mobiliario, el/ *lo-s armamento
the.M the.M-PL furniture the.M the.M-PL weaponry
b. El mobiliario está/ *están aquí, y el armamento está/ *están allí.
the.M furniture is are here and the.M weaponry is are there
'The furniture is here and the weaponry is there.'

Second, allomorphy is conditioned by the terminal nodes and the features on them, given that certain locality and domain requirements are met, rather than the vocabulary items themselves. Thus, if this terminal node α[OBJECT MASS] was in fact Number[PL], we would expect it to trigger the same types of root allomorphy that [PL] on Number does. However, this prediction is not borne out. Some English data are given in (40) and (41).[21]

[21] Two notes are in order here. First, following Harley (2014), I am assuming that roots are abstract indices that are mapped to a form and meaning depending on the syntacitic context in which they are found. For expository and descriptive purposes, however, I will refrain from the index representation. Second, when looking at the rules, the reader might be wondering where the categorizing *n*-head is in the contextual specification. For ease of representation, I have left it out of the formulation of the rules here. The full contextual representation is something like the following in (i).

(i) $\sqrt{\text{ROOT}} \Leftrightarrow$ *root*/ $\_n_{\text{COUNTABLE}}$] Num[PL]/α[OBJECT MASS]]

(40) a. $\sqrt{\text{LEAF}} \Leftrightarrow$ *leave*/ _Num[PL] *leaves*
b. $\sqrt{\text{LEAF}} \Leftrightarrow$ *foli*/ _α[OBJECT MASS] *foliage*, **leavage*

(41) a. $\sqrt{\text{FOOT}} \Leftrightarrow$ *feet*/ _Num[PL] *feet*
b. $\sqrt{\text{FOOT}} \Leftrightarrow$ *foot*/ _α[OBJECT MASS] *footwear*, **feetwear*

In (40), [PL] triggers the insertion of the vocabulary item *leave*; if we supplant the Number with α, a different vocabulary item is inserted: *foli-*. A perhaps more compelling case is (41). The root for *foot* has a suppletive allomorph in the plural: *feet*. In contrast, α[OBJECT MASS] does not trigger suppletion of the root, which surfaces as the unmarked or elsewhere form, e.g., *foot*. Similar allomorphy contrasts can be found in Spanish. Some representative examples are in (42)–(44).

(42) a. $\sqrt{\text{HOJ}} \Leftrightarrow$ *hoja*/ _Num[PL] *hojas* ('leaves')
b. $\sqrt{\text{HOJ}} \Leftrightarrow$ *foll*/ _α[OBJECT MASS] *follaje*, **hojaje* ('foliage')

(43) a. $\sqrt{\text{MUEBL}} \Leftrightarrow$ *mueble*/ _Num[PL] *muebles* ('furniture pieces')
b. $\sqrt{\text{MUEBL}} \Leftrightarrow$ *mobil*/ _α[OBJECT MASS] *mobiliario*, **muebliario* ('furniture')

(44) a. $\sqrt{\text{CUBR}} \Leftrightarrow$ *cubierto*/ _Num[PL] *cubiertos* ('silverware pieces')
b. $\sqrt{\text{CUBR}} \Leftrightarrow$ *cubert*/ _α[OBJECT MASS] *cubertería*, **cubiertería* ('silverware')

The Spanish case in (42) parallels the *leave/foliage* contrast: a plural feature does not trigger suppletion of the root, but the object mass counterpart feature does. The cases in (43) and (44) show a different type of allomorphy, but allomorphy nonetheless. In (43), the *b*-form lacks a diphthong and involves metathesis of the liquid and the vowel, which has shifted in height. In (44), the *b*-form lacks a diphthong as well.

We can conclude that this morpheme is not Number[PL]. It cannot be Number[SG] either. If these nouns were [SG]-marked, we would expect them to form a natural class with singular count nouns with respect to some property beyond singular agreement.[22] And yet, they cannot occur with determiners such as *each, every, a*, and their relevant crosslinguisticic counterparts; and they can occur with quantity determiners (e.g., *much, many, more*), which are unacceptable with singular count nouns. This is shown in (45) with the comparative form of the determiner.[23]

For now it is just worth mentioning that any theory of allomorphy must account for the fact that Num[PL] may trigger allomorphy on the root past the nominalizer, just like T does on the root past the verbalizer, considering that allomorphy is constrained by locality (Embick 2010, 2015; Bobaljik 2012; Moskal 2015; Moskal and Smith 2016; Bobaljik and Harley 2017). In footnote 40, I discuss two approaches to this: the cyclic+zero-morph approach from Embick (2010) and the Hyper-Contextual VI rule approach from Moskal and Smith (2016). I show that, for the purposes of this paper, nothing hinges on this choice.

[22] Singular agreement need not entail [SG]-marking. Singular agreement may arise as the default option in the absence of any number feature being present (Cowper 2005; Nevins 2007, 2011; Coon and Keine 2021; Toquero-Pérez 2024b).

[23] The reason behind this is restriction is found in the structure of the extension of the NP. See footnote 1.

(45) a. more jewelry/*jewel
b. más joyería/ *joya
more jewelry jewel

Last but not least, if it is the case that α[OBJECT MASS] is Num[SG], the lack of a plural counterpart is puzzling. In particular, this is due to the fact that [SG] and [PL] have been argued to both be on the same Number terminal (Ritter 1991; Cowper 2005; Harbour 2007, 2011; Cowper and Hall 2009, 2014). Thus, one would need to explain why these nouns are compatible with one feature but not the other.

Despite the fact that the α, encoding the [OBJECT MASS], and Number, encoding [SG/PL], are distinct, they share some notable properties. They may both trigger allomorphy on the root (e.g., (40) and (41)), and, as the structural descriptions in (37) indicate, the syntactic position that they occupy is very much the same. Based on these facts, and the observation that Number and α morphemes never co-occur, I propose the hypothesis in (46).[24]

(46) *The Number-OBJECT MASS Overlap*
Number and the α[OBJECT MASS] terminal are in overlapping distribution, i.e., they both require complementation by $n_{\text{COUNTABLE}}$.

5.2 The object mass morpheme is a nominalizer

The data just discussed raise the question about the category that α belongs to. Building on De Belder (2013, p.42), I am going to argue that this morpheme is actually a nominalizer of category *n* in these languages.[25]

Pretheoretically at least, it is argued that morphemes generating object mass nouns in these languages are 'derivational,' rather than 'inflectional.' One of the hallmark properties of derivational morphemes is that they can change the category of the base they attach to. This is true of the object mass morpheme. The same morpheme can create (mass) nouns out of other nouns, but also out of verbs. Some examples are given in (47)–(48), where category labels on the base are taken descriptively at face value.[26]

(47) a. $carpet_{\text{V}}$ + *-ing*→ $carpeting_{\text{N}}$
'the result of covering something with a carpet'
b. $carpet_{\text{N}}$ + *-ing*→ $carpeting_{\text{N}}$
'a collection of carpet-related items'
c. $jewel_{\text{N}}$ + *-ry* → $jewelry_{\text{N}}$
'a collection of jewel-related items'

(48) a. $alcantarillar_{\text{V}}$ + *-ado*→ $alcantarillado_{\text{N}}$ ('sewerage')
'the result of installing sewers'

[24] Two elements α and β are in overlapping distribution if α and β can both occur in context *C*, and the choice between the two can indicate a difference in meaning (Bale and Reiss 2018).

[25] This is also the case in Dutch (De Belder 2013), but not in Czech to be discussed in Sect. 9.

[26] In Sect. 8, I will discuss the eventive object mass nouns in detail and argue that their representation is consistent with the containment hypothesis.

b. *alcantarilla*$_{N}$ + *-ado*→ *alcantarillado*$_{N}$ ('sewerage')
'a collection of sewer-related items'

c. *vaca*$_{N}$ + *-ada*→ *vacada*$_{N}$
'a collection of cows'

As observed in the examples above, bases with the object mass exponent seem to be turned into a noun. In addition, related to this recategorization, the effect that OBJECT MASS has on the interpretation of the stem may be idiosyncratic. That is, while it can create pluralities, these are not pluralities of X-items, where 'X' stands for the individual/event that the base denotes; instead, these are pluralities of items that stand in some relation with whatever the base denotes.

That relation seems to be underspecified. For instance, if we think about what it means for something to qualify as 'jewelry,' we can intuitively say something along these lines: jewelry is a plurality or collection of items that are canonically made from or that contain jewels. Thus, we can think of 'made of/contains' as the value for the relation introduced by OBJECT MASS when the base is *jewel-*.[27] Similarly, 'footwear' can be thought of as 'a plurality/collection of items that are worn by someone's feet.'

Under decompositional approaches to morphosyntax, such as Distributed Morphology (Halle and Marantz 1993), the difference between derivation and inflection is not a grammatical primitive but domain and category-driven. Derivational morphemes are generally represented by categorizing heads and inflectional morphemes correspond to functional heads, such as those encoding number, person, definiteness or case (Marantz 1997, 2001, 2013; Arad 2003; Embick and Marantz 2008; Kramer 2015; Wood 2023). In this regard, labeling the α as *n* as opposed to Number is consistent with this view.

In addition to creating new nouns, nominalizers have been shown to change the gender of the base they attach to (Wiltschko 2006; Steriopolo and Wiltschko 2010; Kramer 2015). OBJECT MASS has this property as well. In Spanish, the count nouns *arma* 'weapon' and *grada* 'grandstand' are feminine as indicated by the agreement on the postnominal adjective in (49).

(49) a. arm-a pesad-a
weapon-CLS2 heavy-F
'(a) heavy weapon'

b. grad-a nuev-a
grandstand-CLS2 new-F
'(a) new grandstand'

However, adding object mass markers, such as *-mento* and *-erío* to *arma* and *grada*, respectively, makes the nouns masculine. This is shown in (50), where the adjective must inflect for masculine.

[27] In the article *This Guide to Jewellery Production* by Dauvit Alexander, the author, a professional jeweler, states the following: "Jewellery is broadly defined as "ornament for the body [...] the majority of jewellery can be described as being wearable ornaments, often made from high-value materials such as precious metals and gemstones" (https://make.works/blog/guide-to-jewellery). Cambridge English Dictionary online defines 'jewel' as "a precious stone that is used to decorate valuable objects" (https://dictionary.cambridge.org/us/dictionary/english/jewel).

(50) a. arm-a-mento pesad-o/*a
weapon-CLS2-OBJ.MASS.CLS1 heavy-M/F
'heavy weaponry'

b. grad-Ø-ería nuev-o/*a
grandstand-CLS2-OBJ.MASS.CLS1 new-M/F
'collection of new grandstands'

The data about recategorization and gender shifts are strong evidence for the *n*-status of the α terminal.[28] As a result, we can update our structural description as in (37a) below.

(37a) $[[\underbrace{\sqrt{\text{ROOT}}\ n_{\text{COUNTABLE}}}_{\textit{jewel}}]\ \underbrace{n[\text{OBJECT MASS}]}_{\textit{-ery}}\ ]$ (*final version*)

6 Summary

I have motivated the generalization that object mass nouns and count nouns share a 'countable base' (i.e., root and categorizer) which I represented as in (37) The insight of this generalization leads to the hypothesis in (11) repeated below.

(11) The representation of object mass (and count nouns) properly contains a countable base.

Where the types of nouns differ, however, is in the morpheme that occupies the position outside of the base: Number for count nouns, marking the noun as singular or plural; and a nominalizer in the case of object mass nouns.

The picture that emerges is twofold. First, we can hypothesize that countability is syntactically determined: count nouns (both singular and plural) and object mass nouns form a natural class by being marked for countability. Second, Number and the object mass nominalizer are in overlapping distribution, as formulated in the hypothesis in (46): where you find one, you do not find the other. If correct, this is key, because it provides an avenue for explaining why these nouns resist to be number-marked. Both Number and this nominalizer require a countable-marked complement; that is, the two terminals select for the same sister, which suggests that the two terminals are in competition with each other. In what is left of the paper, I develop a theory that accounts for the properties and the generalizations outlined.

7 Spelling-out the theory: Individuation and number

It is generally assumed in Distributed Morphology-based approaches that there are two distinct domains for the computation of morphological and semantic processes: an "inner" domain and an "outer" domain. The former is tied to morphological

[28] See also Fábregas (2013), Kramer (2015) for additional evidence that changes in declensional class and gender-marking involve renominalization.

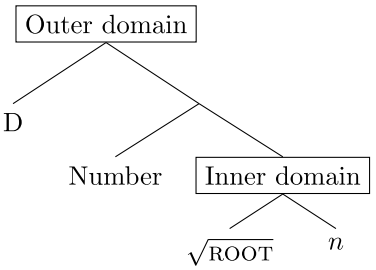


Fig. 1 Inner vs. outer domains within nominals

and lexical irregularity or idiosyncrasies, and the latter is tied to morphological and semantic regularity (e.g., regular inflection). The working hypothesis in the literature is that the inner domain is located within the categorizing domain (i.e., categorizers and below including the root), whereas the outer domain is characterized by functional projections above *n*P, i.e., in the case of nominals Number, D or K, (Marantz 1997, 2001, 2013; Arad 2003; Embick 2010; Harley 2014; Wood 2016, 2023): Fig. 1.

I propose that a theory of the count/mass and countable/non-countable distinction must make reference to at least two types of features, whose syntactic and semantic contribution must differ: individuation and number. The notion of 'individuation' as a syntactic property is not a novel idea, and has in fact been proposed to be encoded in different ways (e.g., Harley and Ritter 2002; Borer 2005a; Cowper and Hall 2009, 2012; Smith 2021). Here I am building on insights from Bale and Barner (2009) and Deal (2017), for who individuation happens at the 'lexical' level. Within a DM-style approach like the one adopted here, this is as close to the root as possible: the categorizing head that the root adjoins to.[29] We can think of [IND(IVIDUATED)] as a classificatory feature that, when applied to a root, makes said root countable; that is, when applied to the predicate denoted by the root, it makes said predicate atomic: it introduces reference to atoms and sums of atoms. We can simply state atomic reference as in (51), where '*' represents Link's (1983) closure under sum operation.

(51) a. P is Atomic iff $\forall x[x \in P \rightarrow x \in {}^{*}\texttt{atom}]$

b. if $\texttt{atom}(x) = \{x\text{: } x \text{ is an atom}\} = \{a, b, c\}$, then ${}^{*}\texttt{atom}(x) = \{x\text{: } x \text{ is an atom or sum of atoms}\} = \{a, b, c, ab, ac, bc, abc\}$

[29] For Bale and Barner (2009), there are two *n*s: one marked [COUNT] and the other unmarked. For Deal (2017), individuation is encoded via an abstract morpheme that is located between the root and Number terminals. Harley and Ritter (2002) propose a feature geometric account according to which INDIVIDUATION is a number feature that dominates [MINIMAL] and [GROUP]. They describe the contribution of this feature as sorting "entities in the world according to their discourse independent properties, that is their quantity and class" (p.490). This notion of [INDIVIDUATION], i.e., a classificatory feature that sorts the noun or expression into things that can be counted, is very much aligned with what I am proposing in the main text and with the formalization in Bale and Barner (2009) and Deal (2017). On Harley and Ritter's account, [SG] and [PL], what they call [MINIMAL] and [GROUP], entail [INDIVIDUATION]. Given that there are plural-marked nouns that are not necessarily countable or 'individuated,' I have decided not to commit to such a feature geometric relation.

If the category head lacks the [IND] feature, the root will not be marked for countability, and will therefore be non-countable. In semantic terms, the nominal predicate will be anti-atomic, i.e., not be generated from the set of atoms. See Bunt (1979), Gillon (1992), Wellwood (2019) for a definition.[30]

That said, the categorizing *n*s that roots may combine with come into the two "flavors" in (52).

(52) Countable vs. Non-countable *n*

a. *n*[IND(IVIDUATED)]

b. *n*

The presence of the [IND] feature on *n* is conceptually justified. The countable/non-countable distinction is in many ways idiosyncratic, and generally considered a "lexical" property of roots (Soja et al. 1991; Chierchia 1994; Rips and Hespos 2019). [IND] is within the inner nominal domain identified in Fig. 1, which is responsible for such idiosyncrasies. What is more, it is also not unreasonable to hypothesize that a root must first be individuated by introducing the relevant atomic structure that constitutes the basis for counting before the cardinality of the atoms in its extension can be measured (e.g., via number marking, quantity determiners or numeral modification).[31]

It is also empirically justified to separate plural-marking from individuation marking. For instance, determiners are not only sensitive to the noun being number-marked, but also to it being count; thus we need a feature making [IND] (in addition to Number) a possible goal for probes on determiners to enter an `Agree` relation with. Second, there are plural-marked nouns like *fumes* in English or *víveres* 'provisions' in Spanish that are nevertheless mass and non-countable. These facts are problematic for any theory in which plural-marking entails countability, as proposed by Borer (2005a) and Cowper and Hall (2009, 2012). Moreover, having this feature helps us formally capture the similarities between object mass nouns and count nouns: the countable base is an [IND]-marked root.

Besides [IND] on *n* making the basic countability distinction, I assume that there are two number features: [SG] for singular and [PL] for plural. In the case of count nouns, these features are encoded by a Number head which is located above *n* and below D (e.g., Ritter 1991; Alexiadou 2004; Cowper 2005; Picallo 2008; Harbour 2011; Toquero-Pérez 2025). I propose that Number requires complementation by an *n*P specified as [IND]. I take this to be a selectional requirement, which I represent with the bullet feature [·IND·] on the Number head.[32] Following Adger (2003), I assume that selectional features must be checked under sisterhood: a feature [·F·] on a syntactic object Y is checked when Y is sister to another syntactic object Z which bears a matching feature *F*. A head with a selecting feature will project the label of the newly created node: $\{\alpha[\cdot\beta\cdot], \beta\} \rightarrow \{\alpha, \{\alpha[\cdot\cancel{\beta}\cdot], \beta\}\}$

[30] Bale and Barner (2009, p.238) refer to an atomic predicate as 'individuated' and to the anti-atomic one as 'continuous.' For a formal definition of `atom`, see them.

[31] See, for instance, Rothstein (2010, 2017, 2021): atomic reference constitutes the basis for counting.

[32] See Svenonius (1994), Adger (2003), Pesetsky and Torrego (2006), Heck and Müller (2007), Müller (2010), Folli and Harley (2020) for a feature-driven approach to selection.

Number may not be the sole location for number-marking. In fact, it has been argued that the source of plural-marking on lexical or idiosyncratic plurals is not Number but somewhere in the inner NP domain, namely *n* (Alexiadou 2004, 2015; Acquaviva 2008, 2016; Wiltschko 2008, 2021; Kramer 2016; Kouneli 2021). I assume that some *n*s may bear a [PL] feature, giving rise to nouns that are plural, but which need not be count (e.g., plural mass).[33]

Last but not least, it has become evident that we need an additional feature that encodes OBJECT MASS properties. De Belder (2013), Alexiadou (2015), Lieber (2016) call this feature [COLL(ECTIVE)], building on insights from Corbett (2000). In his work, the label 'collective' is used to refer to nouns denoting a group whose members are conceived of as a unit. He goes on to point out that the members of the collection share something in common; Corbett 2000, p.141 refers to it as 'the cohesion of a group.' This is intuitively accurate for the case of object mass nouns.[34]

Given the discussion in Sect. 5.2, this feature is in a *n* head. Just like Number, I take *n*[COLL] to require complementation by an *n*P specified as [IND]: [·IND·]. Semantically, this feature creates a plurality (of sorts) out of predicate that is true of atoms and their sums, described as in (53).[35]

(53) [COLL]: when given an individuated item α, COLL(α) creates a plurality of items β which stand in some relation with α.

In a nutshell, the proposed theory is summarized in (54):

(54) a. Count NPs are marked for [IND] on *n* and [SG/PL] on Number.
b. Mass NPs lack Number.
c. An NP is countable if it is [IND]-marked (e.g., count NPs and object mass NPs).

[33] Despite the differing location, I assume that the meaning of number features may be uniform: [SG] maps a predicate P to a property of minimal parts; [PL] maps P to a property of pluralities X every non-minmal part of which satisfies P. If P is atomic, then the minimal parts will be the atoms and the non-minimal parts will be the sums of said atoms.

(i) a. $[\![\text{SG}]\!] = \lambda P.\lambda x.P(x) \wedge \texttt{minimal}(x)$
b. $[\![a\ book]\!] = \exists x\colon [x \in {}^{*}\texttt{atom}][book(x) \wedge \texttt{minimal}(x)]$ (e.g., $\{a, b, c\}$)

(ii) a. $[\![\text{PL}]\!] = \lambda P.\lambda X.\forall x(X(x) \rightarrow (P(x) \wedge \neg\texttt{minimal}(x)))$
b. $[\![books]\!] = \exists X[\forall x\colon [x \in {}^{*}\texttt{atom}](X(x) \rightarrow (book(x) \wedge \neg\texttt{minimal}(x)))]$
(e.g., $\{ab, ac, bc, abc\}$)

$[\![\text{PL}]\!]$ is not restricted to atomic predicates. This is important given that PL may occur with mass nouns, such as *fumes*. If, as a result of the root not being marked for *n*[IND], P is anti-atomic, i.e., closed under sum, but not generated from the set of atoms (Gillon 1992; Wellwood 2019), we can assume that PL has a trivial effect on the interpretation of P: $[\![fumes]\!]$ is true of pluralities of non-atomic subparts.

[34] See Sect. 5.2 and footnote 27.

[35] A formal definition is given in (i): [COLL] maps an atomic predicate P to a property of pluralities X.

(i) $[\![\text{COLL}]\!] = \lambda P\colon \text{Atomic}(P).\lambda X.\forall x(X(x) \rightarrow \exists y,\ R(P(y) \wedge \texttt{minimal}(y) \wedge y \neq x \wedge R(x, y)))$
'For every x among the Xs, there is a minimal y in atomic P which is different from x and stands in some relation R with x'

Note that the meaning of this feature is not too different from what Tomioka (2021) proposes for associative plurals. More details about the formal semantics may be found in Toquero-Pérez (2024a).

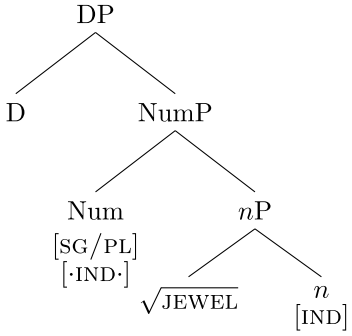
d. Object mass nouns are marked for [IND] but lack of Number. Instead they are [COLL]-marked.

e. Both *n*[COLL] and Number select for an [IND]-marked complement.

7.1 The syntax of count nouns and non-countable mass nouns

I propose that count nouns have the structure in (55). The root adjoins to a categorizing *n* that is specified as [IND], marking the *n*P as countable. Number requires complementation by [IND], as indicated by the bullet feature, which is satisfied upon merger. Number then projects on top of *n*P. This ensures obligatory number marking in count nouns in languages like Spanish or English. Depending on the feature specification on Number, the noun will be marked singular (e.g., [SG]) or plural (e.g., [PL]).

(55) Singular/Plural Count



With respect to unmarked and plural mass nouns, I propose that their underlying structures are as illustrated in (56). Unmarked mass nouns in (56a) are not marked for individuation, which entails non-countable properties, and lack NumP. As a result, singular/plural-marking contrasts are precluded. We can attribute the failure to mark for [SG/PL] to the c-selectional requirement on Number: merger of Number and underspecified *n* will not check off Number's [·IND·] feature. Likewise, plural mass nouns in (56b) are neither [IND] nor Number-marked. The source of [PL]-marking is the nominalizer itself (e.g., Alexiadou 2004, 2011; Acquaviva 2008; Kouneli 2019).[36]

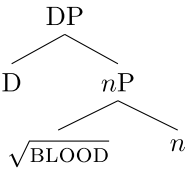
[36] Support for the low position of [PL] with these nouns can be found in noun-noun compounds where only the head of the compound can be inflected for number, a restriction that has been attributed to the fact that the non-head noun may be as large as an *n*P, but it does not include NumP (Wiltschko 2008; Harley 2009): (i)-(ii).

(i) street dog(s), *street-s dog(s).

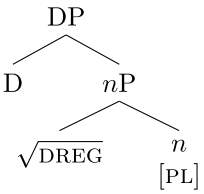
(ii) perro(-s) policía, *perro(-s) policía-s
dog-PL police dog-PL police-PL
'police dog(s)'

When the noun-noun compound has a plural mass noun as a non-head, plural-marking on the non-head survives: (iii)-(iv). This fact is predicted if [PL] on these plural mass nouns is not located on Number, but on *n*, as I am proposing here.

(56) a. Unmarked mass



b. Plural mass



Based on these structures, the reason why mass nouns form a natural class is because of the absence of the Number projection. This conclusion is in line with previous proposals, such as Borer (2005a), Harbour (2009, 2011), Cowper and Hall (2009, 2012), Mathieu and Dali (2021), for who mass nouns are syntactically more impoverished than count nouns. Number is the locus of [SG] and [PL] features in count nouns, and projecting it allows these expressions to show singular (unmarked) and plural contrasts. However, the fact that these mass nouns in (56) lack Number entails that they may only surface unmarked (e.g., (56a)) or plural-marked (e.g., (56b)), but not both. As a result, the unavailability of singular/plural contrasts follows from the absence of NumP.

This featural account can also derive the observations with respect to the determiners in (19)–(25). Assuming that φ-features on determiners are copied via `Agree` between a probe, with unvalued features, and a goal, with a feature that matches the probe (e.g., Chomsky 2000; Carstens 2000; Danon 2011), I propose that these determiners are sensitive to individuation as well as number features on the extended projection of the noun. In particular, while all of the relevant determiners have an [IND:_] probe, they differ in the granularity of the number probes: [SG:_], [PL:_] or [Num:_]. This is summarized in Table 7.

The distribution of the features on the D heads explains why none of these determiners are acceptable with (unmarked or plural) mass nouns: successful `Agree` cannot occur because the relevant features that the probes on D seek are not part of the representation of these nouns.

The other relevant asymmetry between count nouns and non-countable mass nouns concerned modification: numerals and size adjectives. The key to understanding numeral and size adjective modification is the extra piece of structure made available by count nouns: NumP, enabled by *n*[IND]. If we look at word order patterns,

(iii) sud-s filter(s), *sud filter(s)

(iv) niño(-s) baba-s, *niño(-s) baba
kid.M-PL drool-PL kid.M-PL drool
'drooling boy' (lit. 'drools boy', i.e. boy that has/does a lot of drooling)

Table 7 The features on Ds

Determiner type	[F:_] on D	[F] on xNP
a. Sngular count D (e.g., *each, every, cada*)	[SG:_] [IND:_]	[SG] [IND]
b. Plural count D (e.g., *several, varios*)	[PL:_] [IND:_]	[PL] [IND]
c. Count D (e.g., *which, algun(os)*)	[Num:_] [IND:_]	[SG/PL] [IND]

we observe the following: (i) size/shape adjectives precede classificatory adjectives; (ii) numerals precede both types of adjectives; and (iii) determiners, including possessors, must precede everything. This is shown in (57) for English.

(57) Word orders

a. D > # > size/shape A > Classificatory A > N
The/John's/These five big Spanish books.

b. D > # > Classificatory A > size/shape A > N
* The/John's/These five Spanish big books.

c. D > Ssize/shape A > # > Classificatory A > N
* The/John's/These big five Spanish books.

d. # > D > size/shape A > Classificatory A > N
* Five the/John's/these big Spanish books.

Of all the orders in (57), only (57a) is grammatical. The situation in Spanish is very much the same, with the caveat that classificatory adjectives are always postnominal, as the contrast in (58a) and (58b) shows. However, in cases in which the size/shape adjective is also postnominal the order is fixed and mirrors English: size/shape adjectives have to occur further away from the noun than classificatory ones, signaling they have higher scope, e.g., (58c).

(58) Word orders for Spanish

a. D > # > size/shape A > Classificatory A >N
*Lo-s cinco grande-s español-e-s libro-s
the.M-PL five big-PL Spanish-PL book.M-PL
Int.: 'The five big Spanish books'

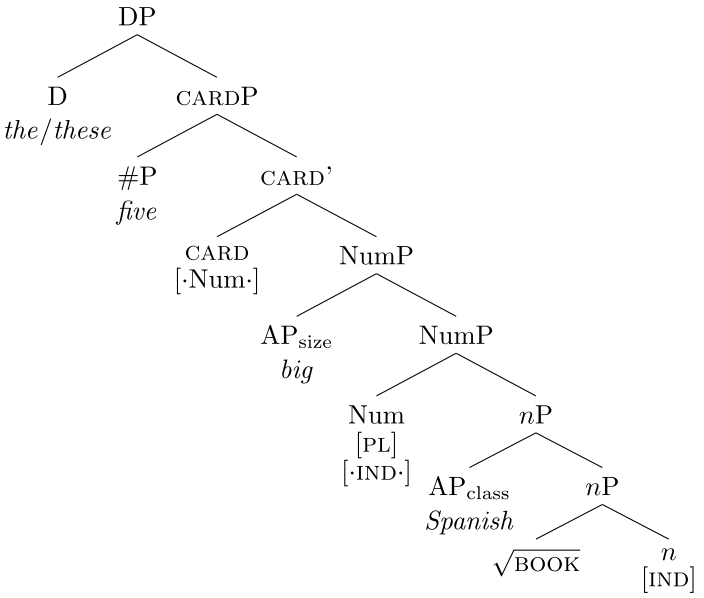
b. D > # > size/shape A >N > Classificatory A
Lo-s cinco grande-s libro-s español-e-s
the.M-PL five big-PL book.M-PL Spanish-PL
'The five big Spanish books'

c. D > # > N > Classificatory A > size/shape A
Lo-s cinco libro-s español-e-s grande-s
the.M-PL five book.M-PL Spanish-PL big-PL
'The five big Spanish books'

d. D > # > N > size/shape A > Classificatory A
*Lo-s cinco libro-s grande-s española-s
the.M-PL five book.M-PL big-PL Spanish-PL
'The five Spanish big books'

I take these facts to represent the structural height at which the different modifiers are introduced.[37] Namely, classificatory adjectives are adjoined the lowest in the structure (Alexiadou et al. 2007; Svenonius 2008; Wiltschko 2014; Dékány 2021): *n*P. Size/shape adjectives must be adjoined higher than the lowest *n*P dominating the root (Cinque 2005, 2010; Svenonius 2008; Deal 2017; Dékány 2021; Toquero-Pérez 2025), which in the case of count nouns is NumP. Numerals are arguments of a functional head CARD(inlaity) (e.g., Scontras 2013), which is higher than Number. In fact, I propose that this CARD head is sensitive to there being a Number projection; this requirement is enforced by the selectional feature [·Num·] on CARD. Finally, determiners and demonstratives are introduced as D heads (Abney 1987; Corver 1990). The full DP structure for count nouns is in (59).

(59) The articulated structure for count nouns



The syntax in (59) is consistent with analyses that have located numerals higher than Number but lower than D, e.g., Pancheva (2022, 2023), Cinque (2023), Toquero-Pérez (2023, 2025).[38] What is more, the selectional feature on CARD accounts for

[37] I assume, as is standard in the literature, that the different adjective-noun orderings in Spanish are derived via *n*/*n*P movement to a higher head (Cinque 2005, 2010). See Fábregas (2017, Sect. 5) for an overview.

[38] Pancheva (2022, 2023) argues based on evidence from Bulgarian that Number may be represented twice in the structure of the NP: a low Number head above *n* and below numerals, as originally proposed by Ritter (1991), and a higher Number head above numerals, in the spirit of Sauerland (2003).

why numerals are exclusively count noun modifiers: these nouns are the only nominal expressions that project Number.

7.2 A brief but important digression on size/shape adjectives

The structural representation in (59) locates dimensional adjectives as adjuncts of the Number projection. This representation is consistent with the hypothesis put forth by Deal (2016, 2017): size/shape adjectives are enabled by projections higher than the lowest *n*P and encode a lexical requirement on the constituent they modify and they. We can follow Deal, and assume that the lexical requirement is encoded via a presupposition on the adjective's individual argument along the lines in (60) for the adjective *big*.

(60) $[\![big]\!] = \lambda x\colon \exists x[x \in P \wedge x \in {}^{*}\mathtt{atom}].\exists d[\mathtt{big}(x) \geq d]$
'The property of being big to a degree larger than d satisfied if x is in P and it is an atom or sum of atoms'

Given that unmarked and plural mass nouns are syntactically impoverished, they have no room for adjunction outside the *n*P. Thus, modification by this class of adjectives is precluded. But even if the grammar attempted to adjoin the adjective low, at the *n*P level, there would be issues: unmarked mass and plural mass nouns are not marked for individuation in the syntax, and thus have no atoms, which would result in presupposition failure. In other words, under this view, satisfaction of the presupposition on the adjective is conditioned by the syntactic make-up of the nominal expression.

In addition, the structural height requirement receives support from the observation that (some) size/shape adjectives crosslinguistically require the presence of overt classifiers, whose distribution is sometimes paralleled to that of Number (e.g., Borer 2005a; Cowper and Hall 2014; Dékány 2021). Examples include Hungarian in (61) or Teochew, Southern Min in (62).

(61) *Hungarian* (Dékány 2021)

a. két nagy szem alma
two big CL_{eye} apple
'two big apples'

b. * két szem nagy alma
two CL_{eye} big apple
Int. 'two big apples'

c. két vekni meleg kenyér
two CL_{loaf} warm bread
'two warm loaves of bread'

d. * két meleg vekni kenyér
two warm CL_{loaf} bread
Int.: 'two warm loaves of bread'

(62) *Teochew, Southern Min* (adapted from Biggs and Zhuosi 2022)

a. Hi sa go dua *(-go) gai tun
that three CL big -A.CL N.MOD candy
'those three big pieces of candy'

b. Hi sa go sio (* -go) gai tun
that three CL hot -A.CL N.MOD candy
'those three pieces of hot candy'

The dimensional adjectives in Hungarian are lower than numerals and must precede the classifier: (61a) vs. (61b). Non-dimensional attributive adjectives like *meleg* 'warm' must follow the classifier: (61c) vs. (61d). Similarly, in Teochew, Southern Min dimensional adjectives require the obligatory presence of the classifier *-go* following the adjective: (62a); but non-dimensional adjectives are ungrammatical with the classifier: (62b).[39]

There is an additional welcome consequence of representing adjectives as in (59), regarding classificatory adjectives. These adjectives are acceptable with mass nouns. In fact, when more than one adjective of this class co-occurs, the order is not fixed, as shown in (63). These facts can be accounted for under the assumption that there are no ordering restrictions between adjuncts of the same XP (Alexiadou 1997; Cinque 1999): *n*P in this case.

(63) a. mineral sparkling water, sparkling mineral water

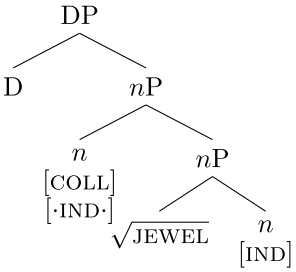
b. agua gasificada mineral, agua mineral gasificada
water carbonated mineral, water mineral carbonated
'carbonated mineral water' 'mineral carbonated water'

7.3 The morpho-syntax of object mass nouns

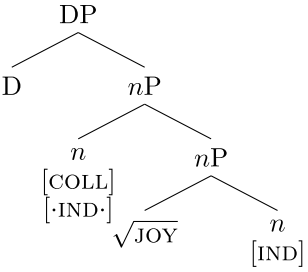
We are now in a position to address the syntax of object mass nouns and compare it to both count and the rest of mass nouns. I propose that the syntactic representation of object mass nouns is as in (64).

[39] Further support for the idea that adjectives are NumP adjuncts is found in Toquero-Pérez (2023, 2025), who reports that in Alasha Mongolian (a group of) countable nouns that is unmarked for number are actually number neutral unless they are modified by size/shape adjectives. In fact, the presence of said adjectives signals a strictly singular interpretation. Toquero-Pérez proposes that this is because number neutral nouns, though individuated satisfying the presuppositional requirement of the adjective in (60), lack NumP making no room for the adjective to adjoin. Unmarked, yet underlyingly [SG], nouns do project NumP enabling size adjective modification.

(64) a. English: *jewelry*



b. Spanish: *joyería* 'jewelry'



Looking at the structures in (64), it is clear what these nouns share with the rest of mass nouns: they lack Number. However, unlike the rest of mass nouns, and like count nouns, they are (i) [IND]-marked and (ii) not syntactically impoverished, given the layered *n*.

The structural position of *n*[COLL] parallels that of Number: both Number and *n*[COLL] immediately c-command *n*[IND]. Therefore the representation of count and mass nouns properly contains the countable base, as predicted by the containment hypothesis, shown in (65).

(65) a. $\{n[\text{IND}], \sqrt{\text{ROOT}}\} \subset \{\text{Number}, n[\text{IND}], \sqrt{\text{ROOT}}\}$

b. $\{n[\text{IND}], \sqrt{\text{ROOT}}\} \subset \{n[\text{COLL}], n[\text{IND}], \sqrt{\text{ROOT}}\}$.

The structural isomorphism between Number and *n*[COLL] explains why Number and *n*,[COLL] can both trigger allomorphy on the root such as (40) and (41): the locality conditions for allomorphy are the exact same. In terms of affix ordering, [COLL]-exponents follow the nominalized root (i.e., root and any class markers), just like [PL]-exponents do, as illustrated schematically in (66)–(67).

(66) a. $\sqrt{\text{ROOT}}$ -*n*[IND] -Number

arm -a -Ø (*singular count*)

arm -a -s (*plural count*)

'weapon(s)'

b. $\sqrt{\text{ROOT}}$ -*n*[IND] -*n*[COLL]

arm -a -mento (*object mass*)

'weaponry'

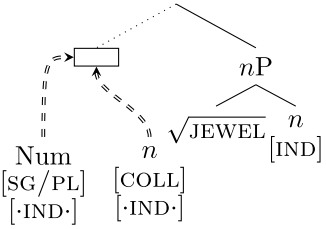
(67) a. $\sqrt{\text{ROOT}}$ -*n*[IND] -Number
dogg -ie -Ø (*singular count*)
dogg -ie -s (*plural count*)

b. $\sqrt{\text{ROOT}}$ -*n*[IND] -*n*[COLL]
dogg -ie -ware (*object mass*)

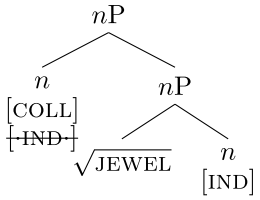
Moreover, just like Number, this [COLL]-bearing head comes equipped with the merge-triggering feature [·IND·]. This feature must be checked-off immediately via merger of *n*'s complement. Given that both Number and *n*[COLL] have the same merge-triggering feature, we can account for the unacceptability of their co-occurrence: merger of *n*[COLL] will block merger of Number, and viceversa. Thus, their overlapping distribution follows. This competition for merger is illustrated in (68).

(68) Satisfying [·IND·]

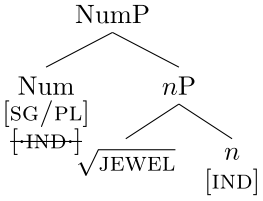
a. Competing for merger



b. Merger of *n*[COLL]



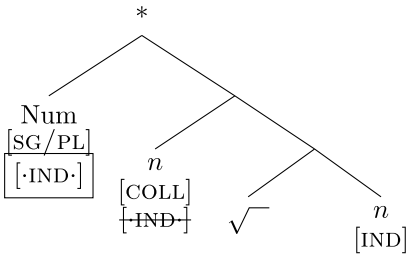
c. Merger of Number



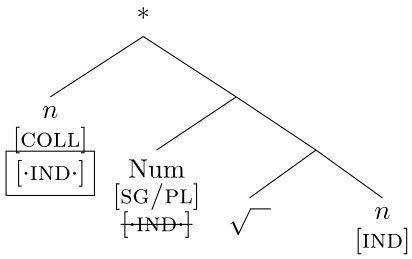
As illustrated in (68a), Number and *n* compete for merger. If *n* is merged, as in (68b), it will write off its selection feature and project *n*P, blocking merger of Number. The resulting vocabulary item is *jewelry*. If Number is merged instead, as in (68c), its selection feature will be discharged and NumP will be projected; this will result in the insertion of vocabulary item *jewel(s)*.

Attempting to iterate Number and *n* leads to a crash: only one of the two heads, i.e., the first-merged head, will be able to write its complementation feature off (Adger 2003; Heck and Müller 2007; Müller 2010). This is schematized in (69).

(69) a. `Merge`(n, n) > *`Merge`(Num,n)

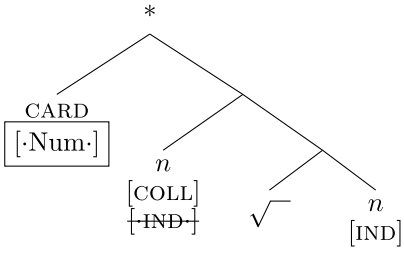


b. `Merge`(Num,n) > *`Merge`(n, Num)



By virtue of not having a NumP, the distributional properties of this class of nouns as mass follow. For instance, the obvious one is no singular/plural contrast. Second, neither of the determiners with the probing features in Table 7 are grammatical: while D is able to value its [IND:_] feature, the Number features will remain unvalued causing the derivation to crash (Chomsky 2000). Third, numeral modification is expected to be disallowed as well. This fact follows from the idea that the CARD head, which introduces numerals in its specifier, requires complementation by Number. Since there is no Number, CARD cannot check off its [·Num·] feature under sisterhood, and the derivation crashes, as in (70).

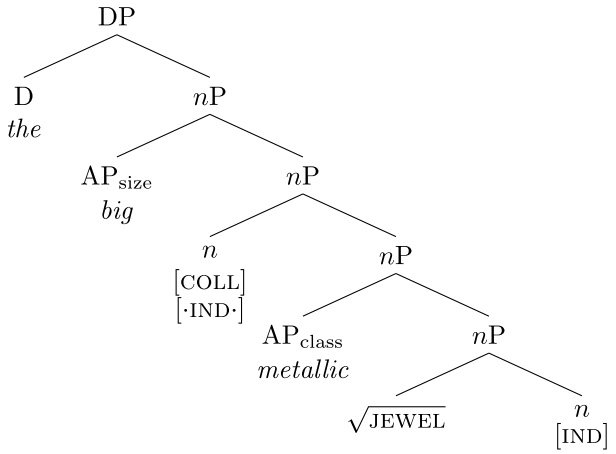
(70) `Merge`(n, n) > *`Merge`(CARD,n)



The situation with size/shape adjectives is different from numerals. Size adjectives depend on there being a larger nominal structure than just *n*P and encoded the lexical requirement that the NP they modify be countable (i.e., it has atoms in its extension).

Both of these are satisfied for object mass nouns. First, they are not syntactically impoverished: they project an additional *n*P. Second, by virtue of being [IND]-marked, they have an atomic extension, which satisfies the lexical semantic requirement of the adjective. That said and given the geometrical parallel with Number, I propose that size/shape adjectives adjoin to this layered *n*P, as illustrated in (71).

(71) *the big metallic jewelry*



7.4 What about the lexical gaps in count-object mass paradigms?

One of the welcome results of the proposed analysis has been explaining the fact that the root morphemes that participate in the class of object mass nouns also participate in the class of count nouns giving rise to the doublets given in Sect. 4. This is expected under the containment hypothesis and the structural representations in which count and object mass nouns share the same root and *n* pairings.

As mentioned when discussing doublets, there is one potential trade-off of adopting this decompositional account that relies on a nesting structure for containment: not every object mass noun has a count noun counterpart. This was most clearly seen in English with the example of *furniture, equipment*, and *cutlery*. However, as mentioned in that section as well, which vocabulary items are missing can be a matter of idiosyncracy across languages, rather than large-scale systemic patterns. Similar idiosyncrasies with respect to the root's flexibility to appear in a count or a mass context are in fact not uncommon, which suggests that syntax may be involved (Deal 2017). In DM-style approaches, like the one adopted here, root-specific conditions are grammatically determined (by the output of the syntax). The question is then what allows the root to occur in one morpho-syntactic context (the object mass) but not the other (the count one).

There are two potential reasons for why a root might not be licensed, i.e., paired up with the relevant terminal or sets of terminals (Harley and Noyer 1998, 1999, 2000; Acquaviva 2009; Harley 2014; Kramer 2015): a semantic condition, and a morphophonological one. The semantic condition entails that pairing up a root with a particular terminal leads to uninterpretability. This is illustrated in (72) where '↔'

is meant to indicate the mapping from structure to interpretation, and '#' stands for 'no meaning'.

(72) $\sqrt{\text{FURN/EQUIP/CUT}} \leftrightarrow$ # / _n[IND]] Number[SG/PL]]

What the rule in (72) amounts to saying is that English speakers cannot compose a count meaning for these expressions. However, attributing these gaps to an inability to assign a certain meaning seems to miss the generalization that I have been attempting to capture all along: the representation, and by virtue of semantic compositionality, the meaning, of object mass nouns is built on the countable base of the noun.

Instead, I hypothesize that the reason why there are lexical gaps in the paradigm is morphophonological: the relevant root cannot be mapped to an exponent at the point of Vocabulary Insertion in a particular context. This entails that, in those cases where there is an object mass noun but no count noun counterpart, the root can only be licensed in a nominal context where n[COLL] is present. For instance, a root like $\sqrt{\text{FURN}}$ may only be exponed in the contexts in (73).

(73) a. $\sqrt{\text{FURN}} \Leftrightarrow$ *furnit*/_ n[IND]] n[COLL]] *furniture*

b. $\sqrt{\text{FURN}} \Leftrightarrow$ *furnish*/_v *furnish*

If the contexts in (73) are not met, no vocabulary item will be able to be inserted. As Kramer (2015, p.54) notes, this way of thinking is very much in line with the Subset Principle: Vocabulary Insertion cannot proceed if (i) the target contains features that are not present in the syntactic derivation or (ii) the target does not occur in the relevant context specified by the rule.[40] Regarding variation, given the idiosyncrasy of what is an acceptable root-categorizer pairing, we do not expect the licensing

[40]The rule in (73a) is what Moskal and Smith (2016) refer to as "Hyper-Contextual" VI rule: it makes reference to multiple terminal nodes. One may wonder about the specificity of the rule and whether it is a conceptual and/or an empirical issue. I want to briefly comment here that it is not. First, any theory of allomorphy has to account for the observation that terminals like Number can trigger suppletion on the root despite "not being strictly local." This can be cashed out by assuming a theory of cyclic spell-out in the sense of Chomsky (2000, 2001), implemented within DM by e.g., Embick (2010): (a) n spells out its complement, if there is one, which does not include the root because roots are adjoined to n forming a complex head; (b) when the next cyclic head is merged (e.g., presumably D or K if there is one), its complement, which includes the root, n and Number, is spelled out; (c) the intervening terminal between the root and Number, in this case n, is a zero-morpheme which is pruned; and as a result, the root is visible to Number, which can then trigger allomorphy on the root. This is in line with Embick (2010), and it is schematically represented in (i)-(ii).

(i) [[[XP] $\sqrt{\text{ROOT}}$ n] Number D]
Cycle A *Cycle B*

(ii) VI rules for the terminals in Cycle B: $\sqrt{\text{GOOSE}}$ n Number

a. $\sqrt{\text{GOOSE}} \Leftrightarrow$ *geese*/_[PL]

b. $\sqrt{\text{GOOSE}} \Leftrightarrow$ *goose*

c. $n \Leftrightarrow \emptyset$

d. [PL] $\Leftrightarrow \emptyset / \sqrt{\text{GOOSE}}$_

The alternative is Moskal and Smith's (2016) who propose, in a nutshell, that allomoprhy on the root can occur as long as it is triggered by the terminal that immediately c-commands the cyclic head: if n is such a head, Number has then access to the root, which they formulate via VI rules that are hyper-context-sensitive. Given that the location of Number and n[COLL] is structurally identical, the same logic applies here. I do not intend to adjudicate between the two proposals; what I hope to have shown is that

conditions on roots to be universal across languages but largely idiosyncratic. While a root-categorizer pair may be available in language A (e.g., Spanish *mueble*), the same combination may not be available in language B (e.g., English). This accounts for the variation in the types of gaps we might observe.[41]

Pushing the licensing condition to the post-syntax, and in particular to the operation of Vocabulary Insertion, entails that certain combinations of (i) nominalizing features, (ii) number features, and (iii) the $\sqrt{\text{ROOT}}$ yield no vocabulary item resulting in a lexical gap.

8 Eventive object mass nouns and containment

Up to this point, I have concentrated solely on object mass nouns with a "collective" understanding (Lieber 2004, 2016; Alexiadou 2015); that is, those whose meaning could be paraphrased as something like "a collection of X-related items," X being a placeholder for the what the nominalized root denotes.

However, as I briefly noted in the introduction, the same object mass expression may also be understood eventively: *(the) carpeting, (the) lighting* or *(el) alcantarillado* 'the sewerage.' Grimshaw (1990), and subsequent work building on it (Borer 2005b; Alexiadou and Grimshaw 2008; Alexiadou 2009; Alexiadou et al. 2010), argued at length that these object mass expressions are argument-taking nominalizations whose base is an atelic VP. (74) illustrates the English data and (75) the Spanish data.

(74) a. The furnishing/lighting(*-s) of the room for hours bothered Max.

b. The frequent/intentional lighting *(of the streets) for hours bothered the neighbors.

c. John's company did more lighting of Christmas trees than Mary's company did. CARDINALITY, #DURATION

the structural description for the licensing of certain roots is not only empirically justified but it can be formalized within current theories of allomorphy. Whether it is preferable to do it via Hyper-Contextual VI rules or cyclic approach plus zero-morph exponence (or pruning) is something that I leave open.

[41] It is also likely that some 'lexical' gaps in the count/mass domain are due to LF-licensing failures. For instance, being unable to express *blood* in English with a countable interpretation can be a such a case. This would account for why English speakers have trouble finding a container interpretation for a root like $\sqrt{\text{BLOOD}}$. This contrasts with roots like $\sqrt{\text{WATER}}$, which can be licensed in an individuated and non-individuated context. The licensing conditions on roots are schematized in (i) for English. In contrast, in Nez Perce and Yudja, both $\sqrt{\text{WATER}}$ and $\sqrt{\text{BLOOD}}$ can be licensed in either context (Lima 2014; Deal 2017). In yet a third type of language like Alasha Mongolian, neither $\sqrt{\text{WATER}}$ nor $\sqrt{\text{BLOOD}}$ are LF-licensed in the individuated context (Toquero-Pérez 2023, 2025).

(i) a.

Form	Syntax		Root meaning at LF	example
water ⇔	[$\sqrt{\text{WATER}}$ *n*]	↔	WATER-SUBSTANCE	'some water'
water ⇔	[$\sqrt{\text{WATER}}$ *n*[IND]]	↔	WATER-UNIT	'a water'

b.

Form	Syntax		Root meaning at LF	example
blood ⇔	[$\sqrt{\text{BLOOD}}$ *n*]	↔	BLOOD-SUBSTANCE	'some water'
blood ⇔	[$\sqrt{\text{BLOOD}}$ *n*[IND]]	↔	#	'a blood'

(75) a. el alcantarillado / *lo-s alcantarillado-s del barrio
the.M sewerage the.M-PL sewerage-PL of.the neighborhood
durante horas
for hours
'The sewerage(*-s) of the neighborhood for hours'

b. el alcantarillado intencionado *(del barrio) durante
the.M sewerage intentional of.the neighborhood for
horas
hours
'the intentional sewerage *(of the neighborhood) for hours'

c. Los romanos realizaron más alcantarillado de las ciudades que
the romans realized more sewerage of the cities than
ninguna otra civilización
no other civilization
'The Romans did more sewerage of the cities than any other civilization did.' CARDINLAITY, #VOLUME

As the English and Spanish data illustrate, these event nominals are incompatible with overt plural marking: (74a) and (75a). Adjectival modifiers like *frequent* or *intentional* can target the eventive reading of the *-ing* or *-ado* nominal in (74b) and (75b). In fact, these sentences are reported to be grammatical only when their internal argument is overt.[42] Besides, when being compared, the interpretation that arises is a countable one, as opposed to a non-countable one in (74c) and (75c). The impossibility to be marked plural and their measurability in terms of cardinality are hallmark properties of object mass nouns. I will refer to them as eventive object mass nouns.

Other argument-taking event nominals, in contrast, behave like count nouns: they may be plural-marked and modified by numerals. This is shown in (76), (a–b) from Alexiadou et al. (2010, p.116). As count nouns, they are also countable, shown in (76d).

(76) a. The killing of the journalist(-s)

b. The repeated killings of the unarmed civilians

c. There were three killings / was one killing in the riots.

d. There were more killings in the 92 riots than in the 2020 ones.
CARDINALITY, #DURATION

A crucial difference between eventive object mass nouns in (74)–(75) and eventive count nouns in (76) is that the underlying VP-base of the latter is telic. For instance, as opposed to (74a), which allows the modifier *for an hour* signaling atelicity, (77) disallows it and only accepts *in one hour*, signaling telicity.[43]

(77) The killing of three journalists in/*for one hour shocked the world.

[42] See Wood (2023, p.55) for more details.

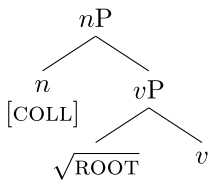
[43] See Vendler (1967), Dowty (1979), van Geenhoven (2005) for diagnostics on telicity.

Table 8 Dimensions of measurement by NP and VP type

Bale and Barner (2009): NP domain		Wellwood et al. (2012): VP domain	
Type of NP	Dimension of measurement	Type of VP	Dimension of measurement
Unmarked mass	VOLUME, WEIGHT	Atelic (homogenous)	DURATION, DISTANCE
Object mass	CARDINALITY	Atelic (non-homogenous)	CARDINALITY
Count plural	CARDINALITY	Imperfective telic	CARDINALITY
Count singular	*	Perfective telic	*

Modulo the presence of an underlying VP shell, the patterns described for the eventive nouns, both object mass and count, are identical to the ones observed for their non-eventive counterparts. Leaving aside the details of the different implementations, what the proposals for eventive object mass nouns generally have in common is the idea that OBJECT MASS directly selects for the VP constituent as its complement. This is schematically translated into the current proposal as (78).[44]

(78)



The structure in (78) seems to pose a challenge to the generalization that object mass nouns are formed on top of countable bases, which may lead to the rejection of the containment hypothesis. I want to briefly entertain two possibilities which are consistent with the generalizations about collective object mass nouns and which are predicted by the containment hypothesis. But, I do not intend to adjudicate between the two. In fact, languages might differ as to which option they instantiate.

8.1 *v* is [IND]

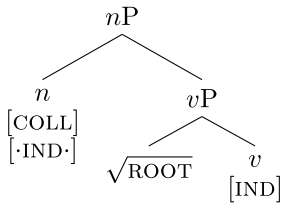
With respect to the first possibility, it has long been observed that there exists a parallelism between count/mass NPs and telic/atelic VPs (Mourelatos 1978; Bach 1986a; Krifka 1989; Borer 2005a,b; van Geenhoven 2005; Wellwood et al. 2012). Telic predicates parallel count ones and atelic predicates parallel mass; Number on NPs parallels grammatical aspect on VPs: perfective and progressive involve singular events whereas imperfective-habitual involves plural events. In addition, the grammatical properties of the NP/VP domain being measured affect the choice of dimension of measurement. These properties are summarized in Table 8, but see Wellwood et al. (2012) for more details.

These facts are relevant for the eventive object mass nouns. In particular, the parallelism between object mass nouns and atelic non-homogeneous activities may be

[44] I am omitting, but not neglecting, the possibility of there being additional verbal projections beside *v* (see Borer 2005b; Alexiadou and Grimshaw 2008; Alexiadou 2009; Alexiadou et al. 2010; Wood 2023, to name a few works).

indicative that their underlying syntax is rather similar. If so, just like ns can perform individuation in the nominal domain, so may vs in the verbal domain: {v[IND], n[IND]}. We can apply this line of reasoning to the deverbal nominalizations under discussion: the root is individuated by the v-head that it adjoins to, and then the nominalizer, selecting for [·IND·], is merged with the newly created v-node. This is shown in (79).

(79)



The structure in (79) is expected by the hypothesis that object mass nouns properly contain a countable base: a categorized root that is marked for individuation. In fact, the selectional properties of the n[COLL]-head are the same across the board (both for collective object mass and eventive ones): it requires that its complement be something marked for the feature [·IND·]. The mass properties, such as inability to be plural/singular marked and modification by numerals, follow because Number is not present. In addition, given the overlapping distribution of [COLL] and [SG/PL], this analysis may shed some light on why event nominals like those in (76) behave as count nouns: they project Number.[45]

A structure like the one in (79) receives independent support from Greek, where the verbalizer (e.g., *-o(n), -i(z))* and the nominalizer (e.g., *-m*, *-s*) are both marked overtly (Alexiadou 2011, 2015). The verbalizing morpheme is closer to the root than the nominalizing one spelling out the collective feature. This is illustrated in (80).

(80) a. epipl-on-o, epipl-o-s-is
furn-VBZ-1SG furn-VBZ-NMZ-GEN.FEM
'to furnish, furniture'

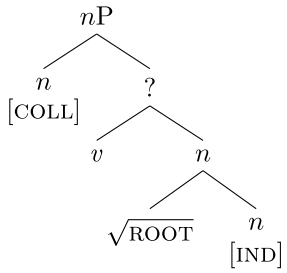
b. end-i-o, end-i-s-is
clothe-VBZ-1SG clothe-VBZ-NMZ-GEN.FEM
'to clothe, clothing' (Alexiadou 2015, p.15)

8.2 Beyond (base-generated) nesting

So far we have only considered nesting as a possible instantiation of structural containment. However, Bobaljik (2012, p.57), and later on Dunbar and Wellwood (2016), notes that there are alternative structures that satisfy containment. Let's suppose that the base structure of eventive object mass nouns is as in (81), ignoring selecional features and the label of node dominating the v and n heads.

[45] A similar analysis is pursued by Alexiadou et al.'s (2010): eventive object mass nouns are marked [-count] and do not project NumP, while their count counterparts are [+count] and project NumP.

(81)



According to (81), the syntactic representation of eventive object mass nouns involves a countable base that is itself nominal. More specifically, the root is adjoined to an n-head that is marked for [IND]. This complex n-head is then merged with v. n[COLL] is merged higher, as discussed so far.

One piece of evidence for the idea that the n and not the v is responsible for the categorization of the root may be found in the following observation by Kiparsky (1982), translated into DM by Arad (2003) and Anagnostopoulou and Samioti (2014, p.100) from whom this quote is taken: "root-based formations do not entail the existence of the corresponding nouns while noun derived ones do entail the existence of the corresponding nouns". The English eventive object mass cases under consideration seem to support the idea that the verbal meaning is noun derived. For instance, *to carpet* and *the carpeting (of the room)* entail there being a carpet (or presumably anything that the lexical semantics of the expression *carpet* picks out). Likewise, *to light* and *the lighting (of the room)* entail there being lights.[46] In the case of Spanish too, the verb to *alcantarillar* 'to lay sewers' and the eventive object mass noun *el alcantarillado (del barrio)* 'the sewerage of the neighborhood' both entail the existence of sewers. Therefore, it seems that the root is first nominalized, then verbalized, then nominalized again. In other words, the '?' on (81) is v, with which n[COLL] is merged.

The question is whether this structure properly contains the countable base in the right way. I will show that there is a series of (independently motivated) assumptions that one could make, and that are compatible with the system developed here, which can lead to answering 'yes' to that question. Consequently, the analysis developed in the paper need not be changed.

Based on the conclusion that '?' on (81) is v, i.e., the verbal meaning of eventive object mass nouns is noun derived, v must select for [$\cdot n \cdot$]. This follows from the system developed here that projection is the result of selection. However, as a result of this application of `Merge`, merger of n[COLL] will fail: this is so if, as I have proposed, n[COLL] always bears a feature [$\cdot$IND$\cdot$] to be checked under sisterhood. To resolve this issue, I propose that the n[IND] constituent moves onto n[COLL].

To trigger movement, I will assume a slightly modified version of Adger's (2003) system: a terminal bearing the feature [$*$F$*$] not only triggers complementation by the category headed by F, but also its movement.[47] In particular, In the case at hand,

[46] See Borer (2014), however.

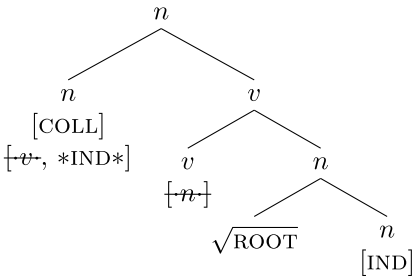
[47] [$*$F$*$] acts like a "strong" EPP feature in the sense of Chomsky (1995).

n[COLL] has the feature bundle in (82), where selectional features are ordered (Müller 2010).

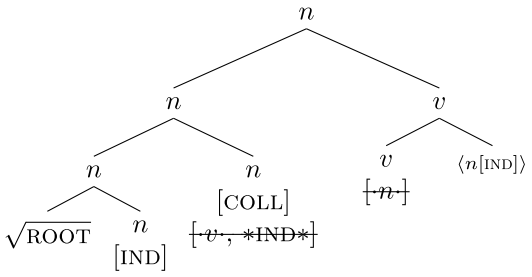
(82) n[COLL, $\cdot v\cdot$, $*$IND$*$]

The bundle in (82) consists of the interpretable feature [COLL], the selectional feature [$\cdot v\cdot$] and the selectional+movement triggering feature [$*$IND$*$]. The latter is to be discharged after [$\cdot vcdot$] has been checked off. The derivation of the noun proceeds as in (83).

(83) a. Merge(v, n[IND]), and Merge(n[COLL], v)



b. Movement of n[IND] to n[COLL]



In (83a), n[IND] categorizes the root; Merge then applies to v and that n node. Since v selects for [$\cdot$IND$\cdot$], v projects. The next step is to Merge v with n[COLL], resulting in the latter projecting the label. As shown in (83b), n[COLL] then triggers the movement of the [IND]-marked constituent, which is the complex n that v had previously merged with. As a result of the movement of n[IND] to n[COLL], the [$*$IND$*$] feature on the hosting head is checked off (under sister-hood) with the moved constituent.[48]

With respect to containment, the branching structure in (83b) is consistent with the Countable Base generalization and satisfies containment as well. The object mass morpheme is built on top of the countable base, i.e., root and the [IND]-marked categorizer.

[48]The derivation in (83) is a slight simplification. Under Bare Phrase Structure there is no difference between minimal and maximal projection, i.e., every projection of n is a "copy" of n. If n has an unchecked/unvalued feature F, it will percolate up to all instances of n until checked/valued. That said, and following Matushansky (2006), we can take movement of n[IND] to be no different from movement of nP and thus target a specifier position: Spec,n[COLL]. The [$*$IND$*$] is then still checked under sisterhood: by the moved constituent in the specifier, e.g., (i). See also Adger (2003) for the implementation of this idea for Spec,vP to Spec,TP movement. The moved node (in the specifier) and the attracting node are then fused at PF (e.g., Matushansky 2006).

An interesting note about potential crosslinguisticic variation is in order. While the syntactic structure and derivation in (83b) could be instantiated by English and Spanish, it may not be available for Greek, which may instead instantiate (79). This is so because of two facts: (i) the morpheme ordering in (80) suggests that the nominalizing affix is further from the root than the verbalizer; and (ii) the Greek verbalizers *-o(n), -i(z)* do not give rise to the same entailment patterns reported for English (Anagnostopoulou and Samioti 2014). Therefore, we can hypothesize that languages might vary in the way that they build the structure for eventive object mass nouns: nesting as in (79) (e.g., Greek) or branching as in (83b) (e.g., English/Spanish).[49]

9 Crosslinguistic variation in the location of [COLL]

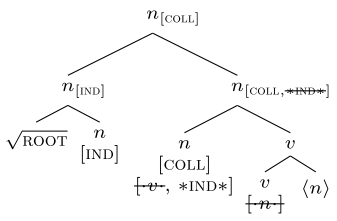
Some crucial aspects of the proposal included disentangling individuation from number-marking as well as [COLL] from [PL]. In addition, I motivated an analysis for English and Spanish, with additional reference to Greek, that locates [COLL] in an outer nominalizer taking an [IND]-marked complement. The location of [COLL] in a nominalizer is not meant to be a universal claim about the syntactic position of this feature. After all, features may appear distributed along different heads in the extended projection within a single language or across languages. In fact, this is the situation with [PL] which may appear on Number or *n* in English and Spanish, Amharic (Kramer 2016) or Greek (Alexiadou 2011, 2015; Kouneli 2019), but also on D in languages like Persian (Ghomeshi 2003). Thus, it would not be surprising if something similar was observed for [COLL].

Given the similarities between [COLL] and [PL] on Number, it might be the case that [COLL] is located on the Number head giving rise to languages that have, potentially, [SG/ PL/ COLL] as part of their inventory of Number features. If that is the case, the theory I have developed makes the predictions in (84) regarding this possibility.

(84) If [COLL] is a Number feature,
  a. only countable bases will bear this feature; and,
  b. [COLL]-marked nouns will enable numeral modification.

(84a) is expected under the containment hypothesis; and (84b) follows from the hypothesis that the head introducing numerals selects for Number. I will argue, based on data from Czech (Grimm and Docekal 2021), that the predictions are borne out.

(i)



[49]The hypothesis that languages may vary as to whether they have an nesting or a branching structure has received support from the domain of comparatives where there are various ways, resembling the two alternatives here, of satisfying containment relations (Bobaljik 2012; Dunbar and Wellwood 2016).

Grimm and Docekal (2021) report that in Czech a morpheme *-í* can be affixed to countable nominal bases resulting in an interpretation that refers to a 'collection of N'. The authors indicate that the morpheme *-í* has several allomorphs, such as *-oví*, which, as far as they are aware, make no semantic difference. The authors gloss *-í* and its allomorphs as 'í,' but I will gloss it as 'COLL' to indicate its collective contribution to the meaning of the noun.[50]

The authors note that this morpheme is not very productive in the language and that its distribution is restricted to a limited set of roots that also appear in count noun contexts.[51] Some singular count and collective-marked noun doublets from their sample are in (85).

(85) a. strom, strom-oví
tree.M.SG tree-NT.COLL
'(a) tree, clump of trees'

b. list, list-í
leaf.M.SG leaf-NT.COLL
'(a) leaf, foliage'

c. cihla, cihl-oví
brick.F.SG brick-NT.COLL
'(a) brick, brickwork'

All the unmarked count forms in (85) may be overtly marked plural with *-y*, regardless of whether they are masculine or feminine (Naughton 2005). This is shown in (86a). However, if the noun is collective *-í*-marked, then it cannot be subsequently plural-marked (Naughton 2005; Grimm and Docekal 2021). This contrast is illustrated in (86b) and (86c).[52]

(86) a. strom-y/ list-y/ cihl-y
tree-PL leaf-PL brick-PL
'trees, leaves, bricks'

[50] I want to note the following: (a) Grimm and Docekal (2021) do not consistently gloss the gender on the *-í*-marked nouns; but according to Naughton (2005) nouns ending in *-i*, regardless of their countability, are generally neuter. See Grimm and Docekal (2021, p.92: ex.10b), included in this paper as (88). (b) They do not always provide a complete morphological segmentation of the nouns, and they do not always provide perfect minimal pairs. Based on their insights and those in Naughton's (2005) grammar, the examples have been adapted to provide minimal pairs when possible.

[51] Grimm and Docekal (2021) surveyed a total of 22 *-í*-marked nouns, which, they claim in their footnote 5, comprise the majority of *-í*-marked nouns in the language.

[52] The plural instrumental allomorph of masculine nouns is syncretic with the nominative plural *-y*. Only for some feminine or neuter nouns, the plural instrumental is *-mi*, see (i), (b–c) from Naughton (2005):

(i) a. list, list-y
leaf.M.SG.NOM leaf-M.PL(.NOM/INSTR)

b. žena, žen-y, žen-ami
woman.F.SG.NOM woman-F.NOM.PL woman-F.INSTR.PL

c. umění, umění-mi
art.NT.SG art.NT-INSTR.PL

b. list-í-m
leaf-NT.COLL-INSTR
'foliage'

c. * list-í-mi
leaf-NT.COLL-INSTR.PL
'foliages'

When the collective-marked noun has instrumental case, the plural allomorph *-mi* is ungrammatical in (86c). Instead, the unmarked instrumental case exponent must surface as in (86b).

In this respect, the distribution of *-í* in Czech is very similar to the distribution of object mass markers in English: it attaches to a countable noun stem, and it is in overlapping distribution with plural-marking. What is more, when describing the meaning of the *-í*-marked forms, Grimm and Docekal (2021, p.93) note the following: "the meanings of nouns derived by *-í* contrast strongly with ordinary plural meanings. [...] [T]he resultant meaning of nouns derived by *-í* is not simply a set of, for example, pine trees, but a set in which the members are coherently related". This semantic contribution resembles Corbett's (2000) cohesion of a group which I claimed underlies the meaning of the feature [COLL].

The fact that *-í*-marking attaches to countable bases and is in overlapping distribution with plural-marking is expected under (84). However, it is not conclusive evidence that *-í* is spelling out a feature on Number as opposed to *n*. The crucial data come from complex numeral modification. Many Slavic languages, Czech included, have simple cardinal numerals, but also morphologically derived complex cardinal numerals, e.g., Ionin and Matushansky (2018). The latter are used to talk about kinds, groups, and collections. See the contrast in (87) taken from Grimm and Docekal (2021, p.94: ex.15).

(87) a. tři námořík-i
three sailor-NOM.PL
'three sailors' simple cardinal numeral

b. troj-ice námořík-ů
three-GROUP sailor-GEN.PL
'a group of three sailors' complex cardinal numeral for groups

Simple cardinal numerals like *tři* 'three' in (87a) are morphologically unmarked and, in the case of numerals 1-4, the NP they modify is nominative and plural-marked. When the numeral is morphologically marked with *-ice* as in (87b), (i) the NP is genitive and plural-marked, and (ii) the numeral root shows suppletion. Besides, complex cardinal numerals marked with *-ice* give rise to a group interpretation: 'a group of *n*-number of sailors.'

Simple cardinals are ungrammatical as modifiers of *-í*-marked nouns, as (88) shows. However, Czech has another complex cardinal numeral which is marked *-oje* (for numerals 2-3) and *-ery* (for numerals above 3) and it translates as '2/3/4...collections.' We can call this numeral "collective cardinal'; I gloss it as such (COLL.CARD). Crucially, collective cardinal numerals are grammatical with *-í*-marked nouns, but

ungrammatical with plural-marked nouns, such as *listy* 'leaves' as shown in (89), adapted from Grimm and Docekal (2021).[53]

(88) a. dva list-y
two.M leaf-M.PL
'two leaves'

b. * dvě list-í
two.NT leaf-NT.COLL
Int.: 'two (sets of) foliage'

(89) a. ?? dv-oje list-y
two-COLL.CARD leaf-PL
'two sets of leaves'

b. dv-oje list-í
two-COLL.CARD foliage-NT.COLL
'two sets of foliage'

As the datapoint in (89b) illustrates, an *-í*-marked noun, such as *listí* 'foliage,' can be directly modified by a collective cardinal *dvoje* 'two (collective).' This fact is what makes this subclass of nouns in Czech different from object mass nouns in English and Spanish.

Under the proposal advanced in this paper, direct numeral modification is only possible if Number has been projected: CARD introducing numerals in its specifier bears a feature [· Number·]. The fact that *-í*-marked nouns in Czech can be directly modified by a numerals is strong evidence that the [COLL] feature is located on Number. The relevant structures are schematized in (90)–(91).

(90) $[_{\text{CARDP}}\ [\#_{[\text{uAGR:}\underline{\text{COLL}}]}\ ]\ [_{\text{CARD'}}\ \text{CARD}_{[\cdot\text{Num}\cdot]}\ [_{\text{NumP}}\ \text{Num}_{[\text{COLL},\ \cdot\text{IND}\cdot]}[_{n\text{P}}\ n_{[\text{IND}]}\ \sqrt{\text{LEAF}}]]]$ = (89b)

(91) $[_{\text{CARDP}}\ [\#_{[\text{uAGR:}\underline{\text{PL}}]}\ ]\ [_{\text{CARD'}}\ \text{CARD}_{[\cdot\text{Num}\cdot]}\ [_{\text{NumP}}\ \text{Num}_{[\text{PL},\ \cdot\text{IND}\cdot]}\ [_{n\text{P}}\ n_{[\text{IND, M}]}\ \sqrt{\text{LEAF}}]]]$ = (88a)

[COLL] is spelled out as /*-í*/, and it surfaces on the noun, underspecified for gender (i.e., neuter). *-oje* on the numeral can be analyzed as the result of nominal concord between the numeral and the [COLL] feature on Number (Norris 2014; Ionin and Matushansky 2018). Plural-marked count nouns have a similar underlying structure, but differ in the set of features that they bear on Number, e.g., (91); as a result, a plural morpheme is exponed on the noun and *-oje* does not surface on the numeral. In addition, the *n* bears a masculine gender feature.

[53] As Grimm and Docekal (2021, p.97) put it: "In the case of nouns derived by *-í*, native speakers always prefer the use of the complex numeral over the simple cardinal numeral". They go on to further indicate that "applying *-oje* to nouns other than those denoting entities which are sets of individuals that typically come in groups or are connected to one another in some manner typically result in infelicities", e.g., (i).

(i) ?? dv-oje stol-y
two-COLL.CARD table-PL
'two sets of tables'

Table 9 Variation in the distribution of [COLL] (and [PL])

	[PL]		[COLL]	
	n	Number	*n*	Number
English	✓	✓	✓	*
Spanish	✓	✓	✓	*
Czech	–	✓	*	✓

If we were to locate the feature on a layered *n* instead, as we did for English and Spanish, we would account for the overlapping distribution of [COLL] and [PL], but we would be left with no explanation as to why numerals can modify [COLL]-marked nouns in Czech, but not in English or Spanish. That said, we can conclude that the location of the [COLL] feature is subject to variation, just like [PL] is (Wiltschko 2021, for an overview): in some languages, it will be located on *n*, while in others it will be located on Number. This variation is summarized in Table 9.[54]

10 Ruling out alternatives

The count/mass distinction and its relation to countability has been the object of study of several theories of morpho-syntax. This section is meant to briefly review some influential proposals and to show that many of the empirical observations and generalizations discussed in the present paper pose non-trivial challenges for them. In particular, I will concentrate on three families of syntactic approaches within the traditional view: (i) the no Number approaches in Borer (2005a) and Cowper and Hall (2009, 2012), (ii) the feature-markedness approach in Cowper and Hall (2014) and (iii) the hybrid approach in Smith (2021).

#1: No number approaches An influential proposal is found in Borer (2005a) who argues that (a) nominal roots denote undivided matter (i.e., they are by default non-countable) and (b) in the absence of a dedicated functional head that performs division of such matter, her DIV(ision), the NP will have a mass syntax and a non-countable interpretation. This is schematized in (92).

(92) a. $[_{DP}\ D\ [_{\#P}\ \#\ [_{DivP}\ Div\ [_{NP}\ N\ ]]]]$ = count

b. $[_{DP}\ D\ [_{\#P}\ \#\ [_{NP}\ N\ ]]]$ = mass

For Borer, DIV is realized by plural-markers in languages like English or classifiers in languages like Chinese. Singular number, sometimes overtly realized as the indefinite determiner *a*, numerals, and quantity determiners like *much, many, more,* etc., are structurally above DIV, in what she labels # (for Quantity). Semantically, DIV introduces the basis for counting (i.e., atoms). DIV is responsible for making NPs have a plural count syntax, but it is also responsible for making NPs countable.

[54] It remains to be probed whether Czech has low plurals. That is why I use '–' on Table 9.

However, there are a series of issues that Borer's system has to face. First, object mass nouns constitute a contradiction: on the one hand, they are mass and must thus lack DIV; on the other, like plural count nouns, they are countable which means they must have DIV. Second, if DIV is the locus of plural-marking, and this differs from the locus of singular-marking, we predict that a PL-marked noun may be subsequently singularized. This would be number system where a noun is overly marked for plural but triggers singular agreement and has a strictly singular interpretation. Toquero-Pérez (2025) argues that such system is yet to be attested in the world's languages. What is more, Harbour (2007, 2011), following Ritter (1991), shows that in languages that make a singular/plural distinction on count nouns, both [SG] and [PL] are located on the same head. Last but not least, amalgamating [PL] and [IND], as in DIV, entails that every plural-marked noun is count and countable. Once again, this is problematic for nouns that are plural, yet they are also mass and non-countable, such as plural mass.

A slightly different version from Borer, but built on similar insights, is found in a series of papers by Cowper and Hall (2009, 2012). They propose a theory of Number that can account for the count/mass distinction. Like Borer, the crucial difference between count and mass NPs is the presence or absence of structure. In their case, the key syntactic piece is a Number head. Mass NPs lack Number while count NPs project Number. They propose a feature geometry according to which plural, i.e., [> 1], is entailed by what they call an individuator, i.e., [#]. Schematically, this looks like (93), where the ':' on the feature bundle indicates 'entailed by.'

(93) a. $[_{DP}\ D\ [_{NumberP}\ [\#]\ [_{NP}\ N\ ]]]$ = singular count

b. $[_{DP}\ D\ [_{NumberP}\ [\#: > 1]\ [_{NP}\ N\ ]]]$ = plural count

c. $[_{DP}\ D\ [_{NP}\ N\ ]]$ = mass

d. $[_{DP}\ D\ [_{NP}\ [\#]\ N\ ]]$ = object mass

Their [#] feature in (93a) and (93b) acts as Borer's (2005a) divider, making the noun countable, and it is additionally in charge of singular-marking. Unlike Borer, plural itself does not perform individuation, but requires the NP to be already individuated and marked singular. They briefly address the situation of *furniture* by speculating that these nouns have the structure in (93d) where [#] is a modifier of the N node (in the spirit of Wiltschko 2008). This approach also falls under the umbrella of the "traditional approach" where object mass nouns are lexically individuated via a low number feature.

If this were the case for object mass nouns, however, we would still need to find an explanation for why Number and the object mass terminal are in overlapping distribution. As far as I know, the presence or absence of a modifier does not preclude the merger of a higher head. In addition, we would miss the generalization about the classes of roots that participate in both object mass and count nouns. The proposal suffers from similar issues as Borer's, including the following: it is unclear what makes countable NPs form a natural class; and given that [>1] is dependent on [#], the system makes no room for plural mass nouns.

#2: Feature-markedness approach Cowper and Hall (2014) propose a revised version of their earlier proposal. In their new system, singular count NPs are the most

featurally unmarked NPs (i.e., uderspecified for any feature), while mass and plural count NPs form a natural class: they are both [Non-Atomic]. According to Cowper and Hall (2014, p.69), if a nominal lacks the feature [Non-Atomic] "it will be interpreted as atomic (i.e. contrastively *not* Non-Atomic) and thus as both count and singular". To further distinguish between mass NPs and plural count NPs they propose that the latter are also marked for a feature [Discrete]. The bundle [Non-Atomic: Discrete] spells-out plural *-s*. A schematic representation of their feature distribution is in (94), (Cowper and Hall 2014, p.69).

(94) a. Singular Count
Ø

b. Mass
[Non-Atomic]

c. Plural Count
[Non-Atomic: Discrete]

[Non-Atomic] is in charge of introducing the property of cumulativity, something that both mass and plural count NPs share (Cheng 1973; Krifka 1989), and [Discrete] makes sure that the NP has separable individuals (i.e., atoms) that can be counted. While the bundling of mass and plural count nouns as a natural class is empirically justified, this is likely a semantic natural class (e.g., Krifka 1989; Deal 2016, 2017; Toquero-Pérez 2024a).

This new proposal does not solve any of the puzzles mentioned above. In the case of object mass nouns, they speculate that these NPs are lexically specified for [Non-Atomic], in a similar vein as their previous proposal. However, given that these NPs are countable, everything in their system suggests they must also be specified as [Discrete]. In that case, there would be nothing that formally distinguishes these nouns from plural count nouns. While plural mass nouns could be described as [Non-Atomic], this specification would not be enough (at least for English) for them to realize plural-marking: *-s* in their system realizes the bundle [Non-Atomic: Discrete]. Again, by further marking them as [Discrete], we incorrectly predict that they are indistinguishable from plural count nouns.

We should note as well that this approach makes inaccurate predictions with respect to the possible types of determiners one might encounter crosslinguistically. As illustrated in this paper, and also in Chierchia (1998a), there are determiners that select for singular count nouns (e.g., *every, each, cada*). The approach by Cowper and Hall (2014) undergenerates by not predicting the existence of this class: given that singular count NPs are featurally unmarked, singular count nouns may only occur with determiners that are unrestricted with respect to the count mass distinction.

#3: The hybrid approach Unlike the other two approaches that conflate Number-marking and Individuation-marking, Smith (2021) proposes a separation of the twobuilding on insights from Borer (2005a) and Bale and Barner (2009). Like Borer, individuation is taken to be the presence division, which Smith implements as a binary feature: [±div(ision)]. But, like Bale and Barner, [±div] is located on the nominalizer that the root combines with. Count nouns have the structure in (95a) and mass nouns, both unmarked and plural, the one in (95b). Note that they only differ in the

feature specification of the nominalizer, but they both project Number which may contain interpretable or uninterpretable features.

(95) a. $[_{DP}\ D\ [_{NumberP}\ Number[SG/PL]\ [_{nP}\ n[+div]\ \sqrt{BOOK}\ ]]]$ = count

b. $[_{DP}\ D\ [_{NumberP}\ Number[Ø/PL]\ [_{nP}\ n[-div]\ \sqrt{BLOOD/\ FUME}\ ]]]$ = mass

The representation of object mass nouns that Smith proposes is as in (96). As it can be observed, it differs from (95b) in several major respects: the nominalizer that the roots $\sqrt{FURNITURE}$, $\sqrt{JEWELRY}$, or $\sqrt{EQUIPMENT}$ combine with is [+div]; the nominalizer also bears an interpretable [*i* PL] feature which has no PF correlate at the point of VI; and Number is not part of the structure.

(96) $[_{DP}\ D\ [_{nP}\ n[+div, i\,PL]\ \sqrt{FURNITURE}\ ]]$ = object mass

Smith's proposal is insightful in that it explicitly divides the labor between individuation and number-marking. One of the welcome consequences of separating Number from individuation is the ability to capture the fact that object mass nouns and count nouns are members of the natural class of countable things.

However, it suffers from non-trivial challenges as well. First, with respect to object mass nouns, while the [+div] nominalizer is responsible for ensuring a countable interpretation on the root, calling the low interpretable feature [PL] is not empirically motivated, as I have argued. What is more, Smith assumes that while interpretable, said plural feature is both syntactically inactive for the purposes of agreement—which is why these nouns never control plural agreement DP-internally or externally—and also semantically unmarked, i.e., an identity function, in the sense of Sauerland (2003), Bale et al. (2011). In other words, there is nothing interpretable about it.

The proposal does not derive the overlapping distribution of object mass-marking and plural-marking either. The account needs to stipulate that Number cannot occur with nominalized elements that are inherently marked for number. Since the root in (96) is inherently number-marked via the [*i* PL] on *n*, the Number head cannot be part of the derivation. More generally, the prospect of mass nouns projecting Number obscures the possibility of establishing different natural classes in the domain of count and mass nouns. The class of count nouns is composed of [+div]-marked and Number-marked NPs, but there is no natural class that can be established for all subtypes of mass nouns: some may be [-div]-marked but Number-marked (unmarked mass and plural mass), whereas others may be [+div]-marked and have no Number (i.e., object mass nouns). Not only is this descriptively inadequate, but also explanatorily so.

11 Broader implications: Nominal architecture, countability, and variation

The core of this paper has been concerned with object mass nouns and how they fit the different natural classes instantiated by the count/mass distinction and the countable/non-countable distinction. The challenge of these nouns is twofold: how can we ensure a mass distribution and at the same time explain their overlapping properties

with count nouns? A possibility is that these nouns are specified as countable (and plural) in the lexicon but enter a mass syntax frame, barring any subsequent count properties. However, I have I argued at length that there is nothing lexically special about this subclass of nouns, and that instead their intersective properties with both mass and count are determined by the syntax. I have then outlined a theory of the count/mass distinction that accounts for the object of study as well as the other subclasses of nouns.

I started by motivating the generalization that count nouns and object mass nouns share a countable base supported by the availability of doublets. Either Number or the OBJECT MASS terminal may attach to such base, leading to the conclusion that these terminals are in overlapping distribution. I proposed that the representations of object mass nouns and count nouns properly contain a countable base. This entails that just like in the case of count nouns, [SG/PL] cannot merge directly with the root terminal, neither can [COLL] responsible for deriving object mass nouns. I then provided evidence that this containment relation could be satisfied in different ways, which may themselves be subject to crosslinguisticic variation.

While overlapping in their distribution, I made the case that [COLL] and [SG/PL] features in object mass and count nouns are located on different terminals: the former is hosted in a nominalizer in English and Spanish (and also Greek, Alexiadou 2011, 2015); the latter are on Number. The two terminals are, however, in competition for merger with each other to satisfy their complementation requirement, i.e., an [IND]-marked complement.

This novel analysis does not only account for distributional differences between mass nouns and count nouns, but it is particularly insightful for the object mass/count distinction. It accounts for their similarities (e.g., many doublets, the possibility of root-allomorphy, and the enabling of adjectival modification across both classes) while accounting for the differences (e.g., the lack of overt plural-marking and ungrammaticality with numerals for object mass nouns). While lacking Number, object mass nouns are [IND]-marked; it is this property that makes object mass nouns and count nouns form a natural class with respect to countability. Thus, I propose the following hypothesis in (97).

(97) *The Countability Hypothesis*
Being countable means being marked for individuation in the syntax.

The hypothesis is very much in line with Deal's (2016; 2017) conclusion that what determines whether a root has, or does not have, discrete individuals that can be counted is syntactically determined. Building on Deal's insights, i.e., every language makes a countability distinction, regardless of whether it makes an overt count/mass distinction, I take [IND] to be a universally grammaticalized feature, in the sense of Guardiano and Longobardi (2016). This feature is part of UG's universal feature inventory: roots within every language, and across languages, will differ with respect to whether they have been [IND]-marked or not by the categorizer. The learner's task is to determine the syntactic conditions under which the root has been or can be licensed (at PF and LF). That said, we can establish a formal typology of noun classes

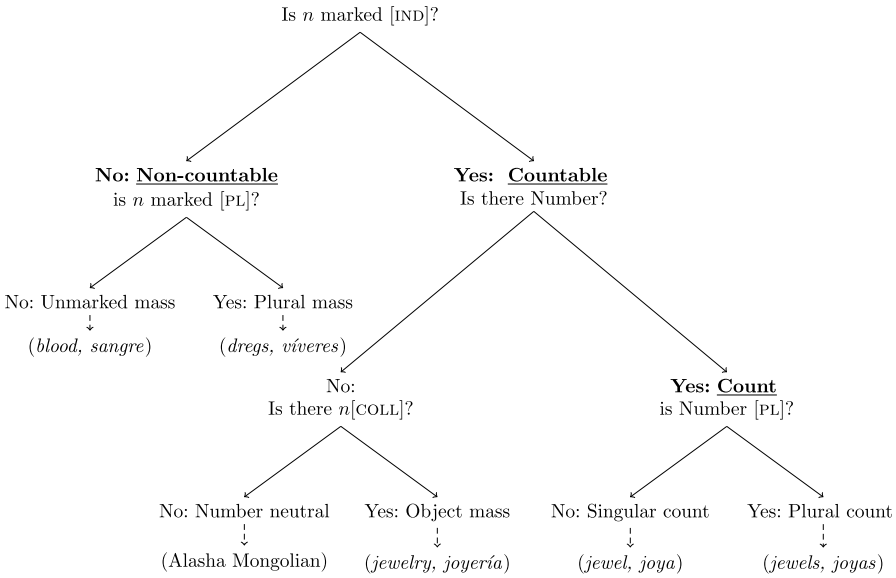


Fig. 2 Predicting countability asymmetries

based on their underlying features. This is shown in the decision tree in Fig. 2, where variation is stated in terms of "yes/no" questions.[55]

The hypothesis in (97) provides an understanding of what countability is, and how it is different from the property of being count. Looking at Fig. 2, nouns that are unmarked for [IND] are non-countable, whereas all the nouns that are marked for [IND] are countable, regardless of whether they are count or mass. In fact, it is possible that a noun does not project Number and yet it is countable: object mass nouns and unmarked number neutral nouns, e.g., unmarked inanimates in Alasha Mongolian (Toquero-Pérez 2025).[56] Therefore, the hypothesis correctly predicts that count NPs are a subset of the NPs that are countable: {count NPs} $\subset$ {unmarked number neutral NPs, count NPs, object mass NPs}.

Besides, there seems to be (i) a correlation between being count and being countable that I describe in the generalization in (98) and (ii) a generalization regarding plural marking, based on the availability of plural mass, that I describe in (99). In fact, the generalization in (99) provides support for the separation of number and individuation features that I have motivated in the paper.

(98) *The Count-Countability Generalization*
Being count entails being countable, but being mass does not entail being non-countable.

[55] As Roberts (2019, p.6) indicates when talking about parameters for variation, "this is an essentially expository move, but it has the advantage of making their binary nature clear, and it reminds us that the parametric options represent ways in which the child interrogates the [Primary Linguistic Data]."

[56] Other examples of languages with countable number neutral nouns unmarked for Number might include Amhraic (Kramer 2017), Buriat (Bylinina and Podobryaev 2020), Haitian Creole (Déprez 2005), Hungarian (Farkas and de Swart 2010), or Western Armenian (Bale et al. 2011).

(99) *The PL-Marking Count Generalization*
Plural-marking on the noun need not entail count syntax.

Last but not least, I want to address two points concerning variation. First, the proposal can accommodate variation in the properties of [COLL]-marked nouns, such as the possibility of numeral modification as in Czech: [COLL] is actually a Number feature in these languages. As a result of there being Number, the functional head that hosts numerals can be merged. This adds to our knowledge that features may appear distributed along the nominal spine. In this regard, we can conclude that the variation is located in the syntax.

We have also seen cases where variation may be much less systematic; at times, said variation is restricted to the vocabulary items that can be found in a particular context. This seems to vary, by and large, on a language-by-language basis. Such was the case of lexical gaps in the paradigm of English doublets, and the environments where certain roots may be licensed (e.g., count-to-mass and mass-to-count 'shifts'). The proposal that I have developed here provides an answer for such variation and for the existence of those gaps: it is syntactically conditioned lexical variation. In other words, it results from the way that the syntax puts terminal nodes together in concert with the satisfaction of the different requirements at the interfaces (both PF and LF).

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Declarations

Competing Interests The author declares no competing interests.

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