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This is a contribution from *Linguistic Variation* 15:2
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Measure words, plurality, and cross-linguistic variation

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In the context of Borer's (2005) theory of nominal classification, the aim of this paper is to explain why measure words in some languages (English, French, Hebrew) necessarily take an *-s* (*two bottles of milk* versus **two bottle of milk*) while in other languages (Azeri, Persian, Ojibwe) measure words can surface without plural marking (the equivalent of *two bottle of milk* is grammatical). If we assume *-s* in English-type languages is responsible for division in measure constructions (as in Borer 2005), we face the following puzzle: What is responsible for division in Azeri-type languages in the absence of the plural? We argue that, for a number of reasons, it cannot be the numeral (*two*) and propose that division is performed, in the absence of a plural, by measure words themselves (as in Chierchia 1998; Stavrou 2003; Acquaviva 2008, among others). We argue that whether or not plural marking appears on the measure word depends on a higher projection that expresses the counting function (distinct from the classifying/measuring function, Rothstein 2010b). Measure constructions thus provide evidence for the idea that, in addition to the dividing plural, we need a higher, counting plural, bolstering the hypothesis that the plural comes in many flavours (Acquaviva 2008; Harbour 2008; Wiltschko 2008, 2012; Butler 2012; Mathieu 2012, 2013, 2014).

Keywords: Measure words; plurals; division; classifiers; counting; measuring; variation; numeral agreement; singulatives; noun phrase

1. A puzzle

As seen in (1), English measure words such as *kilo*, *bottle*, *slice* in measure constructions of the kind *X number of Y* are pluralized; they cannot appear in the singular.¹ The same facts obtain for French, Hebrew, Spanish, among many other languages.

1. We use 'measure word' as a general term for unit nouns (*kilo*, *pound*), container nouns (*bottle*, *cup*, *box*), pseudo-partitive nouns (*piece*, *slice*), cardinal nouns (*million*, *dozen*), and

- (1) a. three kilos/*kilo of sugar
 b. four bottles/*bottle of milk
 c. five slices/*slice of pizza

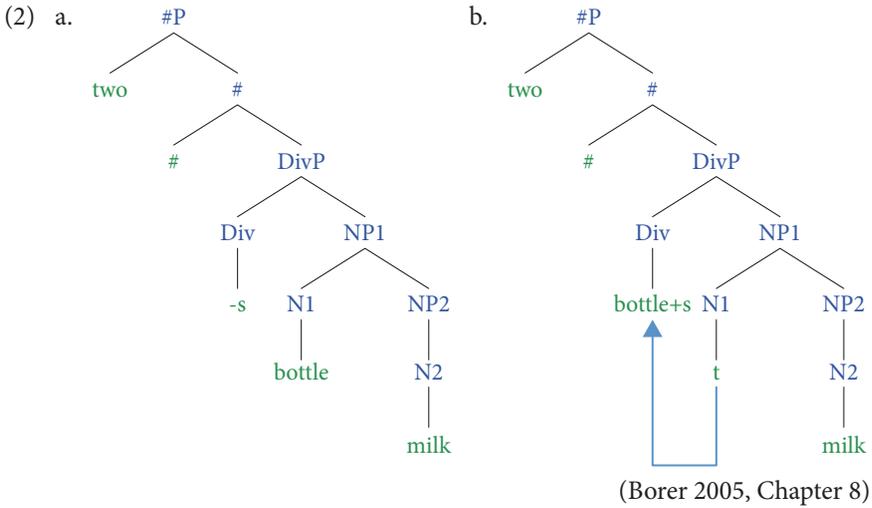
Borer (2005, Chapter 8) proposes that the role of the plural that appears on the measure word in such instances is identical to that of the plural in non-measure constructions (e.g. *three cats, two dogs*): its role is to divide mass and consequently must be generated under the division head described in the earlier chapters of her monograph (this head is called Cl^0 by Borer 2005 and Div^0 by Borer and Ouwayda 2010; we will be using Div^0 throughout this paper).

Borer's (2005) seminal idea is that nominal roots in the world's languages are underlyingly neutral (neither count nor mass) and that in English-type languages the plural acts like a classifier of the type found in Chinese-type languages (the plural and classifiers are in complementary distribution, a well-known generalization, see Greenberg 1972, Sanches & Slobin 1973; Doetjes 1997, and others). The proposal is that the role of the plural is not to count, but to divide: *books* in *zero books* must surface in the plural despite the fact that there is no individual involved.² On Borer's (2005) view, the measure word itself is first base-generated in a lower complement NP position, as shown in (2a) – the measure word is a simple noun – then, it raises via head movement to the Div^0 head that is occupied by plural *-s*, as in (2b).³

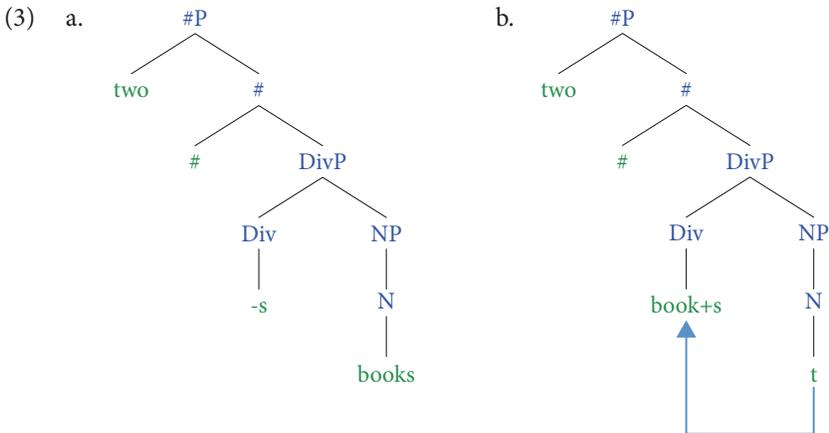
quantifier nouns (*pair*). As pointed by Alexiadou, Haegeman and Stavrou (2003), there is agreement on the fact that these noun classes behave similarly (see also Chierchia 1998; Corver 1998 and Löbel 2001). This does not mean that there are no differences between them (e.g. whereas unit nouns in Germanic languages carry no plural marker, container nouns do, Vos 1999; Krifka 2007, although the plural is not obligatory in some dialects, see examples in (14) below).

2. For Krifka (1989) the plural in English-type languages has no semantic import; it is just an agreement marker (in measure *and* non-measure constructions). He analyses count nouns as extensive measure functions directly analogous to expressions such as *kilo* and *litre*. It is not clear, however, in what sense *-s* is an agreement marker in cases such as *0.7 books*, since there is nothing to agree with (no individual has been generated).

3. We treat, as is customary, the insertion of *of* in English before the second NP as epiphenomenal (e.g. case-related). Many languages have no such preposition before the second NP. A very popular account of measure phrases with a linking morpheme (e.g. *of*) is based on the predicational account (Alexiadou et al. 2007, see Corver 1998; Den Dikken 1998, 2006 among many others). For an interesting comparison between the monoprojectional and the predicational approaches to measure constructions, see Alexiadou et al. (2007: 460–472). Our analysis is in the monoprojectional camp (under the monoprojectional approach the first noun in a construction such as *bottle of milk* is a functional or semi-functional category, not a lexical category like the second noun). The biprojectional analysis (e.g. Borer 2005), whereby both



The proposal that the plural suffix on the measure word has exactly the same function as the plural found in non-measure constructions provides a consistent view of the role of the plural in English-type languages: it appears under Div^0 and its sole function is to divide. In (2), the numeral *two* surfaces in the specifier of $\#^0$ on a par with what is proposed by Borer (2005) for non-measure constructions with count nouns, whose structure appears in (3). (3a) is before, and (3b) is after, the movement of the noun to the plural affix.



The present paper addresses the following puzzle. In many languages, the measure word found in measure constructions typically appears without plural marking. (4a) is an example from Ojibwe, an Algonquian language, spoken in parts of

bottle and *milk* are lexical categories, is not completely rejected, but describes such constructions on their container reading.

Canada and parts of the United States. (4b) is an example from Azeri, a Turkic language. (4c) is an example from Persian. For Ojibwe, the form of the measure word is that of the singular. In Azeri and Persian, the form is that of general number. The context in which these examples are grammatical is given before the examples.⁴

Context: two friends A and B are making a cake. A is mixing the ingredients in a bowl while B, at the request of A, is pouring the ingredients into the bowl. After mixing the eggs and the flour, A asks B: add two cups of sugar.

- (4) a. niizh-naagans zisbaakwad [Ojibwe]
 two cup sugar
 'two cupfuls of sugar'
- b. iki fincan şəkər [Azeri]
 two cup sugar
 'two cupfuls of sugar'
- c. do livan şəkər [Persian]
 two cup sugar
 'two cupfuls of sugar'

In the above context, it is not possible to interpret the measure word as referring to a simple container. B uses one cup and fills it with sugar so that the measure is two cupfuls. It is not natural for B to present A with two cups (i.e. two containers) full of sugar. Rather, B pours one cup of sugar, then is likely to refill it and then pours the content of the second load into the cake mix.

In other contexts, i.e. non-measure environments, where we obtain a simple container rather than a measure reading, there is no problem for words such as *cup*, *bottle*, etc. to be pluralized in these languages. In Ojibwe, (5) is interpretable as 'two cups' as containers, and so is (6). Note, however, that when the plural is used on the measure word, the measure reading is not impossible. Thus, (6) is ambiguous between the measure reading and the container reading. Importantly, in the context described for (6), the example in (4a) is not grammatical.

- (5) niizh naagansan [Ojibwe]
 niizh naagans-an
 two cup-PL
 'two cups'

4. A note on methodology: The second author is a native speaker of Azeri and Persian. The judgements are her own but she also consulted a number of speakers of Azeri and Persian controlling for the targeted interpretations. The data from Ojibwe was obtained via fieldwork (using standard methodology, Matthewson 2004). Data from Arabic were collected via elicitation with a native speaker from Saudi Arabia. Another dialect was used for control (Tunisian Arabic) and in some instances some Tunisian Arabic examples were elicited.

- (6) Context: A is specifically asking B for two cups, each containing sugar.
 niizh naagansan ziiisbaakwad [Ojibwe]
 niizh naagans-an ziiisbaakwad
 two cup-PL sugar
 'two cups of sugar'

What is noteworthy is the absence of the hyphen in (6) when compared with (4a). In (4a), presence of the hyphen signals a measure reading only: *niizh-naagans* is a compound nominal (forming one prosodic word) interpreted as 'two cupfuls' rather than 'two cups'. Other classifiers that attach to numerals in Ojibwe are *-aatig* used for wooden, pole-like elements, *-eg* for cloth-sheet-like elements, *-aabik* for metal, glass, plastic, or stone, and *-aabiig* for string-like elements. Other classifiers include *-ooshkin* 'bagful', *-oonag* 'boatload', *-baneninj* 'handful', *-sag* 'barrelful' (Valentine 2001: 502). Some examples appear in (7).⁵

- (7) a. niizh-waatig mishi [Ojibwe]
 two-CL firewood
 'two sticks of firewood'
 b. niizh-weg zenibaa
 two-CL silk
 'two pieces/sheets of silk'
 c. niizh-ooshkin mnoomin
 two-CL rice
 'two bagfuls of rice'

The situation in Azeri and Persian is slightly different. These languages have general number,⁶ as already pointed out, thus no plural marker on nouns normally

5. The *-w* before *-aatig* and *-eg* is an epenthetic consonant.

6. General number appears in languages where nouns can be expressed without specific reference to number (Corbett 2000); that is to say, semantically, the noun is ambiguous between the singular and the plural reading. In number dominant languages, such as English, there is a choice between the morphologically marked plural and the singular, whereas in languages with general number there is no such choice and the lack of a plural marker does not imply only singular (for an account of general number in Azeri and Persian that is compatible with the proposal introduced in the present paper, see Zareikar 2014). A reviewer suggests that perhaps we need a more nuanced proposal, since there appear to be three types of languages, with Azeri and Ojibwe differing, for example, based on whether general number is available or not. It is important to note that general number is a separate phenomenon, a separate constraint, and does not change the facts described for measure words. Therefore, we need only two types of languages when discussing measure constructions. General number is nevertheless a very interesting topic, and as already pointed out, an approach along the lines of Zareikar (2014) is perfectly compatible with, yet independent from, our analysis.

surfaces, as shown in (8). The examples in (8) are like the one in (5): they yield a container reading.

- (8) a. iki fincan [Azeri]
two cup
b. do livan [Persian]
two cup
'two cups'

Pluralization in Azeri and Persian is nevertheless possible when a specific reading is targeted.⁷ This is shown in (9) for count nouns and in (10) for measure constructions. The plural is thus independently available in Azeri and Persian, but it comes with a special semantics. There are thus clear differences between Ojibwe, on the one hand, and Azeri and Persian, on the other, but we nevertheless group the languages together in relation to measure constructions, since they behave similarly in this regard.

- (9) a. Iki baji-lar gəl-di-lər. [Azeri]
two sister-PL come-PAST-3PL
b. Do ta xahær-ha amæd-ænd. [Persian]
two CL sister-PL came-3PL
'The two sisters came.'
- (10) a. Iki şəkær fincan-lar-i-ni işlæt-dim. [Azeri]
two sugar cup-PL-GEN-ACC use-PAST.1SG
b. Do livan-ha-ye şəkær-ra estefade-kærd-æm. [Persian]
two cup-PL-EZ sugar-OM use-did-1SG
'I used the two cups of sugar.'

Here, we typically obtain a container reading, but note that the measure reading is not impossible. The same situation arises in English: phrases such as *two cups of sugar* or *two glasses of wine* are ambiguous between a container reading (*John, bring two glasses of wine for our guests*) and a measure reading (*Add two glasses of water to the soup*) (Akmajian and Lehrer 1976; Selkirk 1977; Stavrou 1983; Doetjes 1997; Chierchia 1998; Landman 2004; Alexiadou et al. 2007; Rothstein 2010a). In Azeri and Persian, it is only when the measure word appears without plural marking (general number form) that a measure reading is forced on a par with the Ojibwe case when the classifier merges with the numeral as one unit.

7. On specificity in Turkish and Persian, see Enç (1991), Ghomeshi (2003), and Karimi (2003).

The aim of this paper is to account for the variation in plural marking on the measure word between English-type languages and Azeri-type languages. The puzzle we face is why it is possible for measure words in Ojibwe, Azeri and Persian to appear without plural marking while in English-type languages the measure word is necessarily plural. In Azeri-type languages, the plural is possible on the measure word (under a specialized interpretation) but not obligatory. Adopting Borer's (2005) model of nominal classification, many further questions arise: What is responsible for division in Azeri-type measure constructions when there is no plural on the measure word? What is the role of the plural on measure words in English? What is the role of the plural on measure words in Azeri-type languages if a measure word can appear in the singular in the first place? What is the position of the measure word in the nominal structure?

Sections 2 and 3 provide answers to these questions. Section 2 introduces our hypothesis that measure words are classifiers (rather than simple nouns as in Borer 2005) and that the *-s* that surfaces on English measure words is a counting, rather than a dividing plural, providing further evidence (see Mathieu 2012, 2014) that we need a counting plural in addition to the more established dividing plural. While English-type languages have a plural system only, Azeri-type languages have a plural system *and* a classifier system for measure. This is why the construction in which the measure word appears without plural marking is possible. Section 3 provides independent evidence for the existence of a counting plural in Universal Grammar, exemplifying from plurals of singulatives, double plurals in Arabic and Breton, and plurals of diminutivized mass nouns in Germanic. Section 4 concludes.

2. Measure words as classifiers

We propose that it is the measure word itself that performs division in languages such as Ojibwe Azeri and Persian. On our view, measure words of the type *bottle*, *cup*, etc. are like *head* in English (as in *three head of cattle*, see Acquaviva 2008, Chapter 6) and like mass classifiers in languages such as Chinese, which makes them functional (or semi-functional) heads rather than lexical heads. In Ojibwe, Azeri and Persian as well as in many other languages, as far as we can tell, no plural marker need surface, which is what we would expect if it is the measure head that is responsible for division. In the world's languages, classifiers are typically not pluralizable (Aikhenvald 2000).⁸ This is often because classifier languages have

8. The same goes for *head* in English: **three heads of cattle*.

no plural marking in the first place (Greenberg 1972, Sanches and Slobin 1973; Doetjes 1997), but not always. There are, as is well-known, many exceptions to this generalization (Aikhenvald 2000) and we saw in particular in Section 1 that Ojibwe, Azeri and Persian have both measure words that appear without plural marking as well as measure words that appear with plural marking since the languages in question have a plural as part of their grammars.⁹ The question is thus why English-type languages have plural marking on measure words while in other languages it is not necessary.

Our hypothesis is that, since measure words in Ojibwe, Azeri and Persian can perform division in the absence of the plural and since we know independently that Chinese count classifiers and mass classifiers are in complementary distribution,¹⁰ measure words are introduced directly under the Division head¹¹ rather than in a lower NP (as in Borer 2005). This is illustrated in (11). (11a) is the structure for Ojibwe (cf. (4a)); (11b) for Azeri (cf. (4b)); and (11c) for Persian (cf. (4c)). We hypothesize that the reason why Azeri-type languages have the measure word appearing without plural marking is because these languages have classifiers or residual classifiers (no longer fully productive in Ojibwe, Valentine 2001) in addition to the plural. English is a plural language only.¹²

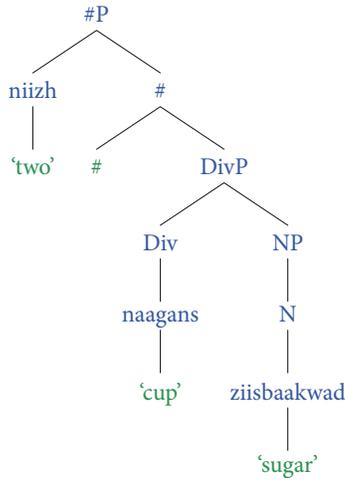
9. It has been shown that, contrary to Chierchia's (1998) hypothesis, Western Armenian is a language that has productive number marking and a classifier system (Borer 2005). However, although both types of marking appear within the same language, they cannot both appear within the same noun phrase. Borer (2005) takes this fact as supporting her hypothesis that number marking and classifiers compete for the same morpho-syntactic position (see Bale & Khanjian 2009 for a semantic account).

10. This is an important observation that cannot be ignored (Cheng & Sybesma 1999, Fassi Fehri & Vinet 2007). The Chinese facts indicate that classifiers are of two types: some classifiers are used with count nouns, others are used with mass nouns. If count classifiers are equivalent to the plural of English-type languages (Greenberg 1972; Doetjes 1997; Borer 2005), then mass classifiers seem to be the equivalent of measure words in English-type languages.

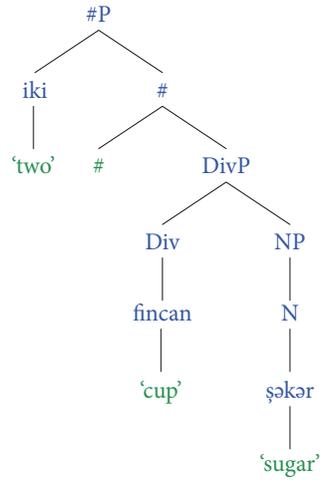
11. See also Chierchia (1998), Stavrou (2003), Acquaviva (2008), Mathieu (2012), and a variation of this in Harbour (2008) where measure words are generated in the *specifier* of *Div*⁰; and also Corver (1998) and Schwarzschild (2006) according to whom measure phrases are in the *specifier* of a functional head.

12. The structures in (11) do not represent our final analysis: they are preliminary and to be modified later in the paper.

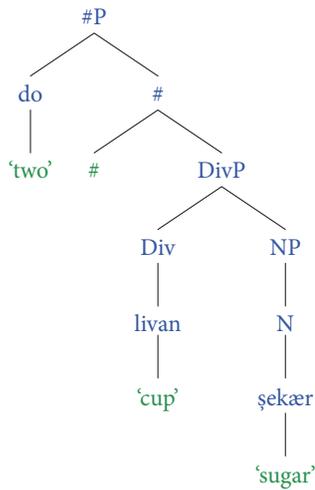
(11) a. Ojibwe



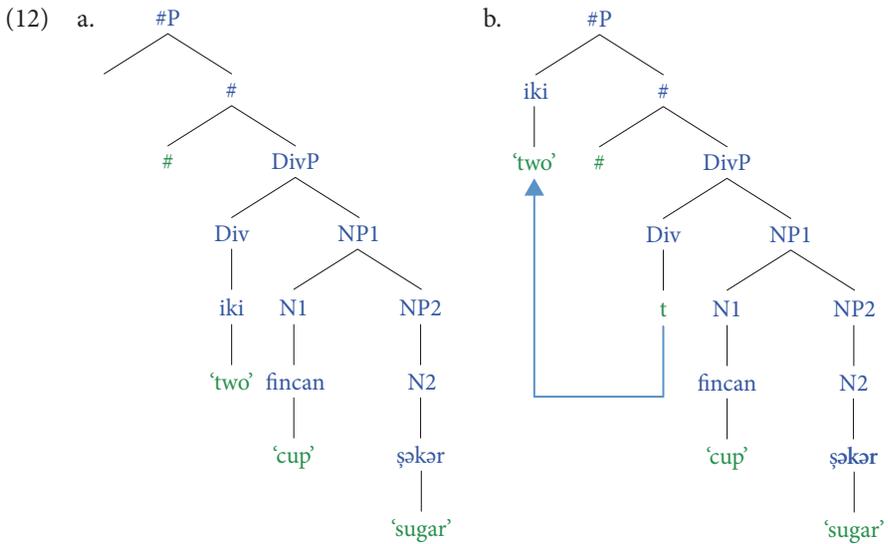
b. Azeri



c. Persian



This is a solution that has clear advantages over Borer's view of Azeri-type languages. On her view, in these languages, it is the numeral, by being generated under Div^0 (see 12a), that performs division (see Wilhem 2008 for a similar proposal for Dëne Słłiné and more generally Krifka 1989). Since these languages have no plural on count nouns (cf. (8)), this is not a property of measure constructions only. After division, the numeral raises to $\text{Spec-}\#P$, in the counting domain, as shown in (12b).

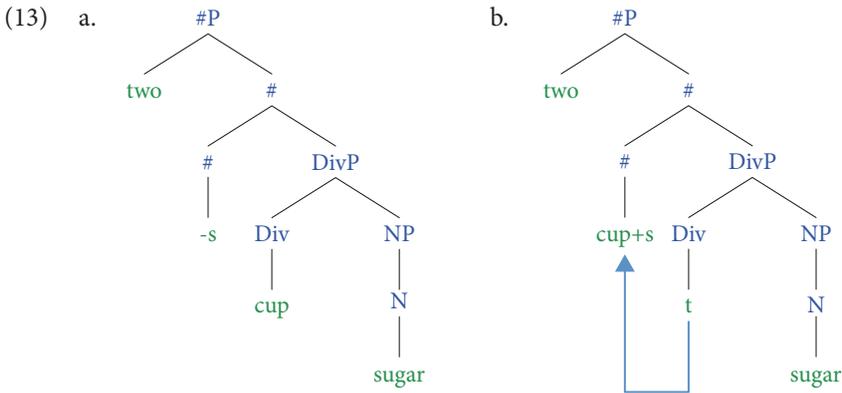


[Azeri on Borer's 2005 view]

The problem with this idea is that there appears to be no necessary correlation between the lack of plural marking on the noun in measure constructions and in the case of count nouns. In Ojibwe, for example, measure words are singular; yet, count nouns, unlike what happens in Azeri-type languages that have general number, must be pluralized, as was shown in (5). One says *niizh naagansan* 'two cups' and not **niizh naagans* 'two cup'.

In order to provide a unified cross-linguistic view of measure heads, we propose for English that it is also the measure word that performs division (for a different view, see Kayne 2005, for whom *pound* in *three pounds of sugar* is not a classifier) and that the *-s* appearing on the measure word is associated with a counting rather than the dividing function. Our view is that the *-s* is an exponent of a higher plural, namely a counting plural (under #⁰) rather than the well-established lower plural, i.e. Borer's (2005) dividing plural (under Div⁰). This is consistent with the idea that there are different kinds of plurals in the grammar and that, depending on its contextual function, the plural sits in different positions along the spine of the syntactic tree (Acquaviva 2008; Wiltschko 2008; Harbour 2008, 2011; Mathieu 2012, 2013, 2014; Butler 2012). Consider (13) as a way of illustration. The measure word raises to # via head movement.¹³

13. This shows that we must abandon the idea that it is *either* the specifier or the head that must be filled in order for number and division to be licensed in the nominal structure (see Borer 2005). Here, both the head # and its specifier are filled.



This also works for languages such as German where pluralization is optional for some measure words, as seen in (14) (Wiltschko 2006; Blühdorn 2006). It appears that “pluralization of the numeral classifier yields an amount interpretation whereas the singular variant denotes a quantity” (Ott 2011: 16fn18, see also Acquaviva 2008, Chapter 6). In the singular the classifier denotes a measure; thus, counting in this case is about a quantity while in the plural the classifier does not denote a measure; thus, counting is about an amount, namely two in (14). In this case, it is about items that can be counted (see also the case of *stukken* versus *stuks* for the plurals of *stuk* ‘piece’ in Dutch as discussed by Donaldson 1987: 34 and Acquaviva 2008: 35).¹⁴

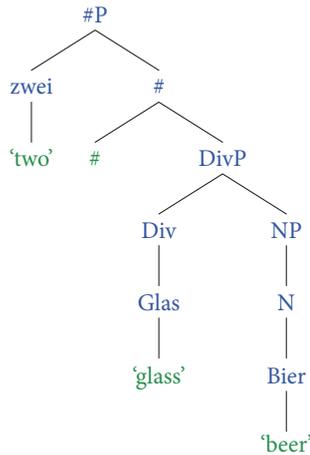
- (14) a. zwei Stück/Stücke Holz [German]
 two piece/pieces wood
 ‘two pieces of wood’
- b. zwei Glas/Gläser Bier
 two glass/glasses beer
 ‘two glasses of beer’

14. A reviewer asks why in some languages (e.g. German), some of the measure words have to be pluralized, while some can be pluralized optionally and others are never pluralized and how this variation comes about under our analysis. On our view, this variation is not different from the variation seen in other domains, e.g. singulative languages, where nouns that are collectives and can be the target of singulativization, vary not only across languages but also across dialects. ‘Ants’ or ‘dates’ can be collectives in one dialect of Arabic but not in another. This is a lexical effect only in that the input to syntactic operations varies. It is not so different from knowing that a count noun, unlike a mass noun, can be the target of pluralization in English or from knowing that French *meubles* is a count noun while *furniture* is not. In German, it must be the case that depending on grammaticalization factors or simple variation, some nouns have become measure words while others have not. Our approach is syntactic: a noun is a measure word by being in a certain position, i.e. Div⁰, when it is not, it is a simple noun (below Div⁰). Under our approach the list of measure words does not have to match in every language or every dialect.

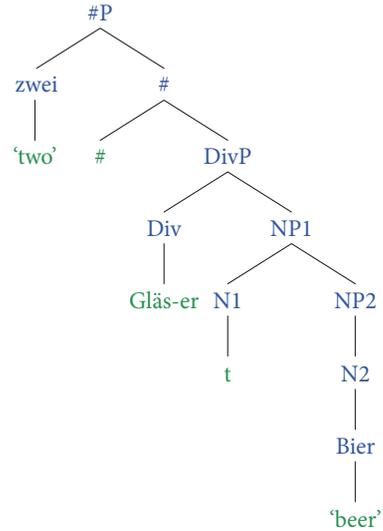
- c. zwei Blatt/Blätter Papier
 two piece/pieces paper
 ‘two pieces of paper’ (Ott 2011:17)

To illustrate, consider the trees in (15) where (15a) corresponds to *zwei Glas Bier* (measure construction) and (15b) corresponds to *zwei Gläser Bier* (container construction).

(15) a. measure construction

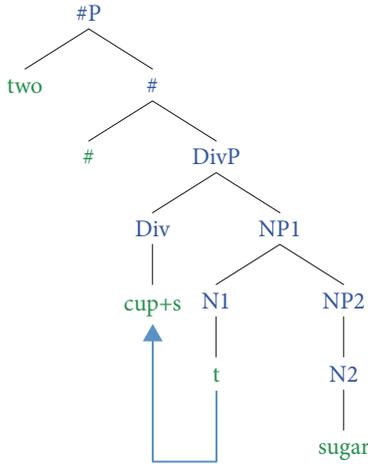


b. container construction

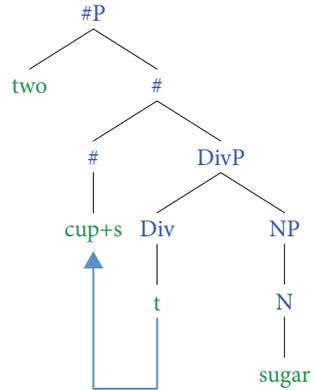


Recall that sentences such as *two cups of sugar* are ambiguous in English and Azeri-type languages: they either generate a measure reading or a container reading. We propose that these two readings correspond to two different structures, (16a) and (16b). Plural *-s*, again, has thus two functions: a dividing function (16a) or a counting function (16b). These are the structures for Azeri-type languages too when the measure word surfaces in the plural (the sentence is ambiguous between the measure reading and the container reading). Our account is similar in spirit to what Alexiadou et al. (2007) propose in that we have a monoprojectional structure. On our account, however, a Div^0 head is projected in both cases, which is not the case with Alexiadou et al. (2007). Note that, on our view, the semi-functionality of measure words is derivative: it is a by-product of certain syntactic structures (Cardinaletti and Giusti 2001), rather than a lexical property (van Riemsdijk 1998): the same word is used in two different syntactic positions and this is how two different meanings arise (the different meanings do not arise because of the potential ambiguity of a given word). See Alexiadou et al. (2007: 474) for discussion about this issue.

(16) a. container reading



b. measure reading



Note that, in these structures, the numeral is generated in Spec-#P. For measure constructions where the measure word necessarily appears without plural marking we propose that numerals are introduced differently:¹⁵ in this case the numeral is a head. In this case, we can say that the counting plural is in complementary distribution with numerals. Evidence for such a view comes from the observation that in Azeri and Persian measure words have to appear with a numeral; they are ungrammatical without (see also Chierchia 1998; Alexiadou et al. 2007 for Greek).¹⁶

(17) a. *(iki) fincan şəkər işlət-dim. [Azeri]
 two cup sugar use-PAST.1SG

15. Demonstratives are other categories that can be heads (English, German, Dutch) or specifiers (Italian, Greek) depending on the language (Giorgi & Longobardi 1991 and references cited in Alexiadou et al. 2007; Section 4.2).

16. It appears that the domain of # when used in a measure context needs to be activated in both English-type languages and Azeri-type languages. Even in English measure phrases have to appear with a numeral. For example, *I bought bottles of milk* is strange on a measure reading. To give a more concrete example, suppose someone is making a cake and asks his cooking partner “Give me cups of flour.” A likely response from the cooking partner will be “Well, how many?” Measure phrases necessarily involve counting. In other words, it appears that it is an inherent property of measure phrases that they need to be counted and to quote Chierchia (1998:74), “Measures attach numerical values to things [...]”. As pointed out by Reviewer #2, Chierchia’s remark is true of “measures” in the strict sense in which Chierchia (1998) uses the term, but it is not the same as “measure” for “unit noun” used here, given that we can say “a few spoonfuls”, with a noun that is unambiguously a unit (not a container) but no numeral.

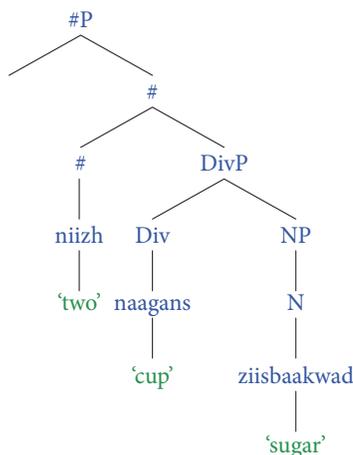
- b. *(do) livan şəkər estefade-kærd-æm. [Persian]
 two cup sugar use-did-1SG
 'I used two cups of sugar.'

On the other hand, pluralized measure words are perfectly fine without a numeral. This is shown in (18).

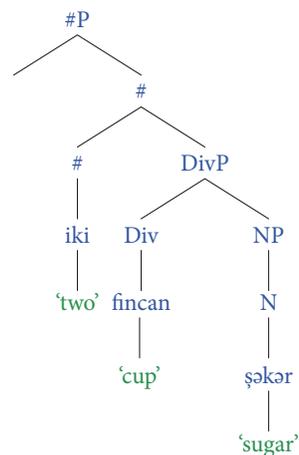
- (18) a. şəkər fincan-lar-i-ni işlət-dim. [Azeri]
 sugar cup-PL-GEN-ACC use-PAST.1SG
 b. livan-ha-ye şəkər-ra estefade-kærd-æm. [Persian]
 cup-PL-EZ sugar-OM use-did-1SG
 'I used (the) cups of sugar.'

In Ojibwe measure constructions, the numeral incorporates in the classifier (a hyphen is needed between the numeral and the head noun giving one prosodic word), evidence that the numeral and the classifier form a head compound. Presumably, in Azeri and Persian too, the classifier and the numeral in such a context form a head compound. As pointed out by Acquaviva (2008), it has been noted that “classifiers are grammatically more strongly linked to numerals (or other quantifiers) than to the complement noun expressing the domain of partition” (p. 178, cf. Greenberg 1972; Allan 1977; Link 1998; Aikhenvald 2000). To quote Allan (1977: 288): “There is a universal principle that a classifier concatenates with a quantifier, locative, demonstrative, or predicate to form a nexus that cannot be interrupted by the noun which it classifies.” We thus propose the structure in (19a) for Ojibwe, (19b) for Azeri, and (19c) for Persian.

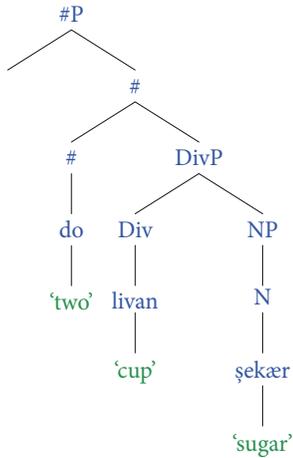
- (19) a. Ojibwe



- b. Azeri



c. Persian



Before Section 2 draws to a close, let us compare our use of the term “counting plural” with the use made by Acquaviva (2008) in relation to Irish unit nouns, which are the focus of Chapter 6 of his book. In Irish, regular nouns surface in the singular when used with a numeral otherwise they surface as plural. On the other hand, unit nouns, i.e. those denoting measures, units of time, etc., take either the standard plural or a special plural when used with a numeral greater than 10.¹⁷ The following examples are from the Christian Brothers grammar by Ó hAnluain (1999:70), cited in Acquaviva (2008:167). As pointed out by Acquaviva (2008:34–35), these special plurals resemble what Stankiewicz (1962) calls quantifying plurals in several Slavonic languages. These are special plural forms that occur after numerals (or after some numerals) and contrast with regular plurals.

- (20) a. Nouns taking the plural after 3–10:
- | Singular | Plural | |
|-------------------------------------|------------------------|---------|
| ceann ‘head (as a unit), one’ | cinn | [Irish] |
| cloigeann ‘head (counting persons)’ | cloigne | |
| troigh ‘foot (measure)’ | troighthe/troigheannaí | |
| slat ‘rod (measure), yard’ | slata | |

17. In some dialects, the plural is generalized to other kinds of nouns not denoting measures or units and in some dialects the plural is not impossible with nouns from 3–10 (see Acquaviva 2008, Chapter 6 for details).

b. Nouns taking a special plural form after 3–10		
Singular	Plural	Plural after 3–10
bliain ‘year’	blianta	bliana
fiche ‘twenty’	fichidí	fichid
pingin ‘penny’	pinginí	pingine
seachtain ‘week’	seachtainí	seachtaine
scilling ‘shilling’	scillingí	scillinge
uair ‘time, occasion’	uaireanta	uaire

It is these plurals that Acquaviva (2008) calls counting plurals. On his view, while unit numerals 3–10 and nouns more generally require an empty classifier as in (21b), counting plurals are noun stems that raise from their NP positions to the head of the Classifier Phrase (Classifier = Division), as in (22b).

- (21) a. trí chat
three cat.SG
‘three cats’
- b. $[_{DP} \emptyset \dots [_{\#P} \text{trí} [_{\text{ClassifierP}} \emptyset [_{NP} \text{chat}]]]]$ (Acquaviva 2008: 190)
- (22) a. trí bliana
three year.PL
‘three years’
- b. $[_{DP} \emptyset \dots [_{\#P} \text{trí} [_{\text{ClassifierP}} \text{bliana} [_{NP} \text{t}]]]]$ (Acquaviva 2008: 192)
- 

We use the term “counting plural”, not as referring to a stem, but to an inflectional form that sits higher than the Classifier head (Dividing head). Thus, our use of the term “counting plural” is completely different from that of Acquaviva’s (2008). On our view, a simple account of the Irish facts introduced by Acquaviva (2008) might work as follows: Irish plurals in measure contexts are generated under #⁰. Having said that, more work is needed on Irish plurals. We leave this topic for future research. What is important is that not all special plurals might be counting plurals in our sense of the term. There remains the possibility that Acquaviva (2008) is correct for Irish plurals but these are different from the cases we focus on in this present paper.¹⁸

To summarize Section 2: we have argued that measure words are universally generated under Div⁰ directly (instead of -s as in Borer 2005). The plural that appears on the measure word in English is an exponent of a higher plural, one that is associated with the counting rather than the dividing function. When

18. Italian lexical plurals (Acquaviva 2008; Kučerová 2015) are also very different from the cases we are discussing.

the plural appears on the measure word in Azeri-type languages, the sentence is ambiguous between the measure and the container readings and can receive an analysis along the line of English where two underlying structures are assumed. In the next section, we provide independent evidence for the idea that, besides a dividing plural, a counting plural is needed in the grammar of the world's languages. We also address the question as to why in English and other languages it is not possible to have double plurals (**boy-s-s* – abstracting away from the complications of haplology).

3. Independent evidence for a counting plural

In this section, we provide independent evidence for the proposal that a higher plural is needed in the grammar of the world's languages. Our argument will be based on plurals that are observed in singulative languages.

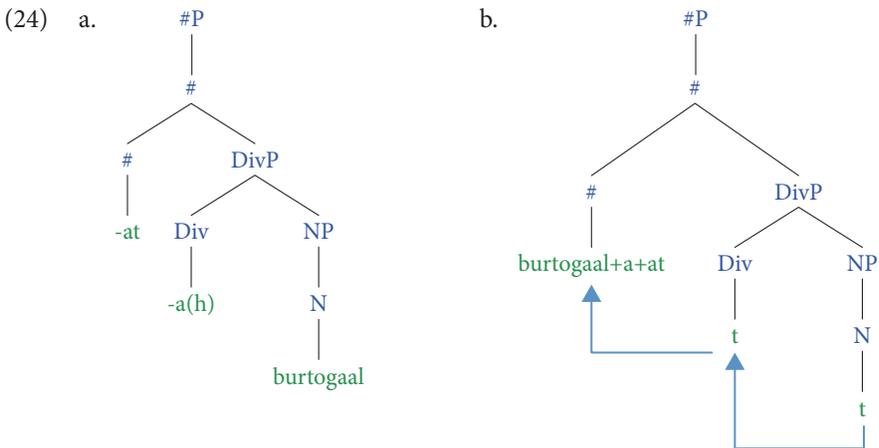
In singulative languages (Breton, Welsh, Arabic), collective nouns (that are semantically plural but morpho-syntactically singular)¹⁹ and mass nouns can be the input to an operation that creates individuals (via gender shift in many languages, e.g. Breton, Arabic): either to “an individual member of the collection” or a “specific quantity of a substance” (Ojeda 1992). Mathieu (2009, 2012) argues that singulative markers are generated under Div⁰ (see also Zabbal 2002; Fassi Fehri 2003, 2012). Singulatives are viewed as quintessential dividers: they create individuals out of collectives or mass nouns. Consequently, Borer's (2005) theory of nominal classification is augmented with the singulative, a phenomenon we find in many languages of the world. Because it is productive, systematic and inflectional (Mathieu 2012, 2014), the singulative cannot be relegated to the lexicon (say, under *n*, as in Acquaviva 2008, see also Lecarme 2002; Lowenstamm 2008, Kramer, 2009, 2012).

19. As pointed out by Gil (1996), there are many uses of the term ‘collective’ in the literature and it is confusing. By ‘collective’, we mean a singular form with plural reference in a singulative language. Collectives in such languages are not unlike ‘collectives’ such as *furniture* in English. They might have the same semantics, namely their denotation has the structure of a semilattice (Zabbal 2002). However, there are many differences between the two kinds of collectives. *Furniture*-type collectives cannot appear with numerals directly and although this is true for Arabic collectives for numbers ranging from 2 to 10, numbers greater than 10 in Arabic surface with numerals directly. From that point of view, Arabic collectives behave more like general number – in the sense of Corbett (2000). By ‘collective’ we do not mean ‘collective’ in languages such as Persian. In order to avoid confusion, we reserve the term ‘group noun’ for such grammatical items.

Consider the Arabic example in (23a): *burtogaal* ‘oranges’ is a collective noun (morpho-syntactically singular and masculine, semantically plural) that can be individuated with the feminine suffix *-a(h)*.²⁰ Then, *burtogaala(h)* ‘an orange’ can be pluralized to give *burtogaalaat* ‘oranges’. In (23b), we have a mass noun *teen* ‘mud’ that can be individuated by way of the singulativizer suffix *-a(h)* to give *teena(h)* ‘a chunk of mud’, a measure reading, and this can be pluralized to yield *teenaat* ‘chunks of mud’.

- (23) a. *burtogaal* ~ *burtogaal-a(h)* ~ *burtogaal-aat* [Arabic]
 ‘oranges’ ‘an orange’ ‘oranges’
 b. *teen* ~ *teen-a(h)* ~ *teen-aat*
 ‘mud’ ‘chunk of mud’ ‘chunks of mud’

Since the singulative marker is responsible for the division, it is generated under Div^0 as in (24a). The plural is added at the next level, namely under $\#^0$, then head movement applies to give (24b).



There is evidence that this unexpected plural is not mere agreement as proposed by Borer and Ouwayda (2010), but a real plural, albeit a different one from the classifying plural. Since they want to keep the idea that the only function of the plural is that of dividing (Borer 2005), Borer and Ouwayda (2010) treat the plural of singulatives as an agreement marker. Putative evidence for their view comes from examples such as those in (25) where they claim a numeral is needed for the plural of the singulative to be licensed (see also Greenberg 1972: 179).

20. An *-h* is needed when another word follows.

- (25) a. *ʔakalt-u *(xams-a) tamraat-i-n fi ʔaʃ-sabaah-i.*
ate-I five-ACC dates-GEN-NUN in the-morning-GEN
'I ate five dates in the morning.'
- b. *kasara *(set-a) ʔubaaat-i-n.*
broke-he six-ACC bricks-GEN-NUN
'He broke six bricks.'
- c. *qaʔaʃ-u *(thalath-a) nahlaat-i-n.*
cut-they three-ACC palm.trees-GEN-NUN
'They cut three palm trees.'

Compare the examples in (25) with those in (26) (broken plurals) and (27) (sound plurals) where here it *is* possible to omit the numeral since we are dealing with regular count nouns – not singularized nouns (in this case, the bare noun takes the accusative; when a numeral is present, it is the numeral that surfaces with accusative marking).²¹

- (26) a. *qaraʔt-u ʃaʃrat-a kutub-i-n.* (broken plural)
read-I ten-ACC books-GEN-NUN
'I read ten books.'
- b. *qaraʔt-u kutub-a-n.*
read-I books-ACC-NUN
'I read books.'
- (27) a. *qaabalt-u xamsat-a muderris-een.* (sound plural)
met-I five-ACC teachers-GEN
'I met five teachers.'
- b. *qaabalt-u muderris-een.*
met-I teachers-ACC
'I met teachers.'

Borer and Ouwayda (2010) take these facts to indicate that, after individuation is realized by the singularive (as in Zabbal 2002; Fassi Fehri 2003, 2010; Mathieu 2009, 2012), the plural becomes a mere agreement marker (it agrees with the numeral).

21. Sound plurals are formed by adding a plural suffix to a stem. On the other hand, broken plurals undergo a change of the stem to indicate plurality, in which case there is no additional suffix. Although it is tempting to view broken plurals as irregular forms (the morphological change is stem internal and the noun systematically surfaces as feminine when the input noun can often be masculine), it has been shown that they are, in fact, quite regular morphologically (see Acquaviva 2008 for discussion) and that, in addition, they do not carry special/lexical meanings.

The first problem with this analysis is that the agreement in question is not always necessary. As (28) shows, the dual can appear without a numeral (see Greenberg 1972) and in fact *must* not, according to traditional Arabic grammars, appear with a numeral (Ingham 1994, siuonʔassoud 2000, p. 447) and in the case of singulars (29), the numeral ‘one’ need not surface. In (28), *samak* ‘fish’, a collective noun, has been singulativized to give *samaka* ‘one fish’ and then dualized. On our view, the dual is simply a counting plural that operates after individuation has applied. Clearly, the dual is not an agreement marker. Note that the ‘t’ on *samaka-tain* is not the plural of the singulative but an epenthetic consonant. The plural of singulative *samaka* ‘one fish’ is *samakaat* ‘fish/fishes’.

(28) ʔištara samak-at-ai-n.
he.bought fish-SING-DUAL.ACC-NUN
‘He bought two fish/fishes.’

(29) ʔištareiyt-u samak-at-a-n.
bought-I fish-SING-ACC-NUN
‘I bought a/one fish.’

The second problem for the Borer and Ouwayda (2010) view that the plural of singulatives is an agreement marker comes from cases where numbers greater than 10 are used. Above 10, plurals of singulatives are not used in Arabic. Rather, a singular form (traditional term = noun of specification) is used instead (it is exactly the same form as the one above in (29)). This shows that numerals need not agree with the nouns with which they are associated. Consider the following examples.

(30) a. ʔakalt-u thalaath-a ʔašrat-a samak-at-a-n.
ate-I three-MS.ACC ten-FM.ACC fish-SING-ACC-NUN
‘I ate thirteen fish/fishes.’
b. raʔeit-u xamsa-a ʔašrat-a baqar-at-a-n.
saw-I five-MS.ACC ten-FM.ACC COW-SING-FM.ACC-NUN
‘I saw fifteen cows.’

The third problem is that in singulative languages other than Arabic, the numeral constraint for numbers between 2 and 10 is not attested. As far as we are aware, it does not apply, for example, in Welsh or Breton (Trépos 1956, 1980; Hemon 1975). In fact, according to our informants, it turns out that it is possible in Arabic (Saudi Arabic and Tunisian Arabic) after all to use numbers between 2 and 10 without a numeral. In this case, however, the meaning is ‘a few’, ‘several’. This is due to the fact that the language has a paucal/greater number distinction. As is well known from traditional Arabic grammars, the paucal is between 2–10 and for numbers above 10, a singular form is used (see also Irish and Scottish where numbers between 3

and 10 also appear in the singular, Acquaviva 2008, with an analysis whereby such nouns behave as measure words, i.e. under Div⁰ on our view).

- (31) a. *ʔakalt-u tamraat-i-n fi ʔaʃ-sabaah-i.*
ate-I dates-GEN-NUN in the-morning-GEN
'I ate dates in the morning.'
- b. *kasara ʔubaat-i-n.*
broke-he bricks-GEN-NUN
'He broke bricks.'
- c. *qataʃ-u naħlaat-i-n.*
cut-they palm.trees-GEN-NUN
'They cut palm trees.'

These examples contrast with those in (32) where collectives take a plural directly (these forms are broken plurals) to denote abundance (the abundance plural, Corbett 2000).

- (32) a. *samak* 'fish' ~ *ʔasmaak* 'a lot of fish'
b. *xayl* 'horses' ~ *xuyuul* 'a lot of horses'
c. *qawl* 'saying' ~ *ʔaqwaal* 'a lot of sayings'

The fourth problem is that plurals of plurals (broken plurals that are pluralized) can appear without a numeral as seen in (33). On the assumption that the broken plural performs division (just like sound plurals, see Mathieu 2013, 2014),²² then the plural of that plural would have to be an agreement marker on Borer and Ouwayda's (2010) view. However, those plurals of broken plurals are possible without a numeral. The singular form is *ʔiswira* 'bracelet' and the first (broken) plural is the singular *ʔaswira(h)* 'bracelets'.

- (33) *ʔiʃtarat ʔasaawir.* (plural of plural)
bought.she bracelets
'She bought bracelets.'

It must be noted that, in some dialects (e.g. Saudi Arabic), it is also possible, as shown in (34), to pluralize broken plurals with the sound plural suffix.

- (34) a. *raḏul* 'a man' ~ *riḏaal* 'men' ~ *riḏaal-aat* 'men'
b. *beyit* 'a house' ~ *beyuit* 'houses' ~ *beyuit-aat* 'houses'

These need not appear with numerals as the grammaticality of the examples in (35) testify.

22. As pointed by Acquaviva (2008), broken plurals have no special meaning and they are fairly regular in their formation despite the various patterns available.

- (35) a. naaqaš-tu ʔal-muškilata maša riɟaalaat ʔal-silmi.
discussed-I the-problem with men the-science
'I discussed the problem with the scholars.'
- b. yaskun-u fii tilka ʔal-beyuitaat.
live-he in these the-houses
Lit. 'He lives in these houses.' *There are groups of houses and he lives in one house which cannot be exactly pinpointed.*

The following examples are from another dialect (Tunisian Arabic) and show the same thing but with different nouns.

- (36) a. ktéb 'book' ~ ktob 'books' ~ ktobb-ét 'books'
hsaan 'horse' ~ hsonna 'horses' ~ hsonn-ét 'horses'

They too can appear in a sentence without a numeral as shown in (37).

- (37) a. chrit ktobb-ét.
bought.I book-PL
'I bought books.' *I bought a few books*
- b. choft hsonn-ét.
see.PAST.I horses-PL
'I saw horses.' *I saw a few horses.*

Double plurals are not uncommon in singulative languages. Breton also has double plurals as exemplified in (38).

- (38) a. houarn 'iron' ~ hern ~ hern-iou
b. louarn 'fox' ~ lern ~ lern-ed
c. bugel 'child' ~ bugal-e ~ bugal-e-ou
d. merch 'girl' ~ merc'h-ed ~ merc'h-ed-ou
(Trépos 1956: 223–230, also Acquaviva 2008: 260)

On our view, the second plural (the plural of the plural) is in #⁰, showcasing the higher, counting plural. Once division has applied (in the case of the singulative or the broken plural), addition of a plural denotes counting. As already mentioned, the plural of singulatives is used with small numbers: it is relevant when counting. Above a certain number, counting matters less and a singular form is used. There is a good context where we can test the property of individuality/counting that plurals of singulatives have and that is questions such as *Do you have oranges?* as in (39). This question is ungrammatical in this context (entering a shop) since it is like asking a few individual/specific oranges, which would make no sense. Instead, it is the collective form of the noun that must be used (it is referring to a kind). Thus, while a collective is viewed as a group, i.e. a collection of individuals, but whose individuals are not separable from the others (quite possibly a mass

term as in Chierchia 1998), the plural of the singulative is viewed as a collection of individuals separable from each other: they can be counted. This contrasts with collectives that cannot take numerals directly (Acquaviva 2008) and thus cannot be counted (directly).

- (39) *Upon entering a shop:*
- a. *hal $\text{\textcircled{h}}$ indik burtogaal-aat?
Q have-you oranges.PL
'Do you have oranges?'
 - b. hal $\text{\textcircled{h}}$ indik burtogaal?
Q have-you oranges
'Do you have oranges?'

One issue arises at this point: why sound plurals in Arabic or English plurals cannot be pluralized. Since they are generated under Div^0 , one would expect the possibility of another plural (the counting plural) to be generated under $\#^0$, but this is not possible as shown in (40).

- (40) a. *I met five teacherses.
b. *qaabalt-u xamsat-a muderris-*een*-aat.
met-I five-ACC teachers-PL-PL
'I met five teachers.'

We propose that the reason why these plurals cannot be pluralized is because the higher plural operates only on singulars (or unmarked forms). While the singulative, sound plurals, English plurals, measure words, etc. are all generated under Div^0 since they all share a crucial dividing property, they do not have the same grammatical status or semantic characteristics. The singulative clearly creates singular items, measure words as classifiers are singular, and there is evidence that broken plurals can be reinterpreted as singular. This is perhaps most obvious when such plurals appear with adjectives as in (41). What is noteworthy is not so much the appearance of singular agreement on the adjective (which might be taken as evidence the broken plural is reinterpreted as singular since this also happens with sound plurals), but the appearance of gender shift on the adjective in (41b). While we expect masculine agreement on the verb, we have feminine agreement ((42b), a sound plural, has masculine agreement).²³ We interpret this mismatch in agreement on a par with singulativization, which also surfaces as gender shift with the

23. Note that nouns denoting humans always agree in number and gender with the adjectives they surface with (Acquaviva 2008:212).

conclusion that the broken plural is reinterpreted as a singular form (see Mathieu 2014; Dali 2015, Dali and Mathieu 2015).²⁴

- | | | | | |
|------|----|-------------|------------|---------------|
| (41) | a. | kitaab | jadiid | singular |
| | | book.MAS.SG | new.MAS.SG | |
| | | 'new book' | | |
| | b. | kutub | jadiid-a | broken plural |
| | | book.MAS.PL | new-FEM.SG | |
| | | 'new books' | | |
| (42) | a. | sayyaar-a | jadiid-a | singular |
| | | car-FEM.SG | new-FEM.SG | |
| | | 'new car' | | |
| | b. | sayyaar-aat | jadiid-a | sound plural |
| | | car-FEM.PL | new-FEM.SG | |
| | | 'new cars' | | |

We also see this gender shift when broken plurals are used with collective predicates or predicates interpreted collectively as in (43a): singular agreement as well as feminine gender appears on the verb (as well as gender shift). When interpreted non-collectively, the verb matches fully in agreement with the noun as in (43b) – see Dali (2015) for details.

- | | | | | |
|------|----|---------------------------------------|--------------|------------------------|
| (43) | a. | ʔal-ʕanaaqeed | tasaaqaʔ-at. | collective reading |
| | | the-clusters.MAS.PL | fell-FEM.SG | |
| | | 'The clusters (of grapes) fell down.' | | |
| | b. | ʔal-ʕanaaqeed | tasaaqaʔ-u. | non-collective reading |
| | | the-clusters.MAS.PL | fell-MAS.PL | |
| | | 'The clusters (of grapes) fell down.' | | |

Here is another couple of examples, this time from Tunisian Arabic (Dali 2015).

- | | | | | |
|------|----|--------------------------|---------------|------------------------|
| (44) | a. | El hsonn-ét | harb-et. | collective reading |
| | | the horse.PL.MAS-PL | escape-FEM.SG | |
| | b. | El hsonn-ét | harb-ou. | non-collective reading |
| | | the horses.PL.MAS-FEM.PL | escape-MAS.PL | |
| | | 'The horses escape.' | | |

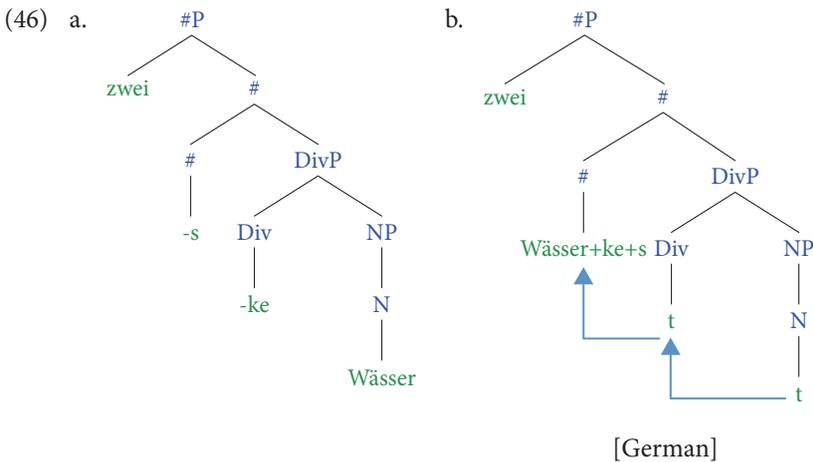
Before Section 3 draws to a close, let us review one last case that shows the relevance of the counting plural: the diminutive in some dialects of German and Dutch (an agreement solution of the type proposed by Borer and Ouwayda 2010

24. According to our informants, the plural on the adjective is in fact never ruled out with broken plurals or sound plurals.

will not work here either, since these constructions can appear with or without numerals). In these constructions, the diminutive forms a unit (measure) out of a mass noun and the output can be pluralized. Consider the examples in (45) from Ott (2011). As a diminutive affix, *-ke* (Low Rhenish) or *-je* (Dutch) is a functional head. It is unlike *bottle* or *cup* in English; it cannot be assumed to be base-generated in a lower NP, as a lexical category, as is done by Borer (2005) for English (and Hebrew).

- (45) a. die Wässer-ke-s [Low Rhenish]
 the water-DIM-PL
 ‘the units (glasses) of water’
 b. veel brood-je-s [Dutch]
 many bread-DIM-PL
 ‘many rolls’

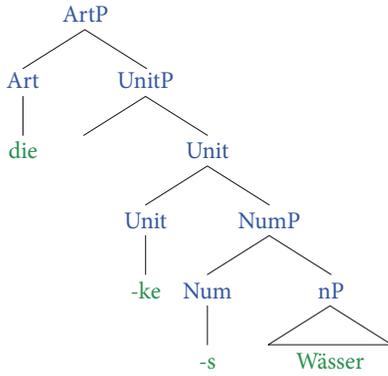
Under our view, the diminutive performs division (we know the diminutive acts a divider, Wiltschko 2006; Mathieu 2012). The plural is added as a counting plural. The addition of the plural is about items, individual “objects” rather than measures.



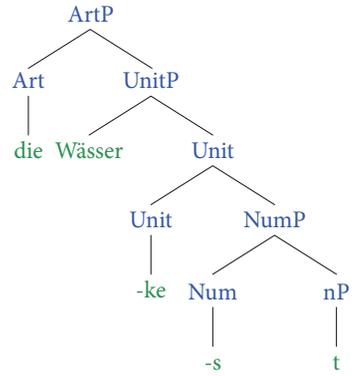
This analysis is simple and makes use of existing structure. Contra Ott (2011) and De Belder (2008, 2011), we do not need to add another projection to the structure in order to account for the facts. Ott (2011) introduces UnitP, and De Belder (2008, to appear) a SizeP, as host for the diminutive.²⁵ (48) is the structure that we assume that Ott (2011) would propose for Dutch (and by extension (47) for German).

25. When the diminutive is not used, measure phrases (e.g. *Stück* ‘piece’, *Glas* ‘glass’) can be used instead (the two are in complementary distribution – but note that *Stück* ‘piece’, *Glas* ‘glass’, etc. can be pluralized).

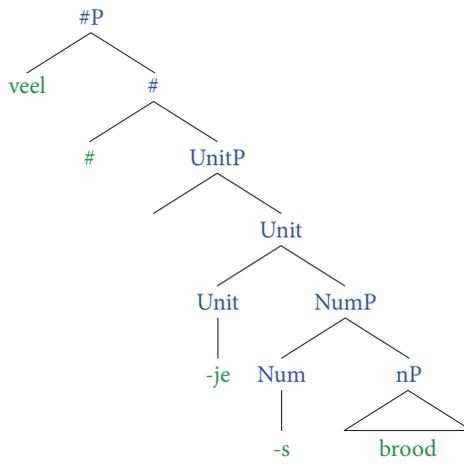
(47) a.



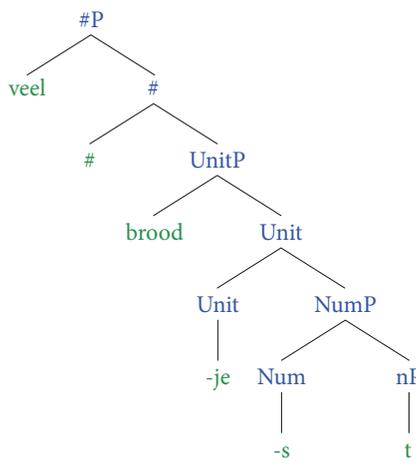
b. [German]



(48) a.



b.



[Dutch]

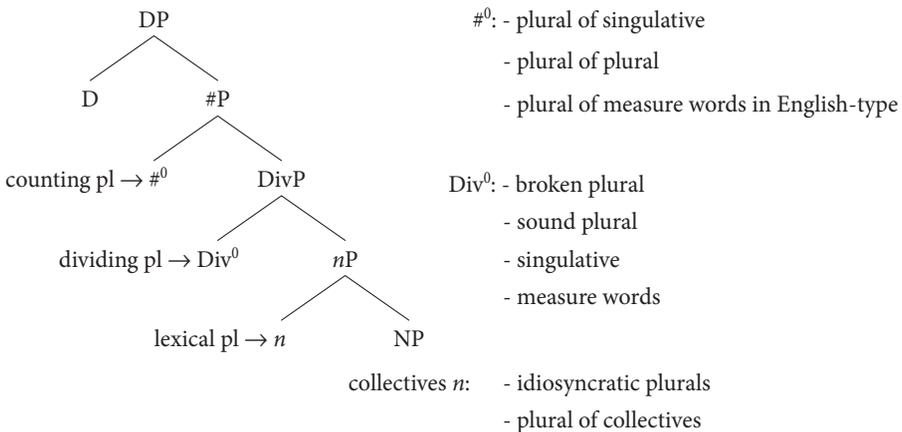
The problem with this analysis is that, although Ott (2011) recognizes the dividing function of the diminutive in Dutch and German, it nevertheless appears to be Num that performs division in these particular cases since, derivationally, NumP is introduced *before* UnitP (bottom up). Therefore, UnitP should thus merely count, not divide, since division has already applied. Because of the way the structure is set up, the *n*P has to raise via phrasal movement, but we can imagine an alternative where it is DivP (UnitP for Ott 2011) that is introduced first and then Number. In this case, it is Div⁰ that performs division and the role of number, in this instance, has to do with counting.

To summarize, division comes in many flavours (Mathieu 2012). The Div⁰ head can be occupied by the dividing plural (English-type languages, sound plurals in Arabic) or Chinese-type classifiers – Borer’s (2005) proposal – but also by singulative markers, diminutive markers, broken plurals (Mathieu 2012) and, as we have argued in this paper, measure words.

The plural marker that appears on English measure words was argued to be a higher plural, distinct from the dividing plural that is generated under Div⁰. The higher plural is generated under #⁰ in a counting projection. The measure construction is not the only context where this higher plural surfaces: we find this counting plural in the case of the plurals of singulatives, the plural of broken plurals in languages such as Arabic and the plural of diminutives when the latter are used as dividers. We saw that there is no reason to treat these special plurals as agreement markers and that they appear in special semantic contexts that favour a counting function (rather than a measuring function).

The typology in (49), from Mathieu (2014), illustrates where the different plurals available in the world’s languages surface.

(49) DP #⁰: - plural of singulative



The lowest plural is a lexical plural (Acquaviva 2008; Alexiadou 2010; Kramer 2009, 2012): it hosts idiosyncratic plurals (English ‘brains’ as in *He’s got the brains for it*), plurals of collectives in Arabic, where a plural can be added directly to a collective noun as in *samak* ‘fish’ ~ *ʔasmaak* ‘a lot of fish’, in which case we obtain an abundance reading (see Corbett 2000 for the abundance plural) and possibly Salish plurals (Wiltschko 2008) where an abundance reading is also attested.²⁶ The dividing plural is the familiar dividing plural from Borer (2005). The counting plural is the one proposed by Mathieu (2012, 2014) for plurals of singulatives, plurals of plurals and, as argued in the present paper, for plurals of measure words in English-type languages. It is neither an agreement marker nor a counting plural in the sense of Acquaviva (2008), but a plural that refers to separable units. In conclusion, the plural is not one but many.

4. Conclusion

In this paper, we argued that there exists, in addition to the dividing plural (Borer 2005), a counting plural whose function is not to divide, but as its name suggests, to count. The folk view that plurality is about counting thus appears to be on the right track and cannot be completely ignored, even if we grant a dividing function to the plural as is done in Borer (2005) and elsewhere. Measure constructions are good illustrations of why we need a higher, counting, non-dividing plural, adding existing evidence to the claim that the plural is not one but many (Acquaviva 2008; Harbour 2008, 2011; Wiltschko 2008, 2012; Butler 2012; Mathieu 2012, 2013, 2014).

Acknowledgements

We wish to thank our reviewers, the audience at the Canadian Linguistic Association 2015 annual meeting, especially David Heap, Ivona Kučerová, Tom Leu, Leslie Saxon, for interesting questions and comments and the members of the Syntax-Semantics lab at the University of Ottawa, especially Myriam Dali and Brandon Fry.

26. Wiltschko (2008) proposes that Salish plurals are modifiers rather than inflectional functional heads.

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