

Partitivity and reference

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The paper presents the partitive phrase (PartP) as a part of the general functional sequence in the nominal domain. It is argued that PartP derives grammatical number and effects related to countability, defines units of division and introduces the potentials of indefinite, non-generic and non-mass reference. Identity is established between this functional projection and the projection that derives partitive constructions. Contents of SpecPartP are related with the structural representation of the lexical meaning of nominal expressions, in order to account for observations that there are two levels in the structure of nominal expressions at which countability is determined.

1. Introduction

The term ‘partitive construction’ is traditionally used to refer to constructions of the type in (1) (e.g. Ladusaw 1982, De Hoop 1998). These are regularly non-definite (in the sense of Barwise and Cooper 1981) nominal expressions involving a complement with respect to which they establish a part-whole interpretation. This complement is realized as a PP (in English, headed by the preposition *of*) or as a nominal expression bearing a morphological case with partitive interpretation (partitive, genitive, dative). The precise interpretation of partitive constructions is that the denotation of the matrix NP is a part of the denotation of the nominal expression in the complement. A special property of this construction is that the nominal expression inside the complement has to be definite, and it is known, since Jackendoff 1977 and Selkirk 1977, as the ‘partitive constraint’.

- (1) a. One of the problems concerns heating.
b. Seven of the ten students we met have blond hair.
c. Some of the ministers are corrupted.

In this paper I argue that a syntactic projection headed by a partitive predicate, the same one that imposes the part-whole relation in partitive constructions, is universally present in all nominal expressions that appear in argument positions, except for those appearing in generic contexts and bearing generic interpretations. I show how the partitive predicate is required to combine a quantifier with a nominal expression, and how it derives the meaning that the literature in the field attributes to grammatical number. A model of the structure of nominal expressions is proposed for the syntax-semantics interface, in which PartP, a projection headed

by the partitive predicate, replaces the projection of grammatical number, giving all its semantic and syntactic effects, but bearing more explanatory power. In addition to accounting for some problems of the low functional structure of the nominal domain, this model also suggests interesting answers to two more general theoretical questions: Is ‘contextual’ information structurally represented (in the sense of e.g. Stanley & Szabo 2000)? and Can cartographic hierarchies be semantically derived (tackled in, for instance, Nilsen 2004)?

2. Partitive relations in nominal expressions

Observe the examples in (2), which illustrate partitive quantification (2a), regular (i.e. non-partitive) quantification (2b) and bare plural nominals (2c).

- (2)a. John saw five of the rats.
 b. John saw five rats.
 c. John saw rats.

It is uncontroversial that the underlined expression in (2a) involves a partitive relation: the particular set of five rats seen by John have to be part of a bigger definite set of rats that can be determined in the discourse. Less uncontroversial is, however, that the same relation is present in the examples (2b-c). The standard analysis for the underlined nominal expression in (2b) is in terms of generalized quantifiers (Montague 1973). The quantifier is seen as an element that specifies properties of the intersection between the set denoted by the NP and the set denoted by a certain predicate. Taken that quantifiers establish a closer relation with the NP than with the predicate that it intersects with (in the sense of *living-on nouns* of Barwise and Cooper 1981), we get to a point of view in which the quantifier indeed specifies the denotation of the nominal expression in terms of its part-whole relation with the denotation of the bare NP.

In our examples, any set of five rats seen by John in (2b) must be part of the set of rats denoted by the bare NP *rats* (i.e. of the aggregate set of rats in the world or the aggregate set of rats in the context). Therefore, the sentence may be interpreted as saying that John saw five individuals from the maximal available set of rats in the context. This way of interpretation determines the line of analysis that I take in the model of the nominal domain in section 3.

And even in (2c), although there is no overt quantifier, the meaning of the sentence is certainly not that John saw all the rats available in the context (the generic reading), the (entire) denotation of the kind of rats (in the approaches assigning bare plurals kind interpretation, e.g. Chierchia 1998), or any full set of rats that could be determined independently of the event of seeing. The intuition is in fact exactly that some undetermined amount of rats, i.e. a part of the aggregate set of rats in the world/context, was seen by John.

I take the presented observations as a motivation to invert the standard way of looking at partitive constructions and at the partitive constraint. Traditionally, partitive constructions are seen as a peculiar nominal construction, special because they involve a partitive relation with certain definite nominal expressions. The view that I am proposing does not see this property as special: all nominal expressions realizing arguments (with the aforementioned exception of fully generic ones) involve a partitive relation represented by the partitive predicate, which projects a PartP.

In languages like English, the partitive predicate is overtly realized only in case the nominal complement of PartP is definite.

(3) Syntactic structure of the nominal domain, and its realization in English

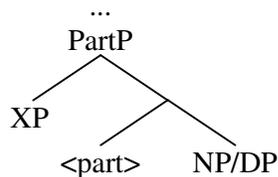
[<quantifier>	[<part>	[nominal complement]]
five	of	the rats
five	øf	rats

In some other languages, however, like for instance Serbo-Croatian (S-C), even regular quantified nominal expressions have the head noun in genitive, the case normally used to realize the partitive relation. This is illustrated in (4). Moreover, since S-C has no marking of definiteness, in both examples the noun in genitive is ambiguous between the definite and indefinite reading (although the indefinite reading is preferred, and there are strategies to clearly mark the definite one, such as the use of demonstratives and/or prepositions). As indicated in the English translations in (4), the definite reading for the noun in genitive in S-C gives the underlined quantified expression the meaning of the English partitive construction.

- (4) a. Ivan uze šest miš-eva.
 Ivan took six mice.GEN
 ‘Ivan took six mice.’ (/ ‘Ivan took six of the mice.’)
- b. Ivan uze nekoliko miš-eva.
 Ivan took several mice.GEN
 ‘Ivan took several mice.’ (/ ‘Ivan took several of the mice.’)

I propose, for the presented reasons, that the common structure present in every nominal expression appearing as an argument is the one in (5).

(5) The PartP, present in the structure of every nominal argument



The intuition behind this structure, so far, is that in order to establish reference, as a necessary condition of argumethood, the denotation of a nominal expression has to be specified as a part of the denotation of an NP or a DP. Three immediate questions are opened by postulating this structure: What is the material that appears in the specifier of PartP (XP) and how is it generated? How come the complement of PartP can take elements of two different categories? And how does this structure fit the bigger picture of the functional domain of nominal expressions? These issues, as well as the general intuition behind the proposed structure, will be discussed in the remaining part of the paper.

3. Classifiers, grammatical number and partitivity

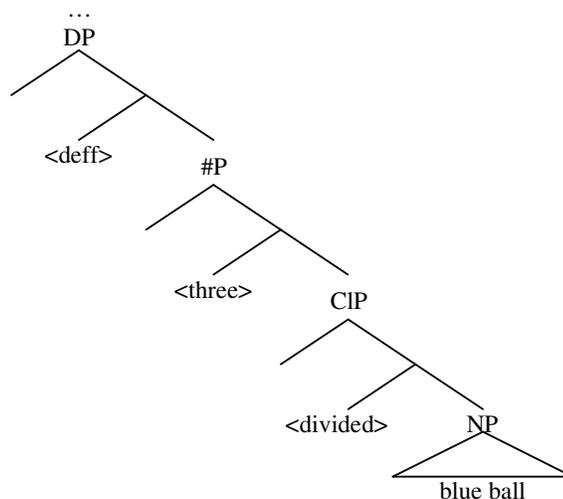
In this section I argue that PartP does not expand the already existing set of functional projections in the nominal domain, because it is in fact the projection supposed to generate classifiers and/or markers of grammatical number, which has to be present in any model.

I will start from the model of the functional domain of nominal expressions proposed in Borer (2005). In this model, the structure in which the lexical noun is generated (NP) is taken to have a mass denotation, as in (6a). Borer takes mass meanings as unbounded, undivided and homogeneous. All non-mass meanings for nominal expressions, like in (6b), have to be derived by one or more functional predicates realized in a relatively small number of functional projections on top of NP (which generates the lexical mass meaning). Major functional predicates that Borer postulates in this domain are the division predicate (related to classifiers/grammatical number), projecting the Classifier Phrase (CIP), the quantifier predicate, projecting the Quantifier Phrase (#P) and the determiner predicate, projecting the Determiner Phrase (DP).¹

- (6) a. There was dog on the floor. → a mass of matter
 b. There were dogs on the floor. → an unspecified quantity with individualized ‘units’

The division predicate of CIP divides the unbounded mass denotation of the lexical domain (NP). When a classifier is present in the specifier of this projection, it will determine the units of division, and when it is not present units of division are either unspecified (i.e. the mass is divided into all the possible units) or pragmatically determined (real world knowledge suggests the most natural unit of division). As a result, a lexical NP that projects only the predicate of division will denote an infinite set of all the possible divisions over the mass denotation of the NP, possibly with a special status of the division into the units specified in one of the two ways: by classifiers or by the knowledge of the world. Further, the quantifier predicate specifies a particular quantity of the (units of) division denoted by CIP, and DP introduces the predicates of definiteness/specificity, related to the discourse-old status of the referent of the nominal expression and to the freedom in referring that this expression has within the set determined by the lower structure (i.e. #P, CIP or NP).

- (7) Borer's model of the functional domain over the NP
 the three blue balls



¹ Borer in fact talks about range assigners rather than predicates, but for sake of simplicity and compatibility with the model I propose, I present her account in terms of predicates.

One of the problems of this approach is its treatment of the units of division in non-classifier languages. Borer argues that no lexical noun is specified for its units of division: this specification may only be done in the CIP, which is a functional projection. This means that the fact that the expression *five apples* does not denote any five units of the mass of apples, but exactly five fruits of the relevant sort has to be either specified in the CIP, or a matter of pragmatics. Since English has no classifiers, this leaves the following two possible explanations. One is that there is some covert material in the specifier of CIP which has nothing to do with the noun *apple*, and is imposed by pragmatics. The other is that after syntax, where the nominal expression is generated, at the interface between the logical form of the sentence (LF) and the conceptual capacity that is supposed to process it further ("the reasoner"), pragmatic knowledge intervenes and disambiguates the five units of apple denoted by the observed expression into five single-fruit-units of apple.

The essence of the problem is that it is possible that the lexical NP contains adjectives such as *big*, *rounded* or *damaged*, which cannot be interpreted without the particular unit of apple being determined. Unless these adjectives are claimed to modify only CIP or higher, the unit of division appears to be determined already at the level of the lexical NP, before even the predicate of division is applied, which opposes the basic claims of Borer.

Another angle of presenting the same problem appears in Mandarin and Cantonese, where, as discussed in Cheng & Sybesma (1998), when the meaning of the noun suggests the unit of division – the noun combines with a limited number of specific quantifiers. When the meaning of the noun does not suggest a unit of division, the noun will tend to appear without classifiers, or with elements that Cheng and Sybesma call massifiers. Massifiers are usually semantically closer to nouns than to classifiers, and often denote containers and similar notions. If the noun itself has no features related to the unit of division, these selectional regularities have to be explained as a pragmatic effect, which introduces the possibility for the system to produce many structures that will be grammatical, but ruled out only at the interface with pragmatics.² As illustrated in (8), not only classifiers, but massifiers as well show selectional restrictions with respect to the nouns they combine with.

- (8) a. saam bui/?deoi seoi b. saam deoi??bui din-nou Cantonese
 three cup/group water three group/cup computer
 ‘three cups/groups of water’ ‘three groups/cups of computers’ (Leo Wong, p.c.)

I propose two modifications for Borer's model, which incorporate the observations made in section 2 and simultaneously avoid the problems outlined above. One modification consists in replacing CIP by PartP, and the other in allowing the lexical specification of the noun to contain some information about the typical unit of division for its mass denotation.

Borer's view of grammar assumes a strong division between lexical and functional elements. There are a large number of lexical semantic elements, concepts, which contribute a lot to the meaning of the expression, but which are fully orthogonal to the grammatical structure and grammatical properties of the expression. On the other hand, there are a limited number of

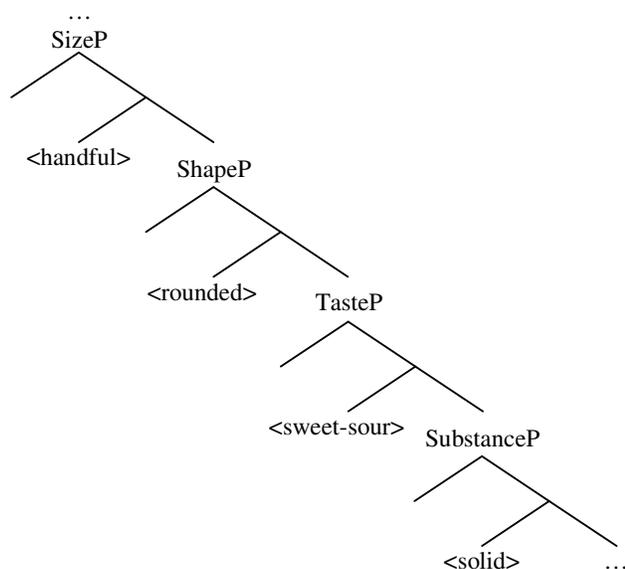
² The same problem appears with Dutch diminutives, as discussed in Doetjes (1997), where diminutives of certain mass nouns get the meaning of a typical unit of division for the mass in question, illustrated in (i).

(i) a. bier	bier-tje	bier-tje-s
beer	beer-DMV	beer-DMV-PL
‘beer’	‘glass/bottle of beer’	‘glasses/bottles of beer’
b. papier	papier-tje	papier-tje-s
paper	paper-DMV	paper-DMV-PL
‘paper’	‘sheet/piece of paper’	‘sheets/pieces of paper’

functional features, which make their contribution to the semantics of any expression only through the syntactic structure, i.e. as a part of the aggregate meaning of the syntactic structure involved. This strong division is, however, neither firmly based in empirical facts, nor in any obvious theoretical necessities. An alternative view is that all semantic features belong to the same class and that 1) there is a subclass of semantic features, which also need a structural, syntactic realization, or 2) in fact all semantic features have a structural realization in syntax, just some of them do not show any interesting behavior with respect to structural realization (e.g. scope and binding related properties). Conceptually, the latter option (in 2) is the most desirable one: it assumes that the whole conceptual material of a certain meaning receives structural syntactic realization, i.e. that the domains of the conceptual and grammatical representation perfectly match. In this view, no division has to be imposed onto the conceptual elements (features) that take part in forming complex conceptual structures corresponding with meanings of linguistic expressions. I therefore adopt this view.

In the adopted view, even features like size, shape, color, or qualities of substance, characterizing the denotation of a noun like *apple* or *brick*, need structural realization within the syntactic representation of the expression in which the noun appears. This is in fact not a very unusual view in contemporary syntax. Especially the so-called cartographic approaches (e.g. Cinque 1999) come very close to the exposed view, by pointing at other, rather syntactic, reasons why the properties listed above, or others, such as direction, source or time, obey certain ordering regularities. Following these approaches, the noun *apple* can be represented by the (simplified!) structure in (9).

(9) Sample from the structure of the noun *apple*



The tree in (9) is no more than a graphical representation of an ordered set of semantic features, where the set of features is exactly the one that constitutes the concept of *apple*, and the order between them is independent of the particular word/concept that they build.³ This means

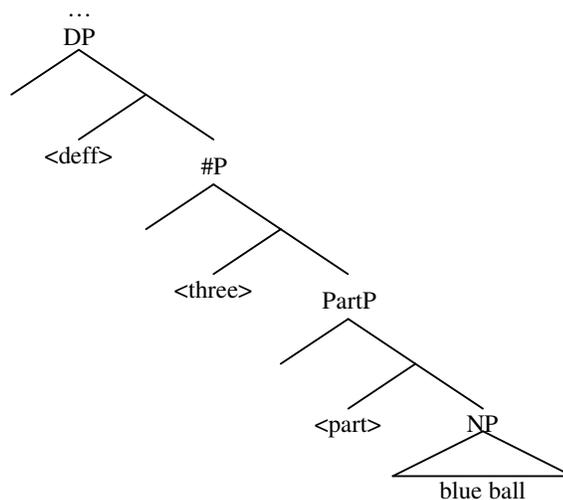
³ Evidence that there is a hierarchical ordering between properties like shape and size is the same as that used to argue for similar orderings between adjectives in Cinque 1999. The ordering of adjectives specifying size and shape in (i) is in crosslinguistically judged natural, while the one in (ii) is marked and has semantic and information structure restrictions.

that the lexical representation of a noun only needs to contain the appropriate set of semantic features, while other properties of the structure come from another, rather general, source.

The interpretation of these features presents an important aspect of the model I propose. The fact that the representation of the noun *apple* contains features specifying shape and size does not yet mean that the noun refers to (a quantity of) individual apples, or even to a mass of apple divided to individual fruits. It only means that the concept of apple involves the potential to be divided into units of the defined kind. In the second half of this section, I will talk about the mechanisms of giving this potential full realization, i.e. of deriving structures which will indeed denote individual fruit-units of apple.

The other modification of Borer's model consists in replacing CIP with PartP. On the first sight, formally speaking, this is quite a vacuous move. Applying the predicate of division to a mass gives an expression which is ambiguous between the infinite set of all the possible groupings of (parts of) units of division over the mass. This is very close to the denotation resulting from the application of the predicate of partition to the mass, which is ambiguous between any possible referent that can be considered part of the mass denoted by the NP. In this sense, the modification does not have any deep effect, and the formal semantic description that Borer gives for the CIP approximately holds of the PartP as well. Therefore the first step in introducing the modified model is to simply re-label the first functional projection, as in (10).

(10) PartP instead of CIP
the three blue balls



NP in this structure denotes the entire mass of 'blue ball' available in the world/context, while PartP denotes all the possible parts of this mass. #P denotes the set of all parts of the mass of 'blue ball' which are three in number (a discussion of how units of counting are determined

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- (i) a big rounded surface
 - (ii) a rounded big surface

This question, however, opens many other issues. Anonymous reviewers of the paper for instance asked whether a restrictive relative clauses like in (iii), which clearly contributes to the meaning of the NP, receives a functional projection with a fixed place in the hierarchy. My general view in this respect is that only modifiers with generic meanings (like roundedness or blueness) are hierarchically ordered. Those that involve episodic predicates (stinking half of the fall) and/or nongeneric nominal expressions (my grandma's cellar) stand outside this hierarchy.

- (iii) apples that stink in my grandma's cellar half of the fall

comes later in this section), and DP denotes one particular discourse-old set of three units of the mass of 'blue ball', and marks that there is only one such referent in the relevant context.

In spite of the presented similarity between PartP and CIP, there are two important differences. One of them has to do with the specifier of PartP, a question waiting to be tackled, and the other with partitive constructions, for which the modified structure accounts directly, without a special strategy.

I follow Borer's model in taking the specifier of PartP as the position that generates the element that determines the unit of division. However, while Borer only considers this position to be filled in classifier languages, the model that I propose allows it to be filled in every language. The only difference between classifier and non-classifier languages is that in the former, the features appearing in SpecPartP can get overt lexical realization (due to the presence of adequate morphological material in the lexicon), and in other languages this marking is either done in terms of other aspects of morphology, or it is simply absent. In other words, classifier languages are not more semantically and syntactically specified for the units of counting in the denotation of a nominal expressions – the only difference concerns the way this specification is phonologically realized.

One of the innovations that I propose comes from combining the two modifications in (9) and (10). Cheng & Sybesma (1998), and more explicitly Sybesma (2005), argue that there are two levels at which the denotation of a nominal expression is determined for countability, a property directly related to having specified units of division/partition (see the discussion of examples in (8) and footnote 2). One of the two levels seems to correspond to Borer's CIP, i.e. to the PartP in the present model. The other seems to be located lower in the structure, somewhere within what Borer considers the lexical domain. Cheng & Sybesma (1998) and Sybesma (2005) argue that there are components of the lexical semantic specification of the nominal root that determine possible units of partition that can be imposed onto the denotation of the NP that the root projects. Note that the difference from Borer's model is only in the nature assigned to this specification: Borer considers it pragmatic, orthogonal to grammar, while the opposed view would rather have it presented in the syntactic structure of the NP.

I will first briefly discuss the nature of the second, lower, level where units of partition are determined, and then complete the presentation of the model that I propose. Let us first try to identify the properties that make nominal roots specified for units of counting. It appears that whenever the meaning of a nominal root involves specification of the properties of shape or size, it also defines a unit of division. This is logical, since properties of shape and size cannot be applied to a mass: they require boundedness, which is achieved through partition. Illustration is given in (11a-b), where the concept of apple involves, among other properties, those related to a single fruit, i.e. its rounded shape and its size, which (9) roughly specified as 'handful'. Circle, on the other hand, can have any size, and therefore is not specified for this property. However, it is very strictly specified for shape, and in this way also for the unit of counting.⁴ Another property with the same effect, i.e. defining a unit of counting, is the property of type. It can be observed in (11) that all concepts can have this property as a possible base for defining the unit of counting. This is because every concept has the potential of being divided into a number of natural classes by specifying more precisely one or more of its properties, or as being seen as a class of some more general concept. Finally, event nouns, whether deverbal or not, have the option of involving a phase transition as their unit of counting. Such is the case in (11e) where the noun *murder*, if used in a nominal expression that involves a cardinal, e.g. *three murders*,

⁴ One additional property that determines units of partition may be functioning: the unit is defined the minimal entity that preserves all the properties of the concept, including its ability to function in a certain way. This property becomes relevant for concepts like e.g. machines or fences. Being specified for functioning thus allows for using minimal parts that preserve the property of functioning as units of counting/partition.

denotes events of murdering. The denotation of *three murders* involves three transitions between an action with respect to a human or animal which is alive and a state of the same human or animal of being dead.

- (11) a. apple: shape+size/type;
 b. circle: shape/type;
 c. water: type;
 d. fear: type;
 e. murder: phase transition/type.

Properties of shape, size and phase transition are present only in the representations of a limited number of nominal roots, because not all concepts related to nominal roots involve these properties. They are absent from the representation of nouns like *water* (11c) or *fear* (11d). The property of type is present in the representation of every nominal root, since every concept can be divided into sub-concepts; whether the property type is interpreted depends on the contents of SpecTypeP, the projection where it is represented (see the discussion regarding SpecTypeP related to (15) below).

While the standard way of treating phase transitions assigns them syntactic structure (see for instance Ramchand 2002, Arsenijević 2006), this is not necessarily the case for the properties of shape, size or type. The structure that I proposed for lexical meanings of nominal roots (9), however, sees all these properties as predicates, each realized in its own syntactic projection. Under such a view, the functional domain of a nominal expression has access to these properties for any NP. Their availability marks that the meaning of the nominal root has the conceptual potential to specify the unit of counting/partition.

Crucially, whether a particular unit of partition will indeed be part of the interpretation of the full nominal expression depends on the contents of SpecPartP. More precisely, a particular unit of counting for a certain concept will only be fully interpreted if the predicates that determine it are realized not only in their projections within NP, but also in SpecPartP, the position that specifies the partition of the mass denoted by NP.⁵ Observe the examples in (12), (13) and (15) below, with three different non-quantified structures that can be projected over the nominal root *apple*.

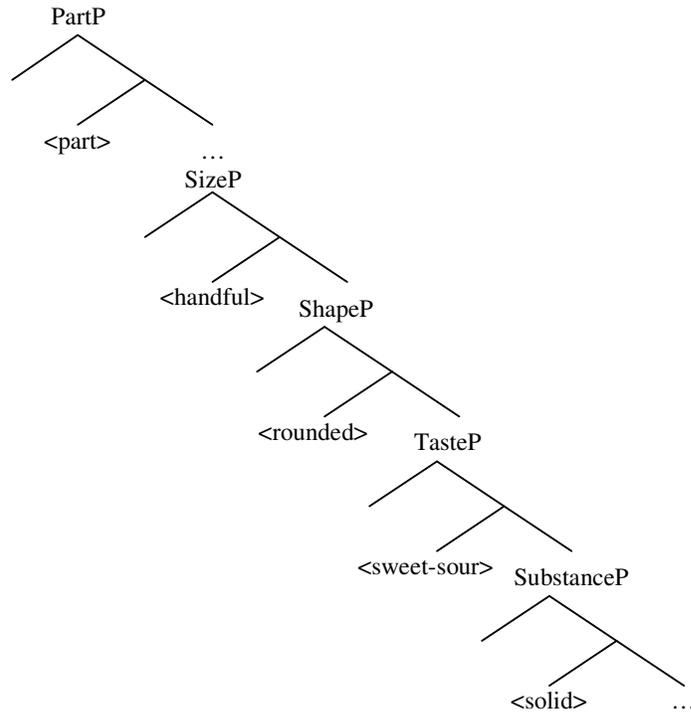
The structure in (12) has no material in SpecPartP. The concept itself, represented in the complement of PartP, involves certain properties that allow for defining counting units. However, since these properties do not appear in SpecPartP, they stay at the level of the pragmatic knowledge about the concept, without any impact on the way this whole nominal expression refers. The nominal expression is thus ambiguous between all possible parts of the maximal mass of apples available in the world/context, denoted by the NP. Through outer aspect and tense of the VP, the nominal expression gets bound and thus disambiguated to denote only one of all the parts between which it is ambiguous when observed in isolation. In other words, the utterance in which it appears gives this expression a definite description: after the sentence in (12) is uttered, there is one particular part of the aggregate mass of apples in the world such that it is on the floor in the situation referred to by the sentence (the sentence in the example can be

⁵ The material in SpecPartP never has overt realization. However, as I suggest in section 5, it tends to trigger agreement in the form of number morphology. This suggests that a better account is to consider that the PartP only may or may not establish the AGREE relation (Chomsky 1999) with the relevant projection in the lower structure. I do not commit myself to either of the accounts, and consider them both compatible with the proposed analysis. The choice is in any case a matter of syntax, and goes beyond the goals of the present paper.

followed by ‘It has been there since Friday.’ – where *it* refers to the mass of apple that is on the floor).

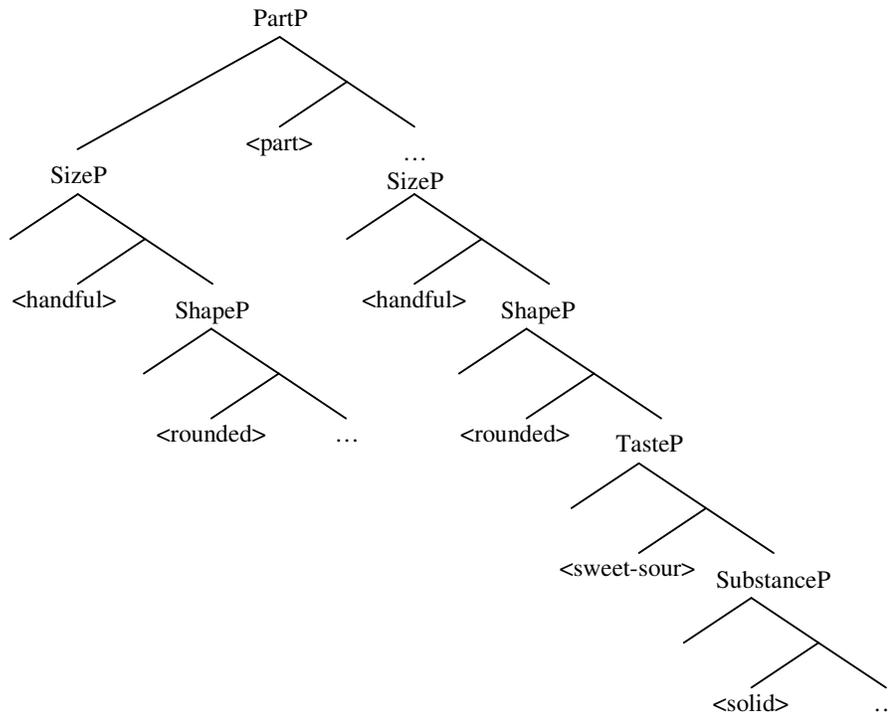
(12) Mass interpretation: no unit of partition is defined in SpecPartP

‘There is apple on the floor.’



The structure in (13) has the properties of size and shape represented in SpecPartP. This means that it refers only to those parts of the aggregate mass of apple available in the world that can be seen as single units or groups of units defined by the given values of size and shape. As already explained, these properties, possibly with one or two more, determine the unit of counting for this concept and for many others; in the given case they are taken to specify one single fruit. The predicate *part* allows the expression to also refer to (groups of) parts of such units. However, these parts are to be conceived as parts of individual units and not parts of the mass of apple, as it was the case in (13).

- (13) Count interpretation with a whole fruit as a unit: SizeP and ShapeP in SpecPartP
 ‘There are apples on the floor.’

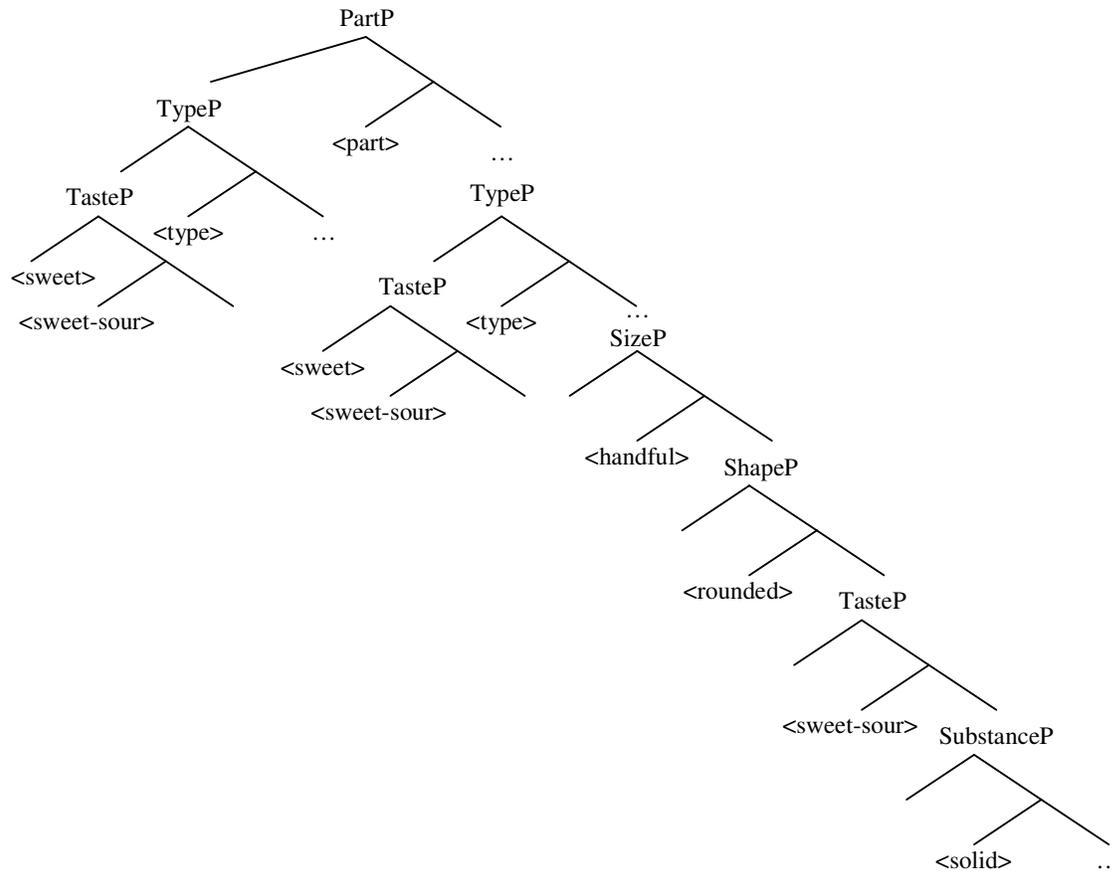


Support for treating the relevant argument in (13) as a PartP comes from Italian, where the same context takes overt partitive constructions. This construction in Italian (also appearing in French and other, not necessarily only Romance, languages) confirms the argument that the same PartP is involved both in partitive constructions and regular nominal expressions. The construction is ambiguous between the meaning of English bare plurals and the meaning characteristic of the partitive construction, where the complement of PartP is definite.

- (14) Ho incontrato degli studenti. Italian
 have.1Sg met of-the students
 ‘I met some of the students’/‘I met students.’ (Zamparelli 2002b)

Finally, in (15), SpecPartP is filled by the TypeP, which in turn has the property of taste in its specifier. The interpretation is the following. The concept of apple is conceived as divided into types according to taste (because TasteP appears in SpecTypeP, specifying the property *type*). The NP denotes the aggregate mass of apple in the world that is sweet in taste. Further, the appearance of the TypeP in SpecPartP results in the interpretation that types defined based on taste are the counting units for the particular nominal expression headed by the noun *apple* and that the particular expression only refers to those among taste-based types of apples that are characterized by sweet taste. The full nominal expression is ambiguous between all individual types of apples that are sweet, including possible sub-types, groups of apples and individual apples as long as all of these referents are conceived as parts of a type of apples.

(15) Count interpretation with types as units of counting: TypeP in SpecPartP
 ‘Sweet apples are more difficult to grow.’



The structure in (12) is different from those in (13) and (15) in one important property. Since, due to the lack of any material in SpecPartP, it does not define any unit of counting (i.e. of division/partition), this structure cannot combine with any quantifying predicate that requires countability. This means incompatibility with numerals, but also with quantifiers like every, each, many etc. Structures of the types in (13) and (15) freely combine with any type of quantifiers, taking as units of counting individual apples and types of apples respectively.

To conclude the section, PartP is introduced instead of CIP or other projection responsible for semantic effects of classifiers and grammatical number. PartP is therefore seen as a functional projection universally projected immediately over the structure with the lexical material, usually referred to as NP. PartP is headed by the predicate *part*, which has effects quite similar to the effects of the predicate of division defined in Borer (2005). In the proposed model, however, SpecPartP can take material that is base-generated within NP and which, when interpreted as the specification of partition, determines units of counting for the denotation of the nominal expression. When the representation of a noun lacks properties that define counting units such as size, shape or phase transition, it is intuitively judged as a mass noun. Mass nouns combine only with PartPs which have empty specifiers (yielding singular nominal expressions in English), or which take the TypeP in their specifier position (yielding plural nominal expressions in English). In this way the model accounts for the observation that there appear to be two levels at which countability is determined (Sybesma 2005), one related to the lexical meaning of the noun and the other to classifiers or to the grammatical number.

4. Partitive construction

In the preceding section I introduced PartP as a functional projection that is part of the universal functional sequence projected over the NP. Now we have to see whether the way it is defined for that purpose still allows us to apply it in partitive constructions, where I first postulated its presence.

Observe the examples in (16).

- | | | | | |
|------|----|---|----|---|
| (16) | a. | five of the ten students | b. | one of those chairs |
| | | [_{#P} five [_{PartP} of [_{DP} the ten students]]] | | [_{#P} one [_{PartP} of [_{DP} those chairs]]] |
| | c. | some of the mice in the box | d. | few of my friends |
| | | [_{#P} some [_{PartP} of [_{DP} the mice in the box]]] | | [_{#P} few [_{PartP} of [_{DP} my friends]]] |

In all four cases, the partitive construction involves a quantificational predicate (a numeral or a quantifier) and denotes an indefinite part from a definite set denoted by the definite DP in the complement of the PartP. On the one hand, it is just like in regular nominal expressions: PartP is ambiguous between different parts of the denotation of its complement. On the other, there are also certain interesting differences.

The first one is that in the partitive construction PartP takes a DP complement, and in regular nominal expressions, so far, we treated this position as filled with an NP. The second difference is that, in the English partitive construction, the partitive predicate is realized through the preposition *of*, while in regular nominal expressions, we have so far observed no overt material that realizes this predicate (recall that we did however consider genitive case in Slavic languages a possible candidate for the overt realization of the predicate *part*). The third difference is that in regular nominal expressions, PartP can appear bare (12), yielding mass interpretation, while in the partitive construction there always has to be a quantificational predicate projected above the PartP. For the rest, they appear to be parallel. In order to preserve the analysis in which the same PartP appears both in regular nominal expressions and in partitive constructions, the differences above must be explained or dispensed with.

Let us start with the first difference between partitive constructions and regular nominal expressions, that the former take DPs in the complement of their PartPs and the latter take NPs in this position. In the view of NP assumed in this paper, it refers to the maximal mass in the world that satisfies a certain property denoted by the NP. Assuming that definiteness involves maximization (the set denoted by the structure in the complement of DP, i.e. by the predicate to which definiteness applies, has exactly one element) and the property of being discourse-old, the denotation of NP described above is in fact definite. There is trivially exactly one maximal mass with a certain property in the world: if there were more it would not be maximal, and if there were none – the property would simply not exist. Regarding being discourse-old, every NP has discourse-old denotation as a consequence of the fact that the interlocutors have to share knowledge about the meaning of the lexical material. If the interlocutors associate the same property with a certain root, the set determined by this property is a part of the presupposition, and thus discourse-old as well. It is impossible to use the noun *water* without knowing what a referent has to be like to have the property of being water. We may not share knowledge about some particular referents that are part of the maximal mass of water, but we know that the

maximal mass of water is present in the universe, and we know what it has to be like.⁶ Finally, there are empirical arguments, e.g. from Romance languages, that strongly support the view that the complement of PartP is always a DP, and never really an NP (17).

- (17) a. Ho incontrato degli studenti.
 have.1Sg met of-the students
 'I met some of the students'/'I met students.'
- b. Ho incontrato tre degli studenti.
 have.1Sg met three of-the students
 'I met three of the students.'/*'I met three students.'

Although, as shown in (17b), the combination of a numeral with the *degli* construction only has the interpretation of the proper partitive construction, when the *degli* construction is bare, it is ambiguous between the meaning of the partitive construction and the meaning for which English uses a bare plural. This suggests that the partitive predicate and the definiteness marker for its complement are underlyingly present for all these readings, but that for some readings, in some languages, they may or must drop. However, the contexts in which they both drop vary across languages; this parametrization involves complex pragmatic and semantic issues far beyond the scope of the present paper and therefore does not receive a discussion.

The conclusion is that in fact the complement of PartP is always DP. The only difference between regular nominal expressions and the partitive construction is that the former have generic mass-denoting DPs in the complement of PartP, while the latter have this position filled with DPs that are not generic and do not have proper mass denotation. More formally, the DP in the complement of PartP in regular nominal expressions contains no PartP in its internal structure, and the DP in the complement of PartP in partitive constructions always necessarily dominates one additional PartP.

Contexts in which the preposition that marks partitivity cannot overtly surface can be formalized in terms of the same distinction. In English, it has to drop if the complement of the PartP that it heads is a DP that dominates no other PartP. In Italian, where the preposition is morphologically realized together with the article of the complement DP, the context in which this element drops involves one additional requirement, namely that the PartP is dominated by a non-empty #P.

The discussion above dispensed with one and deconstructed the other two differences between PartP in regular nominal expressions and in the partitive construction. PartP universally takes a DP complement, and the overt realization of the partitive predicate and the presence of a quantificational predicate are mutually dependent properties. The cost was adopting a general view in which every lexical NP first projects only DP, immediately over the lexical domain, yielding a definite mass nominal expression with generic interpretation. Only after this step, predicates related to grammatical number and quantification can be projected. One consequence of such a view is that there are no real structurally bare nominal expressions: they all have at least DP. Different languages have different conditions for leaving DP without overt realization. In Italian it is almost always, at least optionally, overtly realized. In English, it is dropped only if it dominates no other DP. Finally, in languages without articles, like S-C, it is dropped whenever definiteness is not focalized or topicalized, and otherwise it is marked by different strategies, e.g. by a demonstrative pronoun.

⁶ Another way of defining what it means to be discourse-old is based on having a certain referent already referred to in the previous discourse. In this sense NP does not have definite, but only specific reference.

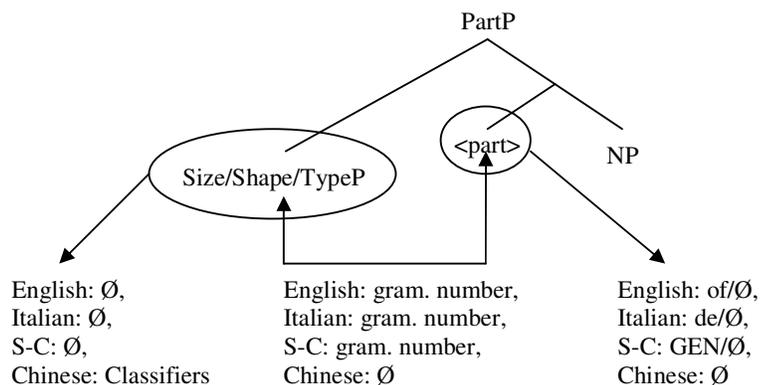
The intuition behind this view is that the so-called lexical predicates cannot refer. They need a DP even only to refer to maximal masses available in the universe that have a certain property. Since the universe is not bounded, denotations of such DPs are not only undivided, but also unbounded. If we want to achieve any other reference, i.e. if we want to refer to entities that satisfy a certain property, but are not unbounded and/or undivided, we have to reach their parts, i.e. to use the predicate *part*. Therefore, this predicate belongs to the universal sequence of functional elements available to be projected in nominal expressions. In order to refer to something by a nominal expression, reference first needs to be established to the maximal mass with a certain property that is available in the universe, which is presupposed and thus definite. At this stage, only definite reference can be established, with highly presupposed referents (generic meanings). In order to introduce the potential to establish indefinite reference and reference to bounded referents, the predicate *part* needs to be used, taking the definite generic nominal expression as its argument. Only after this predicate is introduced, it is possible to quantify over the nominal expression, i.e. to specify the quantity of a part of the mass; quantification over an unbounded undivided mass is quite obviously impossible.

5. Morphology and lexical realization

Most of the discussion so far concerned the semantics of the PartP, and its interface with syntax. PartP is directly related with three phenomena on the syntax-semantics interface: grammatical number (usually marked by affixal elements), classifiers (most often realized as independent words or clitics) and the partitive construction (normally headed by a preposition, such as *of* in English, but in some languages realized by a case ending). There is a neat, one-to-one, correspondence between these three types of elements and the three interesting aspects of PartP: contents of SpecPartP, contents of the head of PartP, and the relation between these two positions.

Partitive predicate, taken to be generated in the head of PartP, is usually lexicalized by a preposition or a genitive/partitive case ending. Predicates specifying units of partition, lexicalized by classifiers, are generated in SpecPartP. Finally, grammatical number arises in the relation between the predicates that specify units of partition and the partitive predicate, when the former are present in the structure. Its phonological realization is a typical instance of agreement between a head and its specifier, and as such its appearance is conditioned by different syntactic and semantic factors.

(18) Structural representation of partitive predicates, classifiers and grammatical number



6. Conclusion and theoretical implications

In this paper I showed how postulating PartP in the functional sequence of the nominal domain, combined with a structural realization of the lexical properties defining the meaning of nominal roots, result in a structure that neatly accounts for the empirical observations in the field of grammatical number. At the same time, this move unifies accounts for regular nominal expressions and for the partitive construction.

There are two more general theoretical questions affected by the discussion proposed in this paper. One is related to the question of the structural representation of pragmatic elements such as quantifier restriction domains, treated in, among others, Stanley & Szabó (2000). The way in which PartP is defined and interpreted is highly compatible with the view that quantifier restriction domains do get structural interpretation. According to the present account, quantifiers always actually specify a property of certain parts from some definite referent (this is also related to the conservativity of natural language quantifiers). This definite referent, the way it is talked about in this paper, has many similarities with the notion of restrictor sets in quantifier domain restriction. The other theoretical question related to the discussion in this paper is whether it is possible to semantically derive cartographic (in the sense of e.g. Cinque 1999) orderings between features and functional projections (this question is systematically treated in Nilsen 2004 and other papers by this author). The position of PartP in this hierarchy is explainable in terms of its effects: it is required to bring about indefiniteness and non-mass reference, and therefore it appears immediately on top of the DP-NP sequence, which derives mass reference. PartP can also introduce the more lexical meaning of partitivity, associated with the partitive construction, in which case again it is natural that it selects for the category parts of which it is supposed to denote. This category that is selected has to have its own reference, so it again has to be a DP. PartP is immediately dominated by #P, which determines the most immediate relation between PartP and DP in its complement – that of quantification.

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References

- Arsenijević, B. 2006. "Inner aspect and telicity." MS. Leiden University.
- Barwise, J. & J. Cooper. 1981. "Generalized Quantifiers and Natural Language." *Linguistics and Philosophy* 4. pp. 159-219.
- Borer, H. 2005. *Structuring sense, Volume 1: in name only*. Oxford: Oxford University Press.
- Cheng, L. L.-S., and R. Sybesma. 1998. "Yi-wan Tang, Yi-ge Tang: Classifiers and Massifiers." *The Tsing Hua Journal of Chinese Studies, New Series* 28. pp. 385-412.
- Chomsky, N. 1999. "Derivation by phase." *MIT Occasional Papers in Linguistics* 18. MITWPL, Cambridge, MA.
- Cinque, G. 1999. *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. Oxford University Press, Oxford.
- Doetjes, J. 1997. *Quantifiers and selection: on the distribution of quantifying expressions in French, Dutch and English*. Ph.D. Diss. Leiden University.
- De Hoop, H. 1998. "Partitivity." *Glott International* 3. pp. 3-10.
- Jackendoff, R. 1977. *X' Syntax: A study of phrase structure grammar*. *Linguistic Inquiry Monograph Series* 2. MIT Press, Cambridge, MA.
- Ladusaw, W. 1982. "Semantic constraints on the English partitive construction". *Proceedings of the First West Coast Conference on Formal Linguistics*. CSLI Publications, Stanford, CA. pp. 231-242.
- Montague, R. 1973. "The proper treatment of quantification in ordinary English." K. J. J. Hintikka, J. M. E. Moravcsik, P. Suppes (eds.) *Approaches to natural language*. Reidel, Dordrecht. pp. 221-242.

- Nilsen, Ø. 2004. "Domains for Adverbs." *Lingua* 114, 6 (special issue on adverbs edited by Artemis Alexiadou). pp. 809-847.
- Ramchand, G. 2002. "First phase syntax." Ms. Oxford University.
- Selkirk, E. O. 1977. "Some remarks on noun phrase structure." P. W. Culicover, T. Wasow & A. Akmajian (eds.) *Formal syntax: Papers from the MSSB-UC Irvine conference on the formal syntax of natural language, Newport Beach, California, June 9-11, 1976*. Academic Press, New York. pp. 285-316.
- Stanley, J. & Z. G. Szabó. 2000. "On Quantifier Domain Restriction." *Mind and Language*, 15: 219-261.
- Sybesma, R. 2005. "Number and countability." Presented in the WSM, LUCL, Leiden University, November 09th 2005.
- Zamparelli R. 2002a. "Definite and bare kind-denoting noun phrase." MS. Università di Bergamo.
- Zamparelli R. 2002b. "Dei ex Machina: a note on plural/mass indefinite determiners." MS. Università di Bergamo.