

PARTS OF SPEECH: A UNIFIED SEMANTICS FOR PARTITIVES

Goal: We propose a unified semantics for various types of partitives in (1) and (2), based on (a) the analysis of cardinals due to Ionin and Matushansky (2004) (henceforth, I&M) and (b) the semantics for *of* in (3).

Proposal: Following I&M and Chierchia (2004), we treat simplex cardinals as nominal heads with the semantic type of modifiers ($\langle\langle e, t \rangle, \langle e, t \rangle\rangle$), as in the sample lexical entry in (4) and the tree in (5). This analysis is easily extended to measure nouns (Chierchia (2004)), as in (6), and we propose a modifier analysis for fractions (7).

Atomicity: An important part of the analysis in (4) is that the complement of the (innermost) cardinal is a set consisting only of atoms (8) (see Chierchia (2004) for a possible implementation). This constraint is not shared either by measure nouns or by fractions. As a result, these kinds of modifier nouns are correctly predicted to impose different restrictions on the complement of *of*.

The Partitive Constraint (Jackendoff (1977), Barwise and Cooper (1981), Ladusaw (1982), Hoeksema (1984), etc.) derives the fact that in cardinal partitives NP₂ cannot be quantified (9a) by requiring that NP₂ denote an entity (type $\langle e \rangle$), i.e., be definite or specific (1a). However, a constraint on semantic type cannot exclude quantification, since a quantified DP may always QR, leaving a type $\langle e \rangle$ trace. The Partitive Constraint also cannot explain why QR is impossible with cardinal partitives (9a) but possible with measure partitives (9b) and fraction partitives (9c), or why, as shown by Abbott (1996), existential quantification of NP₂ is allowed in cardinal partitives (10).

Deriving the constraints on partitives: Due to the atomicity requirement imposed by cardinals, NP₂ in cardinal partitives may not be mass-denoting (2a) or involve quantification over atomic entities (9a) since neither masses nor atoms have atomic parts. This means that the Partitive Constraint is derived from an independent condition on cardinals. Conversely, since neither measure nouns nor fractions require atoms, measure and fraction partitives are not so constrained ((2b-c), (9b-c)).

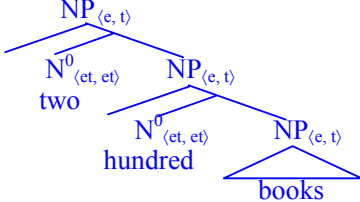
Existential NP₂ is allowed inside cardinal partitives (10) if it (or its trace) denotes a plural individual, because pluralities do have atomic parts. Since universal quantification over cardinal-containing NPs involves obligatory group-formation (cf. Corblin (1987)), we predict that a universal NP₂ is allowed with cardinal partitives in examples like (11): the universal NP₂ QRs, leaving behind a trace denoting an individual that can also have atomic parts. Finally, group formation is restricted by the context, which may explain why existentials are not freely available in partitives (along the lines of Abbott's principle that prohibits mentioning entities without reason).

Bare nouns: Cardinal partitives, in contrast to measure partitives, are impossible with a bare NP₂ (12) (cf. Selkirk (1977) on pseudo-partitives). This is explained if bare plurals are treated as kinds: as kinds are atomic, they have no atomic parts and are semantically unanalyzable wholes (Carlson (1977)).

Improper partitivity: Our view that *of* returns an (im)proper part of its complement (3) contradicts that of Barker (1998), who argued that the *of*-PP must return a proper subset of the set denoted by NP₂ (13). However, Barker's proposal incorrectly predicts ungrammaticality when the complement of *of* is a pronoun (14a), as well as with definite measure partitives (14b). We propose that Barker's constraint is due to conversational implicature and show that it is defeasible under certain discourse conditions (15).

Further results: Since cardinals/measure nouns/fractions take as their first argument a predicate (type $\langle e, t \rangle$), they cannot combine with definite or quantificational DPs directly, which correctly predicts that partitive formation requires additional lexical or functional material (16). This means that *of* is non-vacuous: it applies to individuals ($\langle e \rangle$), returns predicates (type $\langle e, t \rangle$), as in (3), and is therefore a normal transitive preposition. We will also discuss the semantic differences between regular partitives and proportional partitives (*3 books in/out of 7* or *3 in/out of 7 books*) and the role of the preposition.

Syntax of partitives: We will show that our semantics is compatible with the two syntactic structures usually associated with cardinal partitives: with and without an NP before *of* (see Cardinaletti and Giusti (1992, to appear) for references and discussion). However, examples like (14a), where no candidate for a null or deleted NP₁ presents itself, argue that partitives contain only one NP (NP₂).

- (1) a. two of these eight students / two of some students that I know cardinal/count partitives
 b. three quarters of the cheese mass partitives
- (2) a. two of the beans /*the cheese cardinal/count partitives
 b. five pounds of these beans / the cheese measure partitives
 c. three quarters of the beans / the cheese fraction partitives
- (3) [of] = $\lambda x \in D_e . \lambda y \in D_e . y \leq_i x$
- (4) [3] = $\lambda P \in D_{\langle e, t \rangle} . \lambda x \in D_e . \exists S : \Pi(S)(x) \wedge |S| = 3 . \forall s \in S . P(s)$, where
 S is a **partition** Π (cf. Higginbotham (1981:110), Gillon (1984), Verkuyl and van der Does (1991), Schwarzschild (1994)) of a plural individual x, i.e., $\Pi(S)(x) = 1$, iff
 (i) S is a **cover** of x (Gillon (1984), Schwarzschild (1994)), and
 (ii) $\forall z, y \in S [z=y \vee \neg \exists a [a \leq_i z \wedge a \leq_i y]]$
- (5) 
- (6) [kilo] = $\lambda P \in D_{\langle e, t \rangle} . \lambda x \in D_e . P(x) \wedge \mu_{\text{kilo}}(x) = 1$ Chierchia (2004)
- (7) [third] = $\lambda P \in D_{\langle e, t \rangle} . \lambda x \in D_e . P(x) = 1 \wedge \exists y \in D_e$ fraction
 (i) $P(y) = 1 \wedge$
 (ii) $\neg \exists z [P(z) = 1 \wedge y < z] \wedge$
 (iii) $\exists S \in D_{\langle e, t \rangle} : \Pi(S)(y) \wedge |S| = 3 .$
 $\exists s_1 \in S . s_1 = x \wedge \exists \mu \in M . \forall s_1, s_2 \in S [\mu(s_1) = \mu(s_2)]$,
 where M is a contextually determined set of measure functions]
- (8) [two hundred books] $\approx \lambda x \in D_e . x$ is a plural individual divisible into two non-intersecting non-empty sub-individuals p_i such that their union is x and each p_i is divisible into 100 non-intersecting non-empty sub-individuals p_j such their union is p_i and each p_j is a **book** (atom)
- (9) a. *two of every student cardinal/count partitives
 b. three pounds of a/every cake / two liters of every (kind of) wine measure partitives
 c. a quarter of a/every cookie fraction partitives
- (10) a. Every year only **one of many applicants** is admitted to this program. Abbott (1996)
 b. John was **one of several students** who arrived late. Ladusaw (1982)
 c. As **two of seventeen housemates**, we could barely kiss in private.
- (11) The reporter interviewed **two of every seven people that walked down the street**.
- (12) a. *two of students b. two pounds of beans / two liters of water
- (13) a. I met **the two of John's friends** *(that you pointed out last night)
 \Rightarrow John must have more than two friends
 b. *I met **the two of John's parents**.
- (14) a. **The two of us** spent a romantic evening together.
 b. I spent **the (entire) two hours of my free time** sleeping.
- (15) a. ... since 4 bedrooms is way too much for just **the two of my parents**.
 b. Between **the two of my parents** I learned to be creative, care for others and to be independent.
- (16) *three these (seven) books / *two pounds every cake / *a quarter every cookie

Selected references: **Abbott, B.** (1996). Doing without a Partitive Constraint. In: J. Hoeksema, ed., *Partitives*. **Barker, C.** (1998). Partitives, Double Genitives and Anti-Uniqueness. *NLLT* 16. **Ionin, T. & O. Matushansky.** (2004). A Singular Plural. In: *WCCFL 23 Proceedings*. **Ladusaw, W.** (1982). Semantic Constraints on the English Partitive Constructions. In: *WCCFL 1 Proceedings*.