

## On the (non-)cumulativity of cumulative quantifiers

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**Synopsis** – This paper provides an explanation for an asymmetry between English partitive and non-partitive phrases containing *most* – namely that only partitives participate in cumulative/collective readings. We argue that this is due to (i) the generic nature of non-partitive *most*-phrases and (ii) the unavailability of cumulative readings in generics.

**Data – 1.** It has been observed that non-partitive DPs headed by *most* do not participate in cumulative readings with numeral DPs (1-a) (Zweig 2008). However, this does not extend to sentences with *most of the NP* (1-b) (confirmed in an informal survey).

- (1) Scenario: 30% of the boys kissed girl 1, 30% of the boys kissed girl 2, 40% no one  
 a. #Most boys kissed the two girls      b. Most of the boys kissed the two girls

**2.** Non-partitive *most*-phrases do not allow collective readings with mixed predicates, while their partitive counterparts do (2) (Nakanishi and Romero 2004).

- (2) Scenario: 60% of the boys in the room jointly lifted a piano  
 a. #Most boys lifted a piano      b. Most of the boys lifted a piano

**3.** Unlike partitive *most*-phrases, non-partitives do not participate in cumulative readings even in environments where these are available for distributive quantifiers like *every NP*. One such environment is the double object construction where a cumulative interpretation is generally possible if the quantifier is the direct object (3). This type of example is an extension of a paradigm discussed by Kratzer (2003) (cf. Schein 1993), in which a subject DP and a non-subject distributive QP allow a cumulative interpretation.

- (3) Scenario: 50% of John’s books go to Mary, 50% go to Sue  
 John gave two girls every book

- (4) Scenario: 30% of John’s books go to Mary, 30% go to Sue  
 John gave two girls {most of the / #most} books

The unacceptability of the non-partitive *most* in (4) and the fact that (3) is felicitous indicate that the non-cumulativity observed with non-partitives cannot be due simply to their generalized quantifier semantics (contra Nakanishi and Romero 2004).

**Partitive *most* and cumulativity** – We adopt an approach to partitives in which the definite DP is an argument of the adnominal quantifier *most* (Matthewson 2001). The meaning of *most* is in (5). The cumulative readings are derived using the approach to plurality developed in Kratzer (2003) in which lexical predicates are plural (\*\* indicates cumulation). The derivation of the cumulative reading of (1-a) is illustrated in (6). Analogous derivations deliver collective readings of mixed predicates, whereby the relevant cumulated predicate is the respective activity head (Brisson 1998, Nakanishi & Romero 2004 for details).

- (5)  $[[\text{most}_{reg}] = \lambda x_{\langle e \rangle} . \lambda P_{\langle e, \langle v, t \rangle \rangle} . \lambda e_{\langle v \rangle} . \exists y \leq x [P(e, y) \wedge (\mu(\{z \mid z \leq_{at} y\}) > \frac{1}{2} \mu(\{z \mid z \leq_{at} x\}))]]$

- (6) a.  $[_{QP} \text{most (of)} [_{DP} \text{the boys}]] \text{Voice kiss [the two girls]}$   
 b.  $\exists e \exists y [y \leq \iota \text{boys} \wedge \text{**ag}(e, y) \wedge \text{**kiss}(e, \iota 2 \text{girls}) \wedge (\mu_{AT}(y) > \frac{1}{2} \mu_{AT}(\iota \text{boys}))]]$

**Non-partitive *most* and genericity** – Cooper (1996) and Matthewson (2001) observed that sentences with non-partitive *most*-phrases tend to be generic and that *most* does not allow contextual restrictions. An example of this pattern is given in (7).

- (7) a. Most linguists are millionaires (Matthewson 2001)  
 b. #Most linguists went to New Zealand for Christmas last year

Following Matthewson (2001), we assume that the sister of the non-partitive *most*-determiner is a kind-denoting bare plural. Accordingly, we assign *most* the interpretation in (9) where only the minimal non-overlapping individual realizations of a kind are counted (8). This minimality restriction, which is relativized to the main predicate to derive appropriate meanings for collective predicates, is a reflex of a more general counting principle (cf. Casati and Varzi 1999, Kratzer 2008).

- (8)  $R_{min,P}(x,y) = 1$  iff  $R(x,y) = 1 \wedge x \in \text{dom}(P) \wedge \forall z \leq x [z \in \text{dom}(P) \rightarrow z=x]$   
(9)  $\llbracket \text{most}_{knd} \rrbracket = \lambda x. \lambda P. \lambda e. \mu(\{z \mid R_{min,P}(z,x) \wedge \exists e' \leq e [P(e',z)]\}) > \frac{1}{2} \mu(\{z \mid R_{min,P}(z,x)\})$   
The truth-conditions of (1-a) are computed in (10). The distributivity over minimal individuals encoded in the lexical entry in (9) is thereby a property shared by all generic quantifiers. Distributivity with generics is illustrated in (11).  
(10) a.  $[_{QP} \text{most } [_{DP} \text{boys}]]$  Voice kiss [the two girls]  
b.  $\exists e [\mu(\{z \mid R_{min,kiss}(z, \text{boys}_k) \wedge \exists e' \leq e [**\text{ag}(e',z) \wedge **\text{kiss}(e', \iota \text{girls})]\}) > \frac{1}{2} \mu(\{y \mid R_{min,kiss}(z, \text{boys}_k)\})]$   
(11) Students {mostly / always /  $\emptyset$ } kiss two girls  $\frac{1}{2} \mu(\{y \mid R_{min,kiss}(z, \text{boys}_k)\})$   
 $\not\approx$  When there are students, they between them (mostly) kiss two girls

The reason for the non-cumulative behavior of non-partitives in double object constructions (4) is the same. The fact that strictly distributive generalized quantifiers can receive cumulative interpretations in such configurations can be explained by assuming a neo-Davidsonian association of certain thematic arguments with the verb (Kratzer 2003): in (12) two girls are introduced as the possessor of a complex eventuality identified as having every book (Beck and Johnson 2004 for the decomposition of double object constructions).

- (12) a. John [v give BECOME [two girls  $[_{Appl'} \text{APPL every book}]]]$   
b.  $\llbracket \text{Appl}' \rrbracket = \lambda x. \lambda e. \text{possessor}(e,x) \wedge \forall x (\text{book}(x) \rightarrow \exists e' \leq e [\text{have}(e',x)])$   
c.  $\llbracket (12\text{-a}) \rrbracket = \lambda e. \text{ag}(e, \text{John}) \wedge \text{give}(e) \wedge \exists e' \leq e [\text{BECOME}(e', \lambda e''. \text{possessor}(e'', \iota 2\text{girls}) \wedge \forall x (\text{book}(x) \rightarrow \exists e''' \leq e'' [\text{have}(e''',x)]) \wedge \text{CAUSE}(e,e'))]$

**Some consequences – 1.** Zweig (2008) argued that the infelicity of (1-a) – together with the felicity of *Most boys kissed girls* in contexts where the boys each kissed only one girl – is an argument against reducing dependent readings of bare plurals to cumulative readings. The above analysis accounts for the non-cumulativity of (1-a). The ‘cumulativity’ of the example with the bare plural, on the other hand, follows from the genericity of the sentence and the usual number-neutral interpretation of bare plurals in generics. This explains the illusion of non-reducibility of dependent plurals to cumulative readings. **2.** Non-partitive *most* sometimes allows a non-generic interpretation, e.g. *Most people who came to the party left early* (Matthewson 2001). The bare plural in these cases cannot denote a kind (cf. the discussion of *parts of that machine* in Carlson 1977) and is assigned a choice-functional interpretation – *most* is thus interpreted as *most<sub>reg</sub>*. Correspondingly, collective and cumulative readings should be available. This prediction is borne out: e.g. *Most people who were sitting there lifted a piano* can be interpreted collectively.

**Further work – 1.** We need to determine the source of distributivity over the (relative) minimal individuals that obtains with generics (11). Since this is also responsible for the non-cumulativity effects in (1-a) and (2-a), a simpler characterization of *most<sub>knd</sub>* should thereby become possible. **2.** An obvious question is whether other intriguing contrasts (13) that Zweig (2008) uses to argue for the non-reduction of dependent plurals to cumulative readings could be explained in a similar way. It is suggestive that both sentences in (13) are generic.

- (13) a. Seven trains leave every day to Amsterdam from this station (#cumulative)  
b. Trains leave every day to Amsterdam from this station ( $\checkmark$  dependent plural)

**Selected references** – Beck, S. and K. Johnson (2004) “Double objects again.” *LI*. Cooper, R. (1996) “The Role of Situations in Generalized Quantifiers.” In *Handbook of Contemporary Semantic Theory*. Kratzer, A. (2003) *The Event Argument and the Semantics of Verbs*. MS, UMass. Kratzer, A. (2008) “Situations in Natural Language Semantics.” *SEP*. Matthewson, L. (2001) “Quantification and the nature of crosslinguistic variation.” *NLS*. Nakanishi, K. and M. Romero (2004) “Two Constructions with Most and their Semantic Properties.” *NELS*. Zweig, E. (2008) *Dependent Plurals and Plural Meaning*. Ph.D. thesis, NYU.