NUMBER AND DENUMERABILITY

(i) No determiner selects for count singular nouns and mass nouns while excluding plural count nouns;

(ii) Some determiners select for plural and mass nouns while excluding singular count nouns (e.g. *a lot of, most of*).

(1) Cumulativity: the sum of two entities that fall in the denotation of a noun is something that still falls in the denotation of the noun.

Cumulativity groups together plural and mass nouns (boys + boys $\Rightarrow$ boys; water + water $\Rightarrow$ water) and excludes singular count nouns (boy + boy $\nRightarrow$ boy).

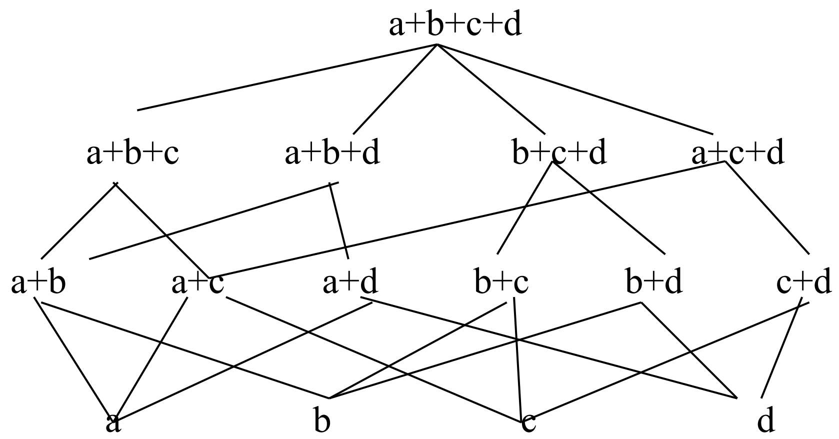
1. **Grammatical number for count nouns**

(2) Harry and Ron are wizards.

(3) $[\![\text{Harry}]\!] \leq_i [\![\text{Harry and Ron}]\!]$

Link (1983): adding structure to the domain D_e of the model via the reflexive, asymmetric and transitive relation *individual-part-of* ($\leq_i$), which creates a mereological structure (a join semi-lattice):

(4)



(5) Atomic individuals: AT= $[\lambda x_e. (\forall y)\ y \leq_i x \leftrightarrow y = x]$

(an individual is atomic iff it has no individual part except itself)

(6) Sum operator +

Given any set $B \subseteq D_e$: $+B$ = the smallest $x \in D_e$ s.t. $\forall b \in B$: $b \leq_i +B$.

(8) Pluralization operator * (= closure under sum) type $<<e,t>, <e,t>>$

Given any set of atomic entities P, $*P = \{y \in D_e: \exists X \subseteq P\ (y = +X)\}$

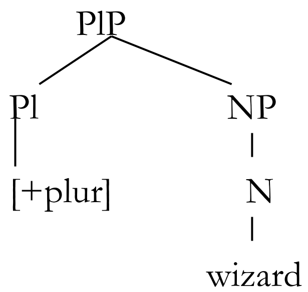
$[\lambda f_{<e,t>}. \lambda x_e. \exists S \subseteq \{x{:}f(x)=1\}\ [x = +S]]$

(9) Hypothesis:

i. Singular count nouns denote a set of atoms.

ii. Pluralization consists in compositionally applying to the denotation of a singular count noun the * operator, yielding a semi-lattice.

(10)



(11) Supremum operator σ (type $<<e,t>, e>$): Given any set of entities $P \subseteq A$,

$\sigma x.P(x)$:= the unique $x \in D_e$ such that $x \in P$ & $\forall y\ (y \in P) \rightarrow y \leq_i x))$

$[\lambda f_{<e,t>}.$ the unique $x \in D_e$ such that $[f(x)=1\ \&\ \forall y\ [f(x)=1 \rightarrow y \leq_i x]]]$

(12) Hypothesis: The definite determiner denotes the σ operator.

→ When it applies to the denotation of a plural noun, it returns the largest plurality: σ ({a, b, c, a+b, b+c, a+c, a+b+c}) = a+b+c (*maximality effect*)

→ When it applies to the denotation of a singular count noun, σ is undefined expect when the noun denotes a singleton set (*uniqueness condition*)

σ ({a}) = a (because $\leq_i$ is a reflexive relation)

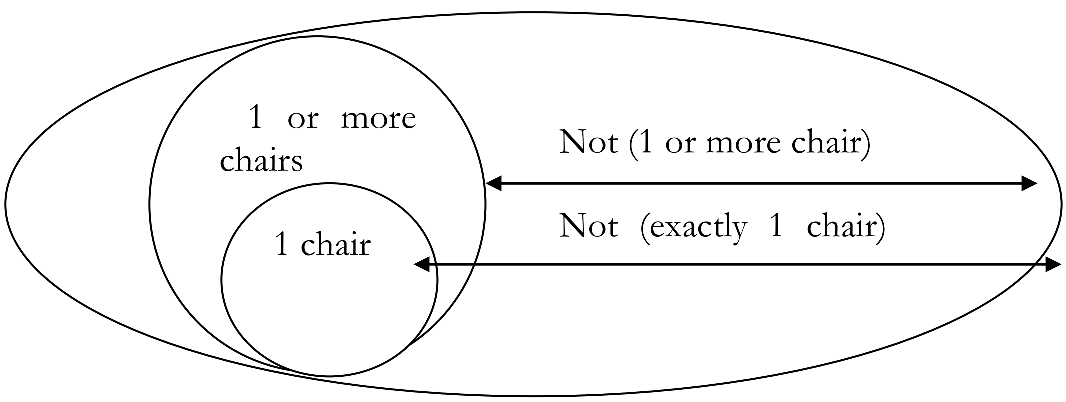
Does the denotation of a plural noun include the atomic entities? Apparently it doesn't:

(13) In questa stanza ci sono sedie
in this room there are chairs

However, (14) is falsified by the presence of even an atomic chair:

(14) In questa stanza non ci sono sedie.
in this room not there are chairs

(15) Hypothesis: The denotation of a plural noun includes atomic entities, but these can be 'filtered out' by a quantity implicature: it is more informative to describe a single chair by using the singular count noun:



Mass nouns inherently denote a (possibly non-atomic) semi-lattice, ordered by the relation $\leq_m$ (material part of). This solves the following paradox:

(16) This ring is new, but the gold it is made of is ancient.

It is possible to shift the denotation of a mass noun to a count denotation:

(17) a. a lot of beer (mass)
b. to have a beer (count: pre-determined quantity of beer, e.g. a glass)
c. Irish beers (count: types of beer)

or vice versa:

(18) a. I ate a chicken. (count)
b. I ate chicken. (mass) (= some unspecified quantity of matter)

NB1: Plural individuals (pluralities) cannot be identified with groups. A group may remain the same even if one or more of its atomic members change (e.g. a committee): a group is an atomic individual of a sort (Barker 1992), which is constituted by ordinary individuals.

→ Linguistic ontology (Link 1983): The individuals in the domain of the model are postulated for a proper account of linguistic phenomena, with no ontological commitment.