Monotonicity as a Consequence of Nominalizing Measures: Evidence from Romanian Pseudo-Partitives

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The two goals of this paper are: (*i*) to argue that, syntactically, the measure expression is the head of the extended projection in Romanian pseudo-partitive constructions like (1) – much like the leftmost noun is the head of true partitive constructions like (2) (in Romanian, the preposition *de* appears only with pseudo-partitives, while the preposition *din/dintre* appears only with true partitives); (*ii*) to propose a suitable semantics for pseudo-partitives that accommodates the syntactic generalization above.

(1) zece grame **de** brînză (de capră)
   ten   grams of cheese (of goat)
   ten grams of goat cheese

(2) zece grame **din** această brînză (de capră)
   ten   grams of   this   cheese (of goat)
   ten grams of this goat cheese

(3) #zece grame **din** brînză (de capră)

(4) #zece grame **de** această brînză (de capră)

The main contribution is deriving the observation in **[6]** that measure expressions are monotonic in pseudo-partitives from the fact that measure expressions have individual-based denotations in such constructions, which can be obtained only if measure expressions are used monotonically relative to the part-whole structures of their underlying domains of individuals (I use (non-)monotonic in the sense of **[6]**). Syntactically and semantically, the measure expression is the head of the pseudo-partitive while the other nominal expression is the non-head, in contrast to **[6]**, where the head/non-head categorization is reversed.

Syntactic and Semantic Properties of Romanian Pseudo-Partitives. The number and gender agreement properties of pseudo-partitives indicate that the measure expression is the head of the (main) extended projection of the pseudo-partitive: the pronominal clitic *i* (they.m.pl) and the definite article *cei* (the.m.pl) in (5) agree with the measure noun *litri* (liter.m.pl) and not with the noun *apă* (water.f.sg) (see **[7]** for more discussion of – and a different take on – the syntax of pseudo-partitives). In contrast, the measure phrase is not the head of constructions in which measure expressions are non-monotonic, like in (6), where the pronominal clitic *o* (it.f.sg) and the indefinite article *o* (a.f.sg) agree with *apă*.

(5) (Cei)   trei **litri**   de **apă**,   Ion tocmai   **i**   = a   băut / *a   băut = **o**.
(The.m.pl) three liter.**m.pl** of water.**f.sg**, John just   they.**m.pl** = HAVE drunk / *HAVE drunk = it.**f.sg**
John just drank (the) three liters of water (more precisely: (the) three liters of water, John just drank them).

(6) O   **apă**   de trei **litri**,   Ion tocmai a   băut = **o**   / ***i**   = a   băut.
  A.f.sg water.**f.sg** of three liter.**m.pl**, John just   HAVE drunk = it.**f.sg** / *they.**m.pl** = HAVE drunk
John just drank a three liter water (more precisely: a three liter water, John just drank it).

Moreover, the topicalization structure in (5) indicates that pseudo-partitives can be used referentially and the entities they refer to are individuated by the measure expression (a count noun) and not by the other nominal expression (a mass noun). This is further supported by the fact that pseudo-partitives can be embedded in partitive structures like the one in (7), which allow only referential, definite NP's (see **[2]** for more discussion). Also, in (7), the indefinite cardinal *doi* (two) agrees in gender with the masculine noun *litri* (liters), not the feminine noun *apă* (water). Example (8) is only meant to show that, as expected in view of (4), such definite pseudo-partitives cannot be further embedded in pseudo-partitive constructions.

(7) doi **din** cei   cinci litri   de apă
   two.m of the.m.pl five liter.m.pl of water.f.sg
   two of (every/the) five liters of water

(8) #doi **de** cei cinci litri   de apă
   two.m of the five liter.m.pl of water.f.sg
   two of the five liters of water

Deriving the Monotonicity Requirement: Pseudo-Partitives as Nominalizations. Following **[6]**, I assume that nouns denoting sets of individuals always associate a part-whole structure with these sets: for mass nouns, this is the material-part lattice structure introduced in **[3]**; for count nouns, the structure is trivial: every individual is a part of itself and of no other individual.

The *nominalization* of a measure expression like *liter*, *degree* etc. (the basic denotations of which I take to be predicates of scalar intervals, following **[6]**) is the semantic operation by which these expressions are associated with predicates of individuals, obtained by restricting the domain of individuals and its associated part-whole structure contributed by the other nominal phrase in the pseudo-partitive to a sub-domain and a sub-structure that are *materially equivalent* (in the sense of **[3]**) to the original structure. Since *liter*, *kilogram* etc. are count nouns, the resulting sub-structure has a count part-whole structure, i.e. no two distinct elements in its domain have a common material part. Thus, the nominalization of a measure materially *partitions* its underlying domain and the individuals that form the partition cells have to also be individuals in the original part-whole structure: five kilograms of cheese are still cheese. Finally, each individual in the partition measures exactly one unit (one liter/kilogram etc.) according to the measure function involved in the original interval-based denotation of the measure expression.

Just as *bottle of wine* can be used to refer to both a measure and a portion of wine (in addition to referring to a container), *kilogram*, *liter* etc. can be used to refer to both measures/scalar intervals and individuals. This is an instance of polysemy, a more extreme (and better known) example of which is using the noun *ham sandwich* to refer to people: *Every ham sandwich at that table is a woman* (**[5]**: (24b); see also **[4]**).

To this, I only add a principle of *individuation by measure* constraining measure-based polysemy: the measure-based partition is *arbitrarily* chosen from a *non-singleton* set of possible partitions – where 'arbitrarily' intuitively means that any partition would 'do equally well'. For example, there are many ways to divide a lump of cheese that weighs three kilograms into three pieces, each weighing one kilogram – and, since any such tripartite division would do equally well, we can arbitrarily choose one of them.

By requiring the existence of multiple possible partitions, we require measure-based individuation to be non-redundant, i.e. there must be no other independent principle of individuation that would deliver the exact same results as the measure individuation (this requirement can be taken to follow from the blocking principle(s) often invoked in lexical semantics). This is how we rule out expressions like #*trei kilograme de copil/creion* (#*three kilograms of baby/pencil*), which are infelicitous unless we run babies/pencils through Lewis's universal grinder: either there is at least one individual in the denotation of *baby/pencil* that does not weigh one kg (pragmatically very likely) and we cannot construct a measure-based partition or, if each baby/pencil weighs one kg, there can be only one partition, the same as the part-whole structure of the count noun *baby/pencil*, and we violate individuation by measure. A similar reasoning rules out pseudo-partitives with definite NP's like the one in (4) above – their part-whole structure is like that of a count noun, except that there is only one individual in their denotation; in contrast, the true partitive in (2) is felicitous because the preposition *din* alters the part-whole structure of the nominal by (say) running the individual under discussion through the universal grinder and delivering a mass-like mereology.

Requiring all the partitions to 'do equally well', therefore allowing us to make an arbitrary choice, means (at least) that they have the same number of cells. And this is how we rule out expressions like #*zece grade de apă* (#*ten degrees of water*): either the temperature of the water in the universe of discourse is not uniformly one degree and we cannot build any measure-based partition, or, if it so happens that the temperature of the whole water is uniformly one degree, we can build multiple, non-equi-numerous partitions (one of them will have only one cell containing all the water, another one will have two cells etc.) that will not 'do equally well'.

The paper discusses why *three cm of snow* is felicitous despite that fact that there is only one possible cm-based partition when we measure the depth of fallen snow – basically: unlike the *baby/pencil* case above, there is no independent partition that blocks the lexicalization of the measure-based individuation. Also, indefinite-measure constructions like *a piece/bit of cheese* do not contribute multiple non-equi-numerous partitions (despite appearances): I take such partitions to be equi-numerous and based on a scale with units of some indefinite size, e.g. *a piece of cheese* just means *some number of units-of-some-size of cheese*.

Two other uses of measure expressions provide evidence that we independently need an operation that maps interval-based denotations for measure expressions to individual-based denotations. First, individual-denoting measure expressions can be used by themselves – see (9). Second, a measure expression can provide the restrictor of a quantifier over individuals – see (10) and (11) (naturally occurring examples, courtesy of www.google.com). The corresponding bare/quantified Romanian constructions are also felicitous. Such bare/quantified measure constructions seem to be possible only with monotonic measures.

(9) Mary bought two kilograms of cherries and John already ate *one kilogram*.
(10) The Allies massed 3091 guns, or one to *every six yards of an eleven mile front*.
(11) There was a policeman *every two yards*, on both sides of the road.

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