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ON THE STRUCTURE AND COMPOSITION OF PSEUDO-PARTITIVES

JOINT WORK WITH EDDY RUYS AND JOOST ZWARTS

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1. A PSEUDO-INTRODUCTION INTO PSEUDO-PARTITIVES

Starting with Selkirk 1977, with many finer distinctions proposed:

(1) a. five inches of rope — measures
b. eight kilowatts of energy
c. a lot of slack

(2) a. a pocketful of rye — containers
b. a glass of vodka

(3) a. a head of lettuce — atoms
b. a grain of gunpowder

(4) a. a set of variables — groups
b. a gang of thieves

(5) a. a slice of cheese — portions
b. a whorl of butter

Properties: special syntax:

Languages where the syntax of pseudo-partitives is distinct from the syntax of partitives appear to also have a parallel partitive construction with measure heads

(6) a. drie liter (*van) water — Dutch
three liter of water
three liters of water

b. en gruppe turister — Danish, Hankamer and Mikkelsen 2008
a group tourists
a group of tourists

Special semantics: the content-container ambiguity (Selkirk 1977, Landman 2004, Grimshaw 2007, Rothstein 2009a, Partee and Borschev 2012, Duek and Brasoveanu 2015, etc.):

(7) There are two glasses of wine in this soup. — content
a. #They are blue.
b. #They (each) contain 100 milliliters.
c. #They (each) cost two euros.
d. ??They add flavour.

(8) There are two glasses of wine on the counter.

Certain modifiers on N_1 (e.g., *blue*) render the content reading difficult to achieve

2. HEADEDNESS AND CONSTITUENCY IN PSEUDO-PARTITIVES

Two major possibilities examined:

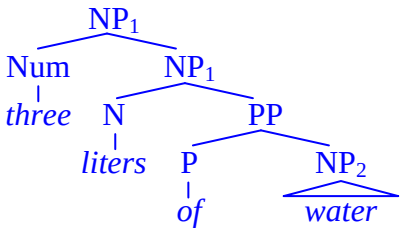
(9a) Klooster 1972, Lehrer 1986, Vos 1999, Grimshaw 2007, Landman 2015, etc.: the measure noun is the head of the pseudo-partitive; the substance NP is merged as its sister (complement)

(9d) Milner 1975, Selkirk 1977, Gawron 2002, Rothstein 2009a, b, 2011a, b, etc.: the substance noun is the head of the pseudo-partitive; the measure phrase is merged as its specifier

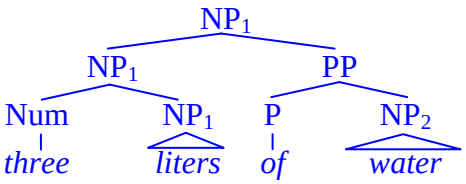
Really, two independent issues:

- headedness: which noun projects?
- constituency: does the measure noun form a constituent with the cardinal or with the substance NP?

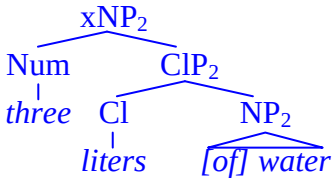
(9) a. **measure head, cascade**



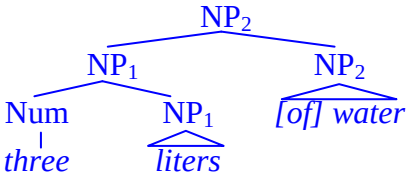
b. measure head, adjunction



c. substance head, cascade



d. substance head, specification



We will argue for the structure in (9a), for dedicated measure pseudo-partitives at least

The shape of the argument: where we see clear evidence for structure, it is for (9a)

2.1. Measure noun as the head (against the structures in (9c,d)

External syntax compatible with both views (corpus examples from Keizer 2007:122):

(10) a. ... nearly two million tons of crude **have** already been pumped into the sea.
b. Ten years of Mrs. Thatcher **has** wiped out…

Internal syntax is not

2.1.1. Agreement

NP-internal agreement is with the measure noun (Ruys [to appear], cf. van Gestel 1986):

(11) a. die éne/halve/twee liter water Ruys [to appear]
that.C=PL one/half/two liter.C water.N
that one liter of water/that half a liter of water/those two liters of water

b. het onsje cocaïne
the.N metric.ounce.DIM.N cocaine.C
the metric ounce of cocaine

(12) een liter water die/*dat we gedronken hebben Ruys [to appear]
a liter.C water.N that.C/N we drunk have
a liter of water that we drink

The argument extends to other languages with overt agreement for gender, whereas choosing a mass or plural NP_2 does not affect number marking on the determiner in pseudo-partitives:

(13) un/*des bon(*nes) kilo de pommes/cannabis
a/some good.SG(F.PL) kilo of potatoes.F/marijuana
a good kilo of potatoes/marijuana

2.1.2. Case

External case-assignment surfaces on the measure noun:

(14) a. On prines butylku vodki.
he brought bottle.ACC vodka.GEN
He brought a bottle of vodka.

b. Na stole stoit butylka vodki.
on table stands bottle.NOM vodka.GEN
There is a bottle of vodka on the table.

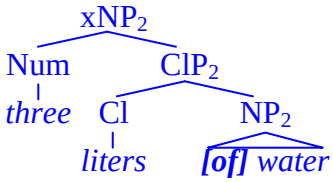
Although the substance NP may also bear the externally assigned case (case-agreement, a.k.a. case-sharing, cf. Stavrou 2003), it happens only if the measure noun does:

(15) a. na vaptisun mriadhes pistus/piston Greek
to baptise.PL thousands.ACC believers.ACC/GEN
to baptize thousands of believers

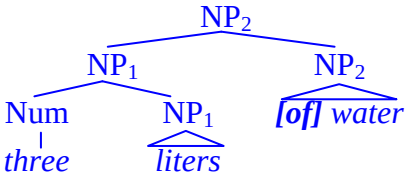
b. piva një shishe verë Albanian (Giusti and Turano 2004)
drank.1SG a bottle.ACC=NOM wine.ACC=NOM
I drank a bottle of wine.

The structures in (9c,d) have no room for **the preposition *of* or for genitive case**:

(9) c. substance head, cascade



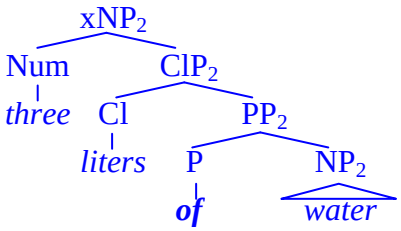
d. substance head, specification



If N_2 is the head, why is it marked genitive and why does the preposition *of* not appear in the structure? Conversely, if N_1 is the head, then the presence of genitive case/the preposition *of* is totally natural as a marker of nominal dependence

It is not impossible to model an extended structure for (9c,d) and the fact that it is categorially a PP need not be a problem (see below). It just becomes progressively more baroque:

(16) c. substance head, cascade



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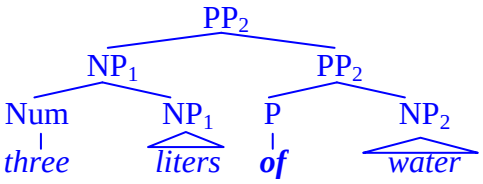


2.1.3. General structure of pseudo-partitives

Ruys [to appear]: unification with **collective nouns**, which must head the partitive NP:

(17) The herd of zebras is/are grazing. Dodge and Wright 2002

(18) a. een doos koekjes Dutch, Ruys [to appear]
a box cookies
a box of cookies

b. en gruppe turister — Danish, Hankamer and Mikkelsen 2008
a group tourists
a group of tourists

Potential objection: this is because group pseudo-partitives obligatorily have one structure of the two available -- measure pseudo-partitives may have the other (cf. Rothstein)

An adjective on N_1 sometimes seems to be able to modify N_2:

(19) a. a delicious plate of (the) (ripe) strawberries — Grimshaw 2007
b. a fragrant bunch of red flowers
c. #a ripe plate of (the) strawberries
d. #a large bunch of flowers

(20) a. ena oreo/kokino/malako zevghari paputsia — Greek, Stavrou 2003
a nice/red/comfy pair shoes
a nice/red/comfy pair of shoes
b. a delicious box of Belgian chocolates
c. a nice warm cup of tea
d. *mia nostimi duzina rodakina
a tasty dozen peaches
e. *ena akrivo kuti tsigara
a expensive box cigarettes

Predication is possible on the two readings simultaneously (Duek and Brasoveanu 2015):

(21) a. The jug of lemonade John broke had lemons painted on it. — D&B2015
b. The jug of lemonade I drank was too sweet.
c. The jug of lemonade my grandfather broke was too sweet.
d. The jug of lemonade I drank had lemons painted on it.

(22) I broke and mopped up a glass of milk.

Copredication strongly suggests that this is not structural ambiguity (contra Rothstein)

2.2. Substance NP as the sister of the measure noun (against the structure in (9b))

The head-complement relation: visible **construct state morphology** for container nouns:

(23) šloša bakbukey yayin — Hebrew, Rothstein 2011a
three bottles.CS wine
three bottles of wine

However, no visible construct state morphology with measure nouns; assuming the same structure, further stipulations are needed one way or the other

The central function of measure nouns in pseudo-partitives is that they measure a substance. Two potential **sources for the measuring relation**: argument structure and a functional head

No direct evidence cross-linguistically for such an extra functional head in pseudo-partitives
Potentially the source of the genitive case/preposition *of*, but surprising in view of their general character

The determiner does not seem to be a constituent with the measure noun to the exclusion of the substance NP. Evidence (Ruys [to appear]): a determiner or a cardinal is obligatory with a measure noun and it cannot be a strong one:

(24) a. Die tas weegt *(een/drie) kilo. — Ruys [to appear]
that bag weighs a/three kilo
That bag weighs one kilo/three kilos.

b. *The bag weighs John's kilo/this kilo/these three kilos.
c. *Mary is John's meters tall.

However, the numeral can and the indefinite article must be absent when the measure phrase appears inside a pseudo-partitive that has as a whole another determiner:

(25) a. Jan's (drie)/(*een) liter wijn Ruys [to appear]
John's three/a liter wine
John's three liters/liter of wine

b. deze (drie)/(*een) liter wijn
this.C=PL three/a liter wine
these three liters/this liter of wine

Numeral inflection: the numeral *één* 'one' is inflected inside a definite NP, including pseudo-partitives:

(26) a. het én-e antwoord
the.N one-AGR answer.N
the one answer

b. dat éne/*één jaar oponthoud
that.N one.AGR/one year.N delay
that one year of a delay/that delay of one year/that one-year delay

Yet not when it is clearly part of another NP:

(27) a. dat *éne/één jaar lange oponthoud
that.N one.AGR/one year.N long.AGR delay
that one-year long delay

b. één/*éne jongen z'n moeder
one.AGR/one boy.C his mother
one boy's mother

Possible objections: compounding in (27a) and non-transparency for inflection in (27b)

2.2.1. Compositional semantics

General assumption: the measure noun has an argument slot for the substance measured

Problem: intransitive uses

(28) a. The box weighs **7 pounds**.
b. She ran **two miles** without stopping.

Possible solution: existential quantification over the internal argument. Problem: it cannot be freely available:

(29) -- Have you eaten?
-- Yes, a lot/*three kilos.

Further problem for (9b): combination with indefinite determiners and cardinals

Resolution: a dedicated semantic type for cardinals (*n*) and complex compositional semantics (Rothstein 2011a, Kennedy 2015) for the cardinal-measure constituent:

(30) $[\![\text{kilo}]\!] = \lambda n \lambda x.\text{MEAS}(x)=<\text{KILO}, n>$ Rothstein 2011a

Unwelcome consequences: the cardinal is an obligatory argument of the measure noun, but:

(31) a. a kilogram of bones, a liter of blood
b. several miles (of rocky terrain)

If cardinals are treated as numbers (Kennedy 2015), **a covert *many* must be assumed in all numeral NPs** (cf. Hackl 2000)

2.2.2. Adjectival modification as a non-argument for the structure in (9b)

Evidence for the substance noun as the head:

(32) a. ena oreo/kokino/malako zevghari paputsia — Stavrou 2003
a nice/red/comfy pair shoes
a nice/red/comfy pair of shoes

b. a delicious box of Belgian chocolates
c. a nice warm cup of tea

(33) #one melted cup of icecream — Landman 2015

Frequent claim: the adjective actually modifies the substance NP
- this is merely metonymy (the pair is comfy, this box is delicious)
- with a true measure noun modification is impossible (Rothstein 2011a)

Rothstein 2011a: different syntax for measure and container readings:

(34) a. The waiter brought three expensive glasses of cognac. — Rothstein 2011a
b. #She added three expensive glasses(ful) of cognac to the sauce.

Landman 2015: same head-complement syntax for measure and container readings, different modes of composition

Our view: **concrete vs. abstract readings of the container noun glass**, with only the former compatible with modification

2.2.3. The issue of extraposition

Selkirk 1977: real partitives disallow extraposition of the complement to the substance noun:

(35) a. Objections soon emerged against these kinds of tactics.
b. The (traditional) objections soon emerged against these kinds of tactics.
c. A bunch of objections soon emerged against these kinds of tactics.
d. ?*A bunch of the (traditional) objections soon emerged against these kinds of tactics.

Explanation for the ungrammaticality of (35d): upward-boundedness constraint (Ross 1967):

(36) No element may be extraposed more than one cycle up from the cycle containing it (Akmajian 1975:119)

Shape of the argument: (35c) is grammatical because in pseudo-partitives the substance NP is not a cycle within another DP

Extension to NPs (Deal 2011 handout):

(37) a. An assortment of responses to those questions of yours were/was considered.
b. An assortment of responses were/*was considered to those questions of yours.

Potential alternative: specificity

Sauerland and Elbourne 2002: semantic agreement with group nouns

2.3. Are prepositional measures an argument for the cardinal-measure constituency?

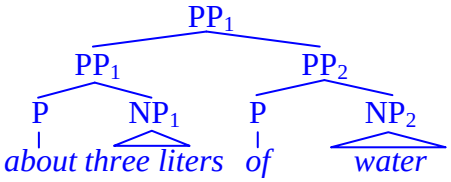
Problems to be resolved:
(i) PP-internally: the semantics of the preposition-MP combination

(ii) PP-externally: the entity denotation and nominal syntax

(i) has to be resolved with any constituency

(ii) gives the right results only with the structure in (9d), the price being that *of* is ignored:

(38) b. measure head, adjunction



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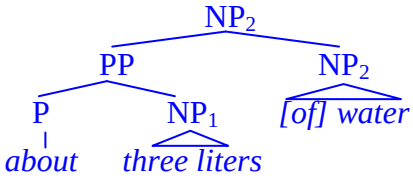

Too little gain: a stipulation is needed to not have a PP as a result anyway

Empirical evidence against (38): Basque **postpositional** pseudo-partitives:

(39) a. bost kilo patata-tik gora Basque, Ane Berro, p.c.
five kilo potato-ABL up.ALL
over five kilos of potatoes

b. bost kilo-tik gora patata
five kilo-ABL up.ALL potato
over five kilos of potatoes

(39b) can be derived from (39a) by extraposition. The opposite is not possible

In non-measure uses of the postposition only the word order in (39a) is available, supporting the extraposition analysis for (39b):

(40) a. Inurri-a bost kilo patata-tan gora joan zen. Basque, Ane Berro, p.c.
ant-DEF five kilo potato-INE up.ALL go be.3SG.ABS.PAST
The ant went up five kilos of potatoes.

b. *Inurri-a bost kilo-tan gora patata joan zen.
ant-DEF five kilo-INE up.ALL potato go be.3SG.ABS.PAST

The postposition clearly combines with the totality of the pseudo-partitive

3. THE SEMANTICS OF PSEUDO-PARTITIVES

The treatment of measure nouns as one-dimensional containers proposed in Matushansky and Zwarts 2016 does not preserve the content without additional stipulations

Empirical problem: measuring watermelons:

(41) a. a pound of watermelon/#watermelons
b. fifty pounds of watermelon/watermelons

(41a) shows that it matters whether the substance can fit into the measure provided

A deeper problem: dotted objects (Pustejovsky 1995, Asher 2011):

(42) a. $[\![\text{three glasses of wine}]\!] = \lambda x \,.\, x \in \text{GLASSES} \,\&\, \exists z\, \text{CONTAIN}(z,x) \,\&\, x \in {}^{U}\text{WINE}_k \,\&\, \text{CARD}(x) = 3$

b. $[\![\text{three glasses of wine}]\!] = \lambda x \,.\, x \in {}^{U}\text{WINE}_k \,\&\, \text{MEAS}(x) = \langle \text{GLASS}, 3 \rangle$

Rothstein's semantics assumes two different structures

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