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## SCALARITY AND DIMENSIONALITY ACROSS CATEGORIES ESTONIAN PSEUDOPARTITIVE CONSTRUCTIONS\*

**Abstract.** Estonian abstract nouns diverge in their morphosyntactic properties, and this reveals several new facts about the semantic structure of nouns and the nature of derivation. Although *temperatuur* 'temperature' and *soe* 'warmth, heat' are synonyms in Estonian, 'warmth' can appear in pseudopartitive constructions (PPC), while 'temperature' cannot (*viis kraadi sooja/#temperatuuri* 'five degrees above zero'). The article shows that the morphosyntactic behavior is sensitive to the lexical semantic meaning, namely, scalarity. If the lexical meaning of the noun encodes a degree along a dimension, then it can appear in a PPC ('warmth'). If the lexical meaning does not encode a degree, then the PPC is not possible ('temperature'). The degree structure of 'warmth' is a feature derived from adjectives, an option unavailable for the noun 'temperature'.

**Keywords:** Estonian, partitive case, pseudopartitive, degree, scalar adjective, abstract noun, cross-categorial features, dimensionality.

### 1. Introduction

#### 1.1. Morphosyntactic behavior of lexical items and lexical semantics

This article is about the relationship between the meaning and form of Estonian pseudopartitive constructions and the shared semantic structure of nouns and adjectives. The puzzle presented by the Estonian data is as follows: why is it possible to have *viis kraadi sooja* 'plus 5 degrees', *viis kraadi külma* 'minus 5 degrees' and *kolmkümmend kaheksa kraadi palavikku* '38 degrees fever' but not *viis kraadi temperatuuri* 'five degrees temperature', glossed in (1a–d)?

- (1) a. *viis kraadi sooja*  
       five[NOM] degree.PTV warm.PTV  
       'plus 5 degrees'

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- b. *viis kraadi külma*  
 five[NOM] degree.PTV cold.PTV  
 'minus 5 degrees'
- c. *kolmkümmend kaheksa kraadi palavikku*  
 38[NOM] degree.PTV fever.PTV  
 '38 degrees fever'
- d. *#viis kraadi temperatuuri*  
 five[NOM] degree.PTV temperature.PTV  
 'five degrees temperature'

Why is a pseudopartitive morphosyntactic construction compatible with 'warmth, heat' or 'fever' but not with 'temperature' in Estonian? Pseudopartitive morphosyntactic constructions include a measure phrase ('five degrees'), and a noun, specifying what is measured ('warmth, cold, fever, temperature'). I will show that accounts that rely on definiteness and quantitative indeterminacy of the embedded noun are inapplicable even if they rely on fine-grained mapping, as in optimality theory (Anttila, Fong 2000). I will argue that the monotonicity constraint that is based on part-whole relationships and that is considered to be responsible for ruling out or allowing nouns in pseudopartitive constructions (Schwarzschild 2002) should but cannot explain the difference between the morphosyntactic behavior of 'warmth' and 'temperature'. More specifically, the constraint based on the part-whole relationships does not explain the pattern of occurrence of abstract nouns in the Estonian pseudopartitive constructions, because warmth and temperature do not differ in terms of part-whole relationships. Instead, Estonian morphology allows us to demonstrate that monotonicity concerns the possibility of a scale related to a dimension as it is lexicalized in the meaning of nouns.

As a more general research question, this article examines if the morphosyntactic behavior of lexical items is derivable from their lexical semantic meaning (cf. Levin 1993 on verbs). The paper aims at identifying the relevant elements in the lexical semantic structure of abstract nouns. The following subsection sketches the research question about the nature of the lexicon in more detail. This section is followed by an introduction to the relationships between conceptual and lexical information, and Section 2 introduces the differences between nouns denoting length, volume, time, and temperature in pseudopartitive constructions. Section 3 presents a study into the properties of partitive and elative case-marking in the partitive constructions and the nature of true partitives and pseudopartitives. Section 4 discusses the morphosyntactic behavior and the lexical semantics of abstract nouns on the example of the lexical item *temperatuur* 'temperature' in comparison with its more specialized synonyms *soe* 'warmth, temperature above 0' and *külm* 'cold, temperature below 0'. The arguments for considering an explanation on the basis of monotonicity on the part-whole relation as a solution to the puzzle posed by the data are found in Section 5, and Section 6 argues that monotonicity on the part-whole relation cannot explain the Estonian data. My proposal in Section 7 is to regard the lexical structure of some abstract nouns, such as 'temperature' as lacking any lexical scalar dimensional property. I argue that while temperature is scalar in natural sciences in the sense that it can be meas-

ured by degrees, not every language has lexicalized this conceptual knowledge. The lexical item 'temperature' is not linguistically scalar in Estonian; 'cold', 'warmth', 'length', 'width', 'depth', 'volume', 'time', on the other hand, are lexically scalar. Lexical scalarity can be demonstrated on the basis of derivation. A scalar adjective gives rise to a scalar abstract noun. This possibility, which I refer to as cross-categorial dimensionality is not available for 'temperature'. Section 8 discusses that the distinction of scalar dimensionality is a linguistically relevant distinction, and that its presence in the meaning of a lexical item is lexically restricted. Section 9 is a summary that establishes that the Estonian data imply that part-whole relationships are not the basic ingredients of the architecture linking lexical semantics and morphosyntax.

## 1.2. The role of the lexicon

In this account, the lexicon is assumed to constrain the well-formedness conditions of pseudo-partitive constructions. I extend the analyses applied to Estonian verb classes (Tamm 2004a) to noun classes. I will show that the way that the properties of noun phrases constrain morphosyntax resembles the way the lexical semantic properties of verb phrases constrain morphosyntax in Estonian. As an illustration of a parallel, I present an example of the verb *leidma* 'find' and its object case. While the object of this verb can be total (i.e., depending on the number, the morphological genitive in singular and nominative in plural) as in (2a), it cannot be in partitive in this environment (2b). To some extent, this constraint is determined by the lexically encoded event structural properties of the verb, because there are other verbs, such as *uurima* 'research', that do not allow total case on the object (2c), allowing partitive instead (d).

- (2) a. *Leidsin vea*  
 find-PST-1SG mistake.TOT  
 'I found a/the mistake'
- b. #*Leidsin viga*  
 find-PST-1SG mistake.PTV  
 Not interpretable as: 'I found a/the mistake'
- c. #*Uurisin vea*  
 research-PST-1SG mistake.TOT  
 Not interpretable as: 'I researched a/the mistake'
- d. *Uurisin viga*  
 research-PST-1SG mistake.PTV  
 'I researched a/the mistake'

If such lexical semantically motivated constraints on the form of the complements apply in a verb phrase, then it is a good question if similar phenomena can be found in the noun phrase as well. That is, the paper tries to find out if the lexical semantic underpinnings of the pseudopartitive construction *viis kraadi sooja* 'plus 5 degrees' can be identified so that they predict the impossibility of the expression #*viis kraadi temperatuuri* 'five degrees temperature' and the possibility of *kolmkümmend kaheksa kraadi palavikku* '38 degrees fever'.

Thus an important lexically encoded parallel between the semantic structures of Estonian verb and noun phrases will be demonstrated. Exactly as it is the problem with verbs, the nature of the semantic features that constrain the morphological and syntactic form of nouns is in need of clarification. The question is whether the semantic constraints on form come from the conceptual-semantic or lexical-semantic part of the grammar. I will argue for the latter.

Exactly as in the case of the adjectival lexicon, where adjectives can be divided into scalar (*good, light, warm, cold, hot*) and non-scalar (*pregnant, black, English*) on the basis of their ability to combine with comparative morphemes, this article shows how nouns or at least some nouns may be characterized by scalarity. The Estonian verb lexicon, where I propose a scale-based account of the aspectual classification of Estonian transitive verb meanings (Tamm 2004a; 2004b), a scale-based and lexically fixed feature seems to be necessary for modeling the structure of at least some Estonian NPs. If an adjective's or verb's scalarity is specified in the lexical entry then, *grosso modo*, the same could be true for nouns. The article sets out to explain how the lexical scalar properties of nouns and not ontological or conceptual properties constrain the mapping to morphosyntax, and proposes why some combinations of nouns and pseudopartitive constructions are ruled out. The core of the analysis is made up by the domain of lexical items denoting temperature. This article provides evidence from Estonian and argues that the semantic constraints on the pseudopartitive construction apply in the lexical domain of temperature. I propose that the constraint does not concern part-whole relationships and amounts but scales and degree structure.

## 2. Measuring temperature

In natural sciences, measuring temperature does not differ much from measuring, for instance, length, area, volume, distance, mass, or time. In natural languages, expressing measurements concerning temperature indicates lexical restrictions (and is therefore predicted to show cross-linguistic variation) that sets temperature apart from length, volume, time, and many other lexical concepts.

The spatiotemporal measure expressions can be expressed by pseudopartitive morphosyntax in Estonian, as witnessed by examples in (4). A pseudopartitive construction (cf Koptjevskaja-Tamm 2001) includes a measure phrase (two meters), and a noun, specifying the substance that is measured (length). In Estonian, the pseudopartitive construction may have the morphosyntactic pattern illustrated in (3), where a nominative measure unit precedes a partitive expression, containing itself a nominative numeral and a partitive noun.

(3) [[Num.nominative (N1.partitive)](measure phrase) N2(substance).partitive]

Spatiotemporal dimensions and temperature can be specified by measure units such as meters, square meters, cubic meters, hours, or degrees in natural science. However, natural language typically does not encode the constructions combining degrees and temperature as it encodes meters and length. In science, spatial and temporal measures may be qualified by two

meters if pertaining to length, by five square meters if area is in question, by four cubic meters if volume is measured, by three hours if time is measured, and twenty degrees if temperature is measured. Language has its means to express these measurements, but the morphosyntactic means of expressing spatiotemporal versus temperature measurements diverge, which is illustrated in (4) and (5).

- (4) a. (*Hoone sai juurde*)  
building[NOM] get.PST3s in addition  
*kaks meetrit pikkust/laiust/sügavust/kõrgust*  
two[NOM] meter.PTV length.PTV/width.PTV/depth.PTV/height.PTV  
'The building acquired two meters of/in length/width/depth/height'
- b. *viis ruutmeetrit pinda*  
five[NOM] square meter.PTV area.PTV  
'five (more) square meters of/in area'
- c. *neli kuupmeetrit mahtu*  
four[NOM] cubic meter.PTV volume.PTV  
'four (more) cubic meters of/in volume'
- d. *kolm tundi aega*  
three[NOM] hour.PTV time.PTV  
'three (more) hours of/in time'

The pseudopartitive construction is not open for the measure constructions with 'temperature', as seen in (5).

- (5) (*Kevadilm sai täna juurde*)  
spring weather get.PST3s today in addition  
*#kakskümmend kraadi temperatuuri*  
twenty[NOM] degree.PTV temperature.PTV  
'The spring weather today got warmer by twenty (more) degrees (of/in) temperature'

Length, width, depth, height, area, volume, and time behave morphosyntactically as substances are expected to behave. Temperature does not behave as substances, being incompatible with the pseudopartitive construction.

### 3. True partitives and pseudopartitives

#### 3.1. Types of Estonian partitives

This article concerns only semantic partitives, more specifically, pseudopartitives. The article does not target the morphosemantic aspectual, epistemic or evidential partitives; for those issues in a related framework (see Tamm 2008; 2009; de Hoop 1998). This subsection wishes to point out that the compatibility of nouns in the morphosyntactic construction is not related to the distinction partitive-pseudopartitive but to another distinction. In addition, the section wishes to contribute to the literature on pseudopartitives by showing that the form-meaning mappings are slightly different than earlier assumed in Estonian and that therefore, if we refer to a pseudopartitive construction in Estonian, we need to be specific if we are speaking of a particular pseudopartitive form or a particular pseudopartitive meaning. The reason for this specification is that the generally assumed

semantics that distinguishes partitives from pseudopartitives on the basis of definiteness is not useful in mapping to distinct morphosyntactic forms in Estonian. In order to make it explicit, this article employs methods from several linguistic subfields, traditions, and trends. I combine the typological, formal semantic, generative syntactic and descriptive research methods and previous research. The approach of typologists is to look at one-to-many, *1-n* relationships in the semantics-morphosyntax mappings across languages. Typologists start off with a constant meaning and see how it is expressed; it may happen that a language has many expressions of one particular meaning. Descriptive linguists approach the data from the opposite direction. A linguistic form is the starting point, in its multiple meanings and uses in context; thus, the *1-n* mappings from morphosyntax to semantics and pragmatics. I combine both methods of data study.

It is not clear why the measurement semantics has exactly the morphosyntactic encoding of pseudopartitive constructions. Strictly speaking, the measurement semantics does not have the prototypical semantics of pseudopartitive constructions, since 'temperature', 'length', 'volume', 'distance', or 'time' are abstract terms that are ontologically categorized under substances but actually behave in divergent ways. In addition, it is not clear if the pseudopartitive and partitive constructions are different at all in Estonian with regard to 'temperature', 'length', 'volume', 'distance', or 'time'. More specifically, it should be first clarified what the semantics of a parallel construction containing elative substance noun is, as in (7a and b). The patterns are illustrated by Estonian examples in (6a and b). In Erelt, Kasik, Metslang, Rajandi, Ross, Saari, Tael, Vare 1993 : 145 is noted that the elative variant, as illustrated in (6b) and (7b), expresses a whole.

- (6) a. [[Num.NOM (N1.partitive)] N2.partitive]  
 b. [[Num.NOM(N1.partitive)] N2.elative]

- (7) a. *pakk*                      *võid*  
 package[NOM] butter.PTV  
 'a package of butter'  
 b. *pakk*                      *või-st*  
 package[NOM] butter-ELA  
 'a packageful of the butter'

### 3.2. What is a pseudopartitive?

Pseudopartitives are generally taken to refer to an amount or quantity of some (indefinite) substance (e.g., *a cup of tea*, *a package of butter*, *a box of chocolates*). True partitives refer to a part/subset of a (definite) superset (e.g., *a hot cup of this green tea*, *a large package of this Danish butter*, *a small box of these chocolates*) (cf. Koptjevskaja-Tamm 2001).

Languages differ in terms of how they encode true partitives and pseudopartitives (Koptjevskaja Tamm 2001). She notices that there is considerable variation between languages in the grammatical marking of the substance-denoting expression in partitive and pseudo-partitive constructions, ranging from case inflections to prepositions to zero marking. These constructions typically denote conventionalized measures (*a litre of x*),

fractions (*a slice of x*), quanta (*a lump of x*), collections (*a group of x*), or forms (*a pile of x*).

Languages where the morphological encoding is not different, as in English, partitive versus pseudopartitive phrases may be assumed to display structural difference. Stickney 2007 proposes the following structural difference in the English partitive versus pseudopartitive phrases. The partitive structure as in (8) (from Stickney 2007 : 407) is a head-complement structure, one DP inside another, whereas the pseudopartitive is a single nominal projection as in (9) (from Stickney 2007 : 407). The true partitive surfaces with a definite determiner in English, but pseudopartitive does not. There is assumed to be more structure in the true partitive construction than in a pseudopartitive one, which contains more functional material. The noun *box* in the partitive structure (8) is a measure phrase in the pseudopartitive structure (9). The preposition *of* is a preposition in the partitive construction (8) and represents a functional projection in the pseudopartitive construction (9). The difference in structure is backed up by experimental research, which shows that pseudopartitives (9) are the basis of building true partitives (8) in the process of acquisition (Stickney 2007 : 414). The bracketing convention reflects syntactic embedding.

(8) [DP [D a][NP [N box (N1)] [PP [P of] [DP [D the] [NP [N chocolates (N2)]]]]]]]

(9) [DP [D a][MP [M box (N1)] [FP [F of] [NP [N chocolates (N2)]]]]]]]

There are languages where the morphosyntactic encoding of the two types of partitive semantics differs. This seems to be the case in Estonian as well. Koptjevskaja-Tamm (2001) is a detailed typological study on Finnish and Estonian pseudopartitives. The illustration is taken from Finnish. Example (10a) is a partitive nominal constructions (PC) and (10b) is a pseudo-partitive nominal construction (PPC) (Koptjevskaja-Tamm 2001).

(10) a. *pala tästä hyvä-stä kaku-sta*  
 bit[NOM] this.ELA good-ELA cake-ELA  
 'a bit of this good cake'

b. *säkki perun-oita*  
 sack[NOM] potato-PTV.PL  
 'a sack of potatoes'

### 3.3. What is the exact semantics?

#### 3.3.1. Definiteness versus quantification

In this section I consider the definiteness hypothesis of the constraints. In Estonian, the pseudopartitive construction may have the morphosyntactic pattern repeated in (11), where a nominative measure unit precedes a partitive noun. The bracketing convention keeps apart the measure phrase and what is measured, the substance, and reflects syntactic patterning.

(11) [[Num.nominative (N1.partitive)](measure phrase) N2(substance).partitive]

### 3.3.2. Finnish

Arto Anttila and Vivienne Fong (2000) discuss Finnish partitive constructions and their case alternation as in (12), and they argue that the semantic condition behind case selection between (12a) and (12b) is quantitative determinacy and not definiteness.

- (12) a. *kilo voi-ta*  
 kilo[NOM] butter-PTV  
 'a kilo of butter'  
 b. *kilo voi-sta*  
 kilo[NOM] butter-ELA  
 'a kilo of the butter'

Arto Anttila and Vivienne Fong (2000) present data that speak against the previously assumed definiteness condition that is coupled with the Partitive Constraint (Chesterman 1991; Alho 1992; Anttila, Fong 2000). The Partitive Constraint states that the embedded NP ('butter') must be definite. They also note that the construction with the partitive case would be seen as being the parallel of the English pseudopartitives and that the construction with the elative case would parallel the true partitives following the results of previous work (see Anttila, Fong 2000). The pseudopartitive would allow embedded bare plurals and mass nouns that should be excluded from true partitives, and the elative case would be subject to the Partitive Constraint. However, the partitive phrases can be definite (13a), and the elative ones can be indefinite (13d) (the data are from Anttila, Fong 2000).

- (13) a. *osa Eurooppa-a*  
 part[NOM] Europe-PTV  
 'part of Europe'  
 b. *osa Euroopa-sta*  
 part[NOM] Europe-ELA  
 'part of Europe'  
 c. *litra viini-a*  
 liter[NOM] wine-PTV  
 'a liter of wine' or 'a liter of the wine'  
 d. *neljännes lehmä-n ruho-sta*  
 fourth[NOM] cow-GEN carcass-ELA  
 'one fourth of a cow's carcass'

These examples are problematic for the definiteness hypothesis in linking the partitive-pseudopartitive constructions. The partitive as well as elative are compatible with both definite and indefinite readings. Elative appears on NPs with interpretations like 'the butter', 'this city', 'a cow's carcass', 'all rental apartments', and 'the monks' (see Anttila, Fong 2000) and can be analyzed as Quantitatively Determined (QD) NPs. Partitive occurs on definite (e.g., 'this city') as well as indefinite (e.g., 'wine') examples, as Quantitatively Determined NPs ('this city') or as Quantitatively Indetermined (ID) NPs ('wine').<sup>1</sup> The conclusion of Anttila, Fong 2000 on

<sup>1</sup> Arto Anttila and Vivienne Fong (2000) divide also determiners into two groups using quantitative determinacy as a criterion: those that require QD "downstairs" NPs and those that do not. Determiners *most*, fractions (*one third*), percentages (30 %) and superlatives (*the tallest*) require QD NPs, while *some*, *plenty*, *kilo* do not require QD NPs.

Finnish is the following: the choice of case depends on multiple constraints, but the most important semantic constraint is Quantitative Determinacy, which differs from the definiteness condition in the original Partitive Constraint. The most important syntactic constraint bans adjacent identical morphological cases. The meaning of the elative case is lexically fixed and relates to quantitative determinacy. Elative is marked, partitive unmarked; in partitive constructions, elative occurs on QD NPs whereas partitive occurs on both QD NPs and quantitatively indeterminate (QI) NPs. The authors do not claim that the semantics of a pseudopartitive construction is QD-based in Finnish. The constructions with the partitive case are QD or QI. However, quantitative determinacy is assumed to be a morphosyntactically relevant semantic property of the nouns in question.

### 3.3.3. Estonian

Is the semantics of a pseudopartitive construction Quantitative Determinacy-based in Estonian? The same hypotheses can be proposed about definiteness and the pseudopartitive construction in Estonian as well. Following the data testing procedure of Anttila, Fong 2000, it is easy to demonstrate about Estonian that definiteness does not determine the morphosyntactic encoding. Partitive and elative mark definite and indefinite NPs, as illustrated in (14).

- (14) a. *osa Euroopa-t*  
 part[NOM] Europe-PTV (partitive construction: +DEF, +QD)  
 'part of Europe'
- b. *osa Euroopa-st*  
 part[NOM] Europe-ELA (elative construction: +DEF, +QD)  
 'part of Europe'
- c. *liiter veini*  
 liter[NOM] wine.PTV (partitive construction: +/-DEF, -QD)  
 'a liter of wine' or 'a liter of the wine'
- d. *neljandik lehma kere-st*  
 fourth[NOM] cow.GEN carcass-ELA (elative construction: -DEF, +QD)  
 'one fourth of a cow's carcass'

Examples (14a) and (14b) are definite, (14c) is definite or indefinite, and Example (14d) is indefinite. Examples (14a), (14b) and (14d) are QD, and Example (14c) is QI. In Estonian as well, the generalization of Anttila, Fong 2000 holds, worded in (15) and (16):

- (15) The Estonian partitive occurs in definite as well as indefinite examples, as Quantitatively Determined NPs or as Quantitatively Indetermined NPs
- (16) The Estonian elative occurs in definite as well as indefinite examples, as Quantitatively Determined NPs

It is not clear what the terms 'partitive' and 'pseudopartitive' should refer to in Estonian, since there are multiple mappings between semantics and morphosyntax. The anonymous reviewer rightly notes that this terminology does not fit these phenomena. In what follows, I will discuss the details of the mappings in order to delineate the essence of the term 'pseudopartitive'

for further discussion and to abstract nouns, which pose a challenge to all previous accounts.

The concept of QD seems to be a more suitable conceptual basis for distinguishing between the constructions in Estonian as well. Also, in Erelt, Kasik, Metslang, Rajandi, Ross, Saari, Tael, Vare 1993 : 145 is mentioned wholeness in connection with elative NPs. Therefore, I test the more typical pseudopartitives and the morphological cases that they allow, and definiteness. Adding a definite article-like demonstrative yields an acceptable combination as in Example (17a), adding an adjective to the measure unit is acceptable as well, as in (17b). This means that these examples can stand for the true partitive structure with multiple DPs and the morphological encoding of partitive.

- (17) a. *klaas seda veini*  
 glass[NOM] this.PTV wine.PTV  
 'a glass of this wine'  
 b. *suur klaas seda veini*  
 big[NOM] glass[NOM] this.PTV wine.PTV  
 'a big glass of this wine'

Thus, partitive NPs are compatible with the true partitive and pseudopartitive semantics, by which I mean now +QD and -QD, respectively. Elative, on the other hand, is indeed found with true partitive semantics only, by which I mean -QD semantics. As in Finnish, it is not definiteness that matters for semantics-syntax mapping in case of concrete nouns. The elative NP and the definite article-like demonstrative does not yield an unacceptable combination, but it refers to 'this kind of wine' instead of 'this particular instance of the substance wine' and is thus quantitatively determined in (18b), while the elative NP without the article-like demonstrative determiner is anomalous, as in (18a).<sup>2</sup>

- (18) a. *#klaas veinist*  
 glass[NOM] wine-ELA  
 intended to mean 'a glass of the wine'  
 b. *klaas sellest veinist*  
 glass[NOM] this-ELA wine-ELA  
 'a glass of this wine'

I generalize that the true semantic partitive semantics can have partitive and elative realization in morphosyntax (19), while the semantic pseudopartitive has only partitive NPs (20). In addition, the distinction that constrains the elatives to appear only in true partitives is based on quantitative determinacy instead of definiteness (21).

- (19) The true partitive semantics (+QD) can have partitive and elative realization in Estonian morphosyntax  
 (20) The pseudopartitive semantics (-QD) has only partitive realization in Estonian morphosyntax

<sup>2</sup> See Tamm 2007 for some criteria for determining the count or mass nature of Estonian total (syntactic accusative; morphological genitive/nominative) case-marked NPs. The conclusion is different from Tamm 2004a: total objects do not have a restriction that constrains the NP to be quantized.

- (21) The morphosyntactically relevant semantic property that differentiates true semantic partitives and pseudopartitives is Quantitative Determinacy for concrete nouns
- (22) True semantic partitives have a positive value for Quantitative Determinacy and semantic pseudopartitives have a negative value for Quantitative Determinacy for concrete nouns

The determiners in Estonian differ somewhat from Finnish and allow more variance. The quantifiers 'some', 'plenty', 'kilo' do not require QD NPs and have elative-partitive NPs, and Estonian fractions determiners 'most', fractions ('one third'), percentages (30%) and superlatives require QD NPs, the exact case encoding of their NPs is either elative or elative-partitive, but in a slightly different way than in Finnish.

Comparing the cases of variation in more detail it is possible to hypothesize that the quantitative determinacy is clearer with the elative instances compared to the partitive ones. Even when they occur in one text, two different constructions may be used. The elative variant is chosen when the NP is more precisely quantitatively determined or determinable, or the speaker's intention is to present more detailed information about a situation. This is the case in the minimal pair found in a text on a survey, where the newspaper article title is more general and has a partitive in (23a), and the details are provided in the article text, in example (23b).

- (23) a. *Enamus lugejaid pole aprillinalja õnge läinud*<sup>3</sup>  
 most reader-PTV.PL not.be april joke.GEN hook.ILL go-pres.PTCP  
 'Most readers have never been fooled by an April joke'
- b. *Enamus tänasele gallupiküsimusele vastanutest pole kunagi aprillinalja õnge läinud*<sup>4</sup>  
 most today-ADE gallup-ALL answerer-PL-ELA  
 not.be ever april.joke.GEN hook.ILL go-pres.PTCP  
 'Most of those answering to the gallup today have never been fooled by an April joke'
- c. *enamik arvutikasutajatest guugeldab ennast*<sup>5</sup>  
 most computer.user-PL-ELA google-3s self.PTV  
 'Most computer users google themselves up'
- d. *Uuring: enamik inimesi on eurole üleminemise vastu*<sup>6</sup>  
 survey: most person-PTV.PL be.3s euro-ALL transfer-GEN against  
 'Survey: most people are against adopting the euro'

This example is relevant, because the referent — the majority subgroup — is identical in the title and in the text. The difference lies with the rest of the group. The NP marked with the partitive, *enamus lugejaid* 'most readers' may mean that there was a set of readers asked, and most of them were never fooled. But it can also mean that all of those writing on the topic of being fooled reported that they were never fooled, without any

<sup>3</sup> <http://www.postimees.ee/?id=244756>.

<sup>4</sup> <http://www.postimees.ee/?id=244756>.

<sup>5</sup> [http://www.novaator.ee/ET/it/enamik\\_arvutikasutajatest\\_guugeldab\\_ennast/](http://www.novaator.ee/ET/it/enamik_arvutikasutajatest_guugeldab_ennast/).

<sup>6</sup> [http://www.ohtuleht.ee/index.aspx?id=384713&utm\\_source=category:all&utm\\_medium=rss&utm\\_campaign=articles](http://www.ohtuleht.ee/index.aspx?id=384713&utm_source=category:all&utm_medium=rss&utm_campaign=articles).

survey with a definitely quantified set. Perhaps no one was ever fooled at all. The elative case is a richer and heavier phrase, *enamus tänasele gallupiküsimusele vastanutest* 'most of those answering to the gallup today', and it specifies the set with several subgroups. The NP marked with the elative has a different identity compared to the rest. The examples in (23c) containing *enamik arvutikasutajatest* 'most computer users' (elative NP) and in (23d) containing *enamik inimesi* 'most people' (partitive NP) confirm this insight into the partitive-elative distinction. The partitive NP, 'people', is a rather vague group, and it is not known if the rest of the referents who can be referred to as 'people' prefers the Euro, is indifferent or has not been asked. In case of *enamik arvutikasutajatest* 'most computer users', the larger set can be better delineated; the use of elative also conveys that the rest of the referents referred to as computer users do not google themselves up. The difference between the partitive and the elative in these constructions is thus additionally that of the identity between the subgroup and the main group. I call this feature "subset difference in identity", and it is positive with the real semantic elative-partitives and not specified for partitive-marked constructions. The existence of this feature is based on some observations only and needs further testing.

In the examples with quantitatively determined NPs, definiteness is frequently also at issue but it is possible to tease apart the two categories by testing.

### 3.3.4. Summary

This section discussed that partitive semantics can have partitive and elative realization in morphosyntax, while the pseudopartitive semantics has only partitive NPs. Also, elative NPs in true partitives are quantitatively determined. The constructions with elative phrases are clearly instantiating the part-of-a quantitatively determined-whole semantics, while with partitive NPs this may or may not be the case. I identified a feature that I call "subset difference in identity", because it seems as if elative partitives would require a difference in identity from the rest of the substance or individuals in the group. So the feature is positive with the real semantic elative-partitives and not specified for partitive-marked constructions.

## 4. Quantitative determinacy and scales

Previous section concluded that elative constructions are all quantitatively determined. It is possible that there are no part-whole relationships in constructions with Estonian partitives, because the measure constructions in question cannot be encoded by elative (24a–d) unless there is an indication specifying the full scale for the measure (25a–d).

- (24) a. %*kaks meetrit pikkusest/laiusest/sügavusest/kõrgusest*  
 two[NOM] meter.PTV length-ELA/width-ELA/depth-ELA/height-ELA  
 'two (more) meters of/in length/width/depth/height'
- b. %*viis ruutmeetrit pinnast*  
 five[NOM] square meter.PTV area-ELA  
 'five (more) square meters of/in area'

- c. %*neli kuupmeetrit mahust*  
 four[NOM] cubic meter.PTV volume-ELA  
 'four (more) cubic meters of/in volume'
- d. %*kolm tundi ajast*  
 three[NOM] hour.PTV time-ELA  
 'three (more) hours of/in time'
- (25) a. *kaks meetrit oma pikkusest/laiusest/sügavusest/kõrgusest*  
 two[NOM] meter.PTV its length-ELA/width-ELA/depth-ELA/height-ELA  
 'two meters of its length/width/depth/height'
- b. *viis ruutmeetrit oma pinnast*  
 five[NOM] square meter.PTV its area-ELA  
 'five (more) square meters of its area'
- c. *neli kuupmeetrit oma mahust*  
 four[NOM] cubic meter.PTV its volume-ELA  
 'four (more) cubic meters of its volume'
- d. *kolm tundi oma ajast*  
 three[NOM] hour.PTV its time-ELA  
 'three (more) hours of his time'

The elative true partitive construction is odd, but possible for the measure constructions with 'temperature', as seen in (26).

- (26) ?(*Kevadilm sai tagasi*)  
 spring weather got back  
*kakskümmend kraadi oma tavalisest temperatuurist*  
 twenty[NOM] degree.PTV its normal-ELA temperature-ELA  
 'The spring weather regained twenty (more) degrees of its usual temperature'

In order to give any interpretation to example (26), one should imagine a situation where the normal spring temperature is 25 degrees, but because of a solar eclipse or a storm, it dropped to 0, then rose to 20 degrees, regaining 20 degrees of what was lost compared to its normal standard.

These data show that the elative true partitives are possible even without any clear quantificational determinacy of substances expressed by mass and bare plurals like wine, butter, or chocolates. This seems to run counter to the generalizations of the previous section, which established the opposite, namely, that the true partitives with elative encoding are quantitatively determined. However, the intuition tells that it is still a case of quantitative determinacy. Instead of quantized substance, it is the extent (the normal length, width, volume) that is quantitatively determined, as witnessed by the felicity of standards such as 'its own length' in this sample. The true partitive constructions with elative denote a closed scale portioned or measured by the measurements of different dimensions: length, volume, etc. These measurements are thus quantitatively determined and in this environment, the elative is expected.

On the contrary, the partitive encoding with the dimensions is not possible if the standard (the whole) is specified, example (27).

- (27) a. #*kaks meetrit oma pikkust/laiust/sügavust/kõrgust*  
 two[NOM] meter.PTV its length.PTV/width.PTV/depth.PTV/height.PTV  
 'two meters of its length/width/depth/height'
- b. #*viis ruutmeetrit oma pinda*  
 five[NOM] square meter.PTV its area.PTV  
 'five (more) square meters of its area'
- c. #*neli kuupmeetrit oma mahtu*  
 four[NOM] cubic meter.PTV its volume.PTV  
 'four (more) cubic meters of its volume'
- d. #*kolm tundi oma aega*  
 three[NOM] hour.PTV its time.PTV  
 'three (more) hours of his time'
- e. #(*Kevadilm sai tagasi*)  
 spring weather got back  
*kakskümmend kraadi oma tavalist temperatuuri*  
 twenty[NOM] degree.PTV its normal.PTV temperature.PTV  
 'The spring weather gained back twenty (more) degrees of its usual temperature'

The data in (27) show that partitive is anomalous in the true partitive construction, which runs counter to the generalizations of the previous section. On the other hand, these data show that dimensions, as opposed to substances, can appear only in partitive encoded pseudopartitive constructions, as in the examples (1a)–(1c). These data are important, since they provide evidence for the existence of the "pseudopartitive" construction in Estonian: the true partitive interpretation is excluded here.

These examples indicate that partitive constructions can be extended to dimensions and are not confined to concrete nouns. The principles that govern the form-meaning mapping in dimensions could be hypothesized to be analogous with the principles that govern the mapping of substances. An important observation is that the true partitive construction with the word 'temperature' is marginally acceptable. At the same time other dimensions, as opposed to substances, can appear only in partitive encoded pseudopartitive constructions. The data demonstrate the existence of pseudopartitive in Estonian, since quantized scales are ungrammatical in pseudopartitive constructions.

## 5. Monotonicity on the part-whole relation as a possible solution

Why can temperature appear only in true partitives, but not in pseudopartitives?

Some explanation for the difference can be provided by approaches such as Schwarzschild 2002. Roger Schwarzschild explains the availability of pseudopartitive in terms of monotonicity. Temperature and volume name properties that can be had in varying degrees and that can be divided into two classes. There are some, like volume, whose degree is a reflection of amount. And there are others like temperature whose degree is not a good gauge of amount. He calls the former monotonic, because their degree is monotonic on the part-whole relation; the latter are called non-monotonic (see Schwarzschild 2002).

This explanation covers the observed morphosyntactic encoding difference in the data concerning the compatibility of the lexical items of length, width, volume, and time with the pseudopartitive construction. 'Temperature', 'warmth, heat' or 'strength' are predicted to be incompatible with pseudopartitive constructions.

## 6. Monotonicity on the part-whole relation cannot be a solution

However, Roger Schwarzschild's account gives only preliminary clues to the right solution. Monotonicity as the licenser of the pseudopartitive constructions should be discarded from the explanation, since there are instances where the degree of the property is clearly not a good gauge of amount. Take the degrees of alcohol, whose degrees are not monotonic on the part-whole relation. That is, the degree of strength of alcohol is not a reflection of an amount, exactly as the degree pertaining to temperature is not a reflection of an amount. However, the pseudopartitive construction is not available if the degrees pertain to temperature, while it is available for strength, witnessed by example (28).

- (28) *Alkohol sai tehases juurde*  
alcohol[NOM] get.PST3s factory-INE in addition  
'The alcohol acquired in the factory additional  
*kakskümmend kraadi kangust*  
twenty[NOM] degree.PTV strength.PTV  
'twenty (more) degrees of/in strength'

The solution to the pseudopartitive puzzle is, therefore, not the monotonicity constraint on the part-whole relation, since non-monotonic part-whole relations result in divergent morphosyntactic mappings. The strength of alcohol, which does not reflect any concrete amount of alcohol, is compatible with the pseudopartitive construction. The previous explanation does not cover these data. It remains to be a puzzle why degrees of temperature are different from degrees of strength, or meters of length.

## 7. Scalar properties of nouns

My proposal is to regard the lexical structure of 'temperature' as lacking the lexical scalar property as opposed to all other dimensional nouns that are discussed above. While temperature is scalar in natural sciences in the sense that it can be measured by degrees, language has not registered it — temperature is not scalar linguistically. Length, width, depth, volume, time, on the other hand, are lexically scalar, they are based on adjectives that are scalar. Lexical scalarity can be demonstrated on the basis of derivation. A scalar adjective gives rise to a scalar abstract noun. This is illustrated by the cross-categorial scalarity of long > length, wide > width, deep > depth, and, crucially for this account, groups these scalar adjective-noun pairs with the pair strong > strength. This resource, which I refer to as 'cross-categorial scalarity' is not available for 'temperature' in Estonian (see Erelt 1986 on more information on the Estonian adjective syntax and Viks, Vare, Sahkai 2010 on the Estonian resources on derivation). However, the pseudopartitive construction is available for

temperature expressions that do have scalarity, such as 'warm/warmth' in example (29).

- (29) (*Kevadilm sai täna juurde*)  
 spring weather[NOM] get.PST3s today in addition  
 'The spring weather today got warmer by  
*kakskümmend kraadi sooja*  
 twenty[NOM] degree.PTV warm/warmth.PTV  
 twenty (more) degrees in warmth'

The adjective 'warm' is a scalar adjective, and it can appear in pseudo-partitive constructions. The example shows that the distinction in scalarity is a linguistically relevant distinction, and that it is lexically restricted. It is another interesting but theory dependent question whether in example (29) there is an instance of cross-categorical transfer or sharing of linguistic scalarity. What is relevant is that the monotonicity constraint does not concern part-whole or amount-based relationships in the pseudopartitive constructions of temperature expression. Instead, monotonicity concerns the relationships between the degrees and scales as they are lexicalized in the lexical item of temperature.

## 8. Discussion

I studied why some Estonian abstract nouns can and others cannot occur in pseudopartitive constructions. The puzzle was, why there is *viis kraadi sooja* 'five degrees warmth' but not *#viis kraadi temperatuuri* 'five degrees temperature'. That is, why a pseudopartitive construction, which includes a measure phrase (two degrees), and a noun, specifying what is measured (warmth, temperature) is compatible with 'warmth' but not with 'temperature' in Estonian.

This study on the temperature domain enabled to gain another important insight into pseudopartitive constructions. It turned out that it is not the part-whole relationships that are relevant for understanding the so-called monotonicity constraint. Monotonicity was previously understood as being dependent on amount, and the compatibility of the word and the construction was dependent on whether the word can semantically denote an amount. This idea of monotonicity worked perfectly for distinguishing the behavior of temperature and volume in pseudopartitive constructions. Indeed, volume is compatible with the construction, seemingly because its degree is a reflection of an amount. That is, one liter of wine reflects the amount of wine. On the contrary, temperature is not compatible with the construction, since with temperature, its degree is not a reflection of an amount. One degree of temperature does not reflect the amount of temperature but a measurement. Those lexical items that name properties whose degree is a reflection of amount were called monotonic — their degree is monotonic on (maps to) the part-whole relation. Those lexical items that name properties whose degree is not a reflection of amount were called non-monotonic — their degree is not monotonic on the part-whole relation.

Explaining the compatibility with pseudo-partitive constructions via monotonicity based on part-whole relationships is wrong. The idea of

monotonicity may be retained, but degrees do not pertain to parts and amounts but degrees pertain to scales along dimensions.

The difference is in the lexicalization of a degree. The noun 'warmth' is based on or related to the adjective 'warm', which is a scalar adjective. Scalar adjectives encode a degree lexically. This is why 'warmth' can appear in the pseudo-partitive construction. On the contrary, the noun 'temperature' is not scalar and does not lexically encode a degree. This is why 'temperature' cannot appear in the pseudo-partitive construction. The example shows that the distinction of scalarity is a linguistically relevant distinction, and that it is lexically restricted.<sup>7</sup>

The generalizations in this article can shed light upon several issues. Importantly, the degrees that are accessed by the rules that map semantics to syntax are not based on extralinguistic and cognitively perceivable notions such as amount, but on linguistic, lexically encoded information about dimensionality and scales. Therefore, the study of the data has shown how language and cognition interact. If the lexical meaning of the noun encodes a scale along a dimension, then the pseudopartitive construction is compatible with the noun, as in the case of 'warmth, heat'. If the lexical meaning of the noun does not encode a degree on a scale, then the pseudopartitive construction is not possible, as in the case of the lexical item 'temperature'. Maria Kopjevskaja-Tamm p.c. notes that loanwords such as 'temperature' tend to behave morphosyntactically in a deviant way. I have found out that the word 'temperature' varies in its ability to be accommodated in the lexical system of a language. In Ukrainian, it has accommodated on a par with other temperature expressions, and has been extended to mean 'fever' as well (Olena Sydorenko, p.c.). These facts again speak for a lexical approach to the encoding of dimensionality.

## 9. Summary

This article discussed Estonian nominal properties in terms of the lexical semantics-morphosyntax mapping. On the basis of the Estonian data, adjectives and nouns share lexical semantic structure. More particularly, nouns and adjectives share certain dimensional and scalar properties that are preserved across categories.

The core of the empirical material is from the lexical domain of Estonian abstract nouns denoting measurements along dimensions, especially degrees

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<sup>7</sup> The monotonicity constraint concerns the relationships between the degrees and scales of dimensions, which is an idea that is also discussed in recent work on scalarity (cf. also Schwarzschild 2006). However, clear morphosyntactic data on dimensionality being preserved in derivation, suggesting the important role of lexicalization, has not been noticed yet, and morphologically rich languages have not been studied in this respect. Roger Schwarzschild (2006 : 12) is still puzzled about 'temperature' and 'heat'. He notes that there is a tendency for a measure phrase to be associated with a default dimension. For instance, *20 degrees* with temperature, *20 pounds* with weight. He writes that "in *20 degrees of heat*, the measure phrase can't be characterizing the temperature of the heat, since that makes no sense. More likely it characterizes an amount of energy, defined in terms of thermometric effects" (Schwarzschild 2006 : 12). However, the thought is not worked out well enough to judge if it can explain the minimal pairs discussed in this article. The idea of default association with a dimension is promising, but the exact representation and module of this process is left unspecified in the source.

and temperature. I was interested in the exact meaning elements that are relevant in semantics-morphosyntax mapping in pseudopartitive constructions, and in the conceptualization and lexicalization of measurements. I found that scalarity or degree along a dimension in the lexical semantics of the noun is a necessary precondition for the compatibility of the examined nouns in the Estonian pseudopartitive constructions. If the lexical meaning of the noun encodes a degree, then the pseudopartitive construction is compatible with the noun, as in the case of *soe* 'warmth, heat', or *kangus* 'strength'. If the lexical meaning of the noun does not encode a degree, then the pseudopartitive construction is not possible, as in the case of the lexical item *temperatuur* 'temperature'. In several instances, the scalarity of a noun is a feature derived from the corresponding lexical item in the adjectival category. Alternatively, this feature is shared across the categories of noun and adjective.

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**Abbreviations**

ADE — adessive; ALL — allative; ELA — elative; GEN — genitive; ILL — illative; INE — inessive; NOM — nominative; PL — plural; PRES — present; PST — past; PTCP — participle; PTV — partitive; SG — singular; TOT — the morphological genitive or nominative as an aspectual object case.

Evaluations of ill-formedness classify the judgments by the following signs: \* — grammatically unacceptable, violates a syntactic or a morphological rule, # — semantically unacceptable, % — pragmatically unacceptable, violates a Gricean maxim, ? — odd use, rather context-dependent.

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АННЕ ТАММ (Будапешт—Флоренция)

**ОБЩЕЕ В СЕМАНТИКЕ РАЗНЫХ ЧАСТЕЙ РЕЧИ:  
СКАЛЯРНОСТЬ И ДИМЕНСИЯ  
В ЭСТОНСКИХ ПСЕВДОПАРТИТИВНЫХ КОНСТРУКЦИЯХ**

Автор статьи задается вопросом, почему морфосинтаксические свойства абстрактных существительных в эстонском языке различаются. Хотя *temperatuur* 'температура' и *soe* 'тепло' имеют одинаковое значение (как синонимы они используются в тех случаях, когда речь идет о температуре выше нуля), в псевдопартитивных конструкциях в эстонском языке используется лишь тепло, но не температура. В эстонском языке можно сказать *viis kraadi sooja* 'пять градусов тепла', но не *\*viis kraadi temperatuuri* 'пять градусов температуры'. Морфосинтаксическое поведение в псевдопартитивной конструкции зависит от лексико-семантической скалярной структуры существительного, а не от отношений части и целого, как предполагалось ранее. Если лексическое значение несет в себе шкалу некой размерности (например, по поводу понятия 'тепло'), то слово вполне может использоваться в псевдопартитивной конструкции. Если же элемент шкалы отсутствует, псевдопартитивная конструкция невозможна (например в связи с понятием 'температура' в эстонском языке). Слово *temperatuur* 'температура' не связано со скалярным прилагательным и потому не встречается в псевдопартитивных конструкциях. Лексико-семантическую скалярную конструкцию следует отличать от размерности конкретной шкалы: так, как 'тепло', так и 'температура' измеряемы с помощью шкалы, но лишь тепло имеет лексико-семантическую скалярность, а потому последняя существенна и в лингвистическом плане.