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Peter Kosta

Case and Agree in Slavic Numerals
- Valuation of Features at the Interfaces within a Phase-Based Model

1 Introduction

The Quantification of Nominal phrases in Slavic is one of the most analyzed but also still a poor understood and controversial point of discussion in both traditional descriptive and generative studies. Numeral phrases in Polish and Russian, as in other West and East Slavic languages, exhibit puzzling behavior. In particular, to judge by the morphosyntax of the constituents of the numeral phrase, the internal structure of the phrase appears to depend upon the external context of that phrase. The problem is a well-known paradox of Slavic syntax, and a considerable literature has been devoted to it. The purpose of this paper, which complements other work by Babby (1987), Franks (1995), Kosta (2008), Rappaport (2002), (2003) and Rutkowski (2006), is to develop a Minimalist theory of formal features, case syncretism, and lexical representation which effectively removes the paradox by maintaining (despite appearances) the usual independence of internal phrase structure and external context, while placing the morphosyntactic variation where such anomalous facts belong: in the lexicon and to the interfaces.
In the first part, I shall try to give a short overview of the puzzle concerning all the problems of case, number assignment and agreement in numeral and numerative constructions in Russian and Polish. In the second part, I shall try to give the solution to some problems so far unresolved, namely in which connection Agreement and Case assignment are driven by interface conditions of either PF (SM) or LF (CI) in the new approach of Strong Minimalist Thesis (Chomsky 2005). The patterns of Case assignment will be analyzed under the notion Agree and Feature checking within the descriptive generalization of so called heterogeneous vs. homogeneous paradigm. This section tries to refine the analysis of "heterogeneous" vs. "homogenous" morphosyntax of numeral expressions making use of recent syntactic developments, namely the emergence of the case-assigning mechanism *Agree.* The key insight is taken from Gilbert Rappaport's approach on case assignment (2002), refined and enriched by the mechanism of interpretability and valuation of features from the recent studies on the Syntax of Valuation and the interpretability of Features developed by David Pesetsky and Esther Torrego (2004).

1.1 A short overview of the puzzle

Quantified nominal phrases in Russian and other Slavic languages include numeral phrases (such as *odin*, *dva, tri, sorok, pjat'desjat* ,... *pervyj, vtoroj...)*, different kind of quantifiers (such as *každyj), vse, nekotorye, kto-to, kto-nibud', malo, mnogo, množestvo, menšinstvo*) but also other quantifying expressions (e.g., numeratives and container constructions such as *stakan, košelek, korobočka, kilo, liter...*).
Crucially, the syntactic distribution of quantified numerative and numeral phrases depends on the semantics of countability of NPs (cf. Krifka 1989). Unlike mass nouns, individual

items can be quantified in number. Mass nouns, on the other hand, need always a combination or a numeral and a numerative (e.g. *stakan* etc.) to become countable items, cf: odin stakančik vody ‚one glass (of) water' , dva stakančika vody 'two glasses (of) water'.

A central problem for the analysis of quantified (numeral) expressions in Russian concerns the case and number assignment and agreement. In his book "Parameters of Slavic Morphosyntax", Steven Franks (1995) mentions the problem that display many unusual and mysterious morphosyntactic properties, among which are that (a) the numeral sometimes governs the nominal material following it and sometimes agrees in case with it, and (b) the numeral phrase sometimes induces subject-verb agreement and sometimes does not (cf. Franks 1995: 93).

Gilbert Rappaport (2003) describes the phenomenon as a paradox that lies in the fact that the numeral acts like a nominal head of phrase in the direct cases (1a), but like a modifier of the quantified noun in the oblique cases (1b):

(1) a. videt′ pjat′ -$_{\text{ACC=NOM}}$ krasivyx$_{\text{-GEN PL}}$ ptiček$_{\text{ -GEN PL}}$
'to see five beautiful birds'

b. vosxiščat′sja pjat′ju-$_{\text{INS}}$ krasivymi-$_{\text{INS PL}}$ ptičkami-$_{\text{INS PL}}$
'to be enthralled by five beautiful birds'
(Examples from Rappaport 2003)

The syntax of (1a) is that of, say, *videt' staju*-$_{\text{ACC SG}}$ *krasivyx*-$_{\text{GEN PL}}$ *ptiček*-$_{\text{GEN PL}}$ 'to see a flock of beautiful birds', in which *staja* 'flock' is the head of the direct object noun phrase (in the accusative case) and *krasivyx ptiček* 'beautiful birds' is a genitive complement of *staja.* In (1b), each constituent of the phrase stands in the instrumental case required by the governing verb, as if *pjat'ju*$_{\text{-INS}}$ *krasivymi* $_{\text{-INS PL}}$ *ptičkami*$_{\text{-INS PL}}$ 'five beautiful birds' were a noun phrase headed by 'birds', with 'five' and 'beautiful' as modifiers. Following Babby (1987 and elsewhere), we term the morphosyntactic pattern displayed in (1a) HETEROGENEOUS, and that displayed in (1b) — HOMOGENEOUS. To actually posit a contrast in syntactic structure to account for this contrast in morphosyntax would lead to overgeneration (deriving constructions which are actually not grammatical), and a complicated apparatus would be required to rule out the ungrammatical possibilities. The challenge has been to find alternative means of accounting for the apparent variation in structure. We define a NUMERAL to be a category (part of speech) that displays heterogeneous agreement in the direct cases (nominative and accusative), and homogeneous agreement in the remaining, oblique cases. This category is split into two in Russian: LOWER NUMERALS (2-4) (thus NumP$_{\sim\text{pauc}}$) assign the singular grammatical number under heterogeneous agreement (*videt' dve rekí*-$_{\text{GEN SG}}$ 'to see two rivers'), while HIGHER NUMERALS ($x \geq 5$, NumP$_{\sim\text{magn}}$) do not (*videt' pjat' rek* $_{\text{-GEN PL}}$ 'to see five rivers'). In contrast, the number *odin* one' displays homogeneous morphosyntax regardless of syntactic context, and is therefore an adjective. Certain other numbers (e.g., *tysjača* 'thousand', *million* 'million') display heterogeneous morphosyntax in all contexts and are nouns. Thus, not all numbers are categorially numerals. (Rappaport 2003).

This contrast between homogenous and heterogeneous NPs (or DPs) itself is not difficult to formulate but it is difficult to explain it by independent properties of the Agree / Case system within the approach of Minimalism in its recent development (Chomsky 2005).

Let us first consider some of the examples we have already discussed by large in Kosta (2008: 248):

(2) Nado skazat' čto èti dve zadači budut
Must say_{Inf} Comp these-$_{NomPl}$ two-$_{CardNumPl}$ exercises-$_{GSgF}$ will be_{3Pl}
vypolnjat'sja orkestrom Volga-Band
conducted by the Wolga-Band
"It should be mentioned that these two exercises will be conducted by the Wolga-Band"

In this example, the nominal phrase as a whole stands in a case position to which the narrow syntax assigns a direct case (nominative), and the numeral *dve* "two" acts like a nominal head of the phrase, assigning the Genitive to the quantified noun *zadača* as if it were a complement. When this same quantified NP stands in a position assigned an oblique case, the quantified noun acts like the head of the phrase, with the numeral falling in line with the other modifiers in agreeing with that quantified noun. The latter descriptive observation is exactly what happens in example (3) where the lower numeral četyre "four" stands in a case position governed by the head of the PP s "with" that governs Instrumental in Russian and all the material must agree in Number and Case with the Numeral:

(3) Tak, v oktjabre "Volga-Bend" budet vystupat' s *četyr'mja amerikanskimi muzykantami*.

The first pattern can be called descriptively the heterogeneous pattern of Case assignment and Agreement whereas the latter one can be called for expository reasons the homogenous pattern. In the examples (3), we can see that in Russian this descriptive generalization is true for the lower numerals *2-4* (called in new terminology Paucal for Lower number) where the numeral *četyre* is part of the homogeneous pattern, and in the example (4) where the Paucal *tri* "three" stands in a structural case position of Nominative, the heterogeneous pattern must be chosen. Furthermore, this generalization is valid for masculine and feminine gender:

(4) Saratov posetjat tri dirižera i odin trubač.
Saratov will visit $three_{Nom}$ $director_{GSgM}$ and one trumpeter
"Three directors and one trumpeter will visit Saratov"

1.2 Higher Numerals in Russian

The same observation can be made for the contrast between the higher numerals ('5' and higher, i.e. $\exists (x) \geq 5$) and their nominal complements in direct case position (structural case Nominative and Accusative) vs. oblique case position: in a structural context (with the $NumeralP_{magn}$ in nominative or accusative case) the Numeral assigns a Genitive Plural Case to its complement but in an oblique context where either the verb or the preposition assign an oblique case (in 5 it is he Instrumental and in 6 the Prepositive) the Numeral and the rest oft he nominal material behave like nouns within a noun phrase where all the elements agree in Case and number. However, the numeral itself has the morphology of a singular noun:

(5) Prožila ona rovnym ščetom pjat' let
live-$_{Pret3Sg}$ she exact bill five-$_{AkkSg}$ years-$_{GenPl}$
čtoby 1 janvarja 1998 g. obratit'sja skromnymi pjat'ju rubljami
Comp 1 January 1998 year get along modest-$_{InstrPl}$ five-$_{InstrSg}$ rubel$_{-InstrPl}$
"She spent exactly five years, in order to satisfy herself (to come along) with modest five rubel"

(6) Kstati, o pjati rubljax, točnee, o pjati-rulevoj
In fact, about five-$_{PrepSgFem}$ rubel$_{-PrepPlM}$, more precisely, about five-$_{PrepSgFem}$
kupjure.
Note$_{-PrepSgFem}$

It is worthy to mention for the analysis in part 3 of this paper, that the nominal pattern with the agreeing (homogeneous) paradigm can be split so that the modifier of the NP *skromnymi* 'modest' and the nominal head *rubljami* need not to be adjacent. We will see how these data can be compared to the situation in Polish numerals.

2 Three types of cardinal numerals in Polish

2.1 The classification of Pawel Rutkowski

Similar to Russian, Polish numerals are not a homogeneous class. The semantic set of cardinals can be divided into three distinct syntactic subclasses (cf. Rutkowski 2006: 90; Rutkowski 2001, 2002a, Rutkowski and Szczegot 2001; see also Neidle 1988, Franks 1995, Giusti and Leko 1996 for similar classifications proposed for other Slavic languages):

- *A-numerals* (adjectival numerals) – the four lowest numerals (*odin, jeden* 'one', *dva, dve*, dwa 'two', tri, trzy 'three' and četyri, cztery 'four')
- *N-numerals* (nominal numerals) – very large numerals such as *tysjača*, *tysiąc* 'thousand', *milion* 'million', *milliard(a)* 'billion' etc.
- *Q-numerals* (numerals proper) – numerals such as *pjat'*, *pięć* 'five', pjatnadcat', *piętnaście* 'fifteen', *pjat'desjat'*, *pięćdziesiąt* 'fifty' or *pjat'sot*, *pięćset* 'five hundred' (this is the biggest subclass).

These three subclasses differ in terms of case assignment. N-numerals resemble nouns because they always assign genitive to the quantified noun. Q-numerals require that the noun take genitive only when the larger nominal expression is in a structural case (nominative or accusative) position. In the context of inherent cases (genitive, dative, locative and instrumental), Q-numerals agree in case with the noun. Finally, A-numerals agree with the quantified noun in all case contexts. These three patterns of morpho-syntactic behavior are illustrated below: note that the verb *lubi*ć 'like' assigns accusative, whereas the verb *doradza*ć 'advise' requires dative.
N-numerals (all examples taken from Rutkowski 2006):

(5) a. *Cezary lubi million osób.* [structural case context]
Cezary likes million-ACC people-GEN
'Cezary likes one million people.'

b. **Cezary lubi milion osoby.* [inherent case context]
Cezary likes million-ACC people-ACC

(6) a. *Cezary doradza milionowi osób.*
Cezary advises million-DAT people-GEN
'Cezary advises one million people.'
b. **Cezary doradza milionowi osobom.*
Cezary advises million-DAT people-DAT

Q-numerals:

(7) a. *Cezary lubi pięć osób.* [structural case context]
Cezary likes five-ACC people-GEN
'Cezary likes five people.'
b. **Cezary lubi pięć osoby.* [structural case context]
Cezary likes five-ACC people-ACC

(8) a. *Cezary doradza pięciu osobom.* [inherent case context]
Cezary advises five-DAT people-DAT
'Cezary advises five people.'
b. **Cezary doradza pięciu osób.* [inherent case context]
Cezary advises five-DA T people-GEN

A-numerals:

(9) a. *Cezary lubi trzy osoby.*
Cezary likes three-ACC people-ACC
'Cezary likes three people.'
b. **Cezary lubi trzy osób.*
Cezary likes three-ACC people-GEN

(10) a. *Cezary doradza trzem osobom.*
Cezary advises three-DAT people-DAT
'Cezary advises three people.'
b. **Cezary doradza trzem osób.*
Cezary advises three-DAT people-GEN

The following table summarizes this complicated pattern of case assignment:

(11)

Genitive assignment	N-numerals	Q-numerals	A-numerals
in structural contexts	+	+	–
in inherent contexts	+	–	–

Table 1: Genitive assignment in Polish numeral expressions Rutkowski (2006: 90-91)

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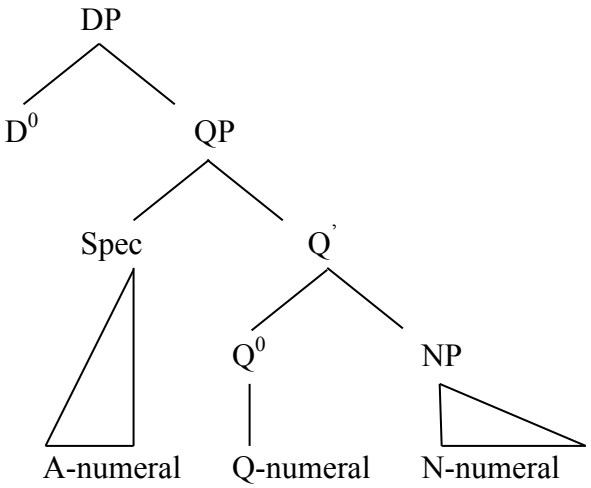
(12)



Rutkowski (2001, 2002a, 2006) attempts to account for this tripartite division by assuming that A-numerals are specifier-based modifiers (c.f., e.g., Giusti and Leko 1996, Veselovská 2001), and N-numerals have the syntactic status of nouns, whereas Q-numerals are functional elements, which are base-generated in a special projection (QP) in the region between DP and NP. The three possible syntactic locations of numerals are illustrated below: This analysis can explain the complex pattern of case assignment in Q-type expressions. If functional (as opposed to lexical) elements are inserted into the syntax after inherent case assignment but before structural case assignment, their inability to assign case in the inherent case contexts is straightforward (the noun has already been assigned an inherent case value). Thus, Q-numerals, being functional, can only assign genitive in structural contexts (see Veselovská 2001, Rutkowski 2001, 2002a, for a more detailed analysis).

2.2 The Accusative Hypothesis for higher numerals 5 by Miechowicz-Mathiassen

A slightly different proposal especially for higher numerals (($x \geq 5$, $NumP_{\sim magn}$)) which constitute a larger group and are opposed to the lower (paucal) numerals 1-4 gives Miechowicz-Mathiassen (2012). Her paper addresses the issue of the Accusative Hypothesis, which is a descriptive fact about Polish numeral expressions with higher numerals according to which they are intrinsically accusative.

Contrary to what she proposes, I would like to take a more conservative and general stance and define the category that quantifies over numerals as the functional category Q and its projection QP heading different types of projections, namely $NumP_{\sim magn}$, $NumP_{\sim pauc,}$ and NP for Case reasons. Miechowicz-Mathiasen (2012) analyses Polish Numerals as Numeral Phrase (NumP) that can entail different features:

(13) Number head types
a. Num^0 [+Q] [+plural] – numerals 5 ($x \geq 5$, $NumP_{\sim magn}$)
b. Num^0 [+Q] [+paucal/plural] – numerals 2-4 ($NumP_{\sim pauc}$)
c. Num^0 [± plural] – unquantified noun phrases (also with 1)

Table 2: Miechowicz-Mathiasen (2012:)

She further proposes that "in the process of *numeralisation*, the once nominal nouns instead of merging in their NP (N^0), merge in the counted noun's Num^0, which explains both why they have lost their own φF[α]-features and why they exhibit the gender properties of the counted noun." While we believe that this could be a plausible explanation for the mixed character of the numerals between lexical and functional categories, it is not clear how the Case assignment and Agree pattern work in her system. Especially, we are not persuaded that the examples she gives must necessarily prove the numeral *pięć* ‚five'in Polish to be an old accusative, because this numeral can be either ACC *tych pięciu mężczyzn* or GEN *tych pięciu mężczyzn*. Also the other arguments in favor of an accusative hypothesis of *pięciu* are not convincing. Instead, the examples Miechowicz-Mathiasen gives show that the form *pięciu* could be either an Gen-Acc for animate male nouns or a partitive Genitive.

(14) a. Czekałam około godziny/minuty/tygodnia.
→ structural GEN checked by *około*
$waited_{1.SG.IMP}$ around $hour_{GEN}$/$minute_{GEN}$/$week_{GEN}$ '
'I've waited about an hour/minute/week.'
b. Było około *pi*ęć / ***pięciu*** *tysiący* Polaków.
→ structural ACC & GEN
$were_{3.SG.N}$ around $five_{ACC}$/$five_{GEN}$ $thousands_{GEN}$ $Poles_{GEN}$ checked by *około*
'There were around five thousand Poles.'
c. Nie było około **pięć* /***pięciu*** *tysiąc* Polaków.
→ GEN of negation
not $were_{3.SG.N}$ around *$five_{ACC}$/$five_{GEN}$ $thousands_{GEN}$ $Poles_{GEN}$
'There were around five thousand Poles absent/missing.'
d. Pomogli około ***pięciu*** *tysiącom* Polaków.
→ lexical DAT checked V
$helped_{3.PL}$ around $five_{DAT}$ $thousands_{DAT}$ $Poles_{GEN}$
'They helped around five thousand Poles.'
e. Opiekuję się około *pięcioma tysiącami* Polaków.
→ lexical INST checked
$care_{3.PL}$ self around $five_{INSTR}$ $thousands_{INSTR}$ $Poles_{GEN}$ by V
'They are taking care of around five thousand Poles.'
(all ex. from Miechowicz-Mattiasen 2012)

As we can see, the form *pięciu* cannot be the Accusative but rather a frozen Genitive Partitive form of the i-stem noun *pi*ęć because the preposition okolo that governs the numeral and is adjacent does not even affect the Case assignment. The form *pięciu* in PL is thus a frozen Case form that is not assigned Case at all. The only case where the Verb assigns the Case Instrumental in (14) e. it is a lexical (inherent) Case.

3 Agree and Valuation in Russian in a Phase-Based Model

This section tries to refine the analysis of "heterogeneous" vs. "homogenous" morphosyntax of numeral expressions with focus on Russian making use of recent syntactic developments, namely the emergence of the case-assigning mechanism Agree. The key insight is taken from Gilbert Rappaport's approach on case assignment (2002), refined and enriched by the mechanism of interpretability and valuation of features from the recent studies on the Syntax of Valuation and the interpretability of Features developed by David Pesetsky and Esther Torrego (2004) and partly adopted for Russian by Gilbert Rappaport (2003ab).

Since the Minimalist program is a logical step towards a more economical version of the language knowledge described as I-language in previous work on generative grammar (cf. e.g. Chomsky 1981, 1986ab), it should be based on and descend from the notion of economy of representation and derivation. Thus, we assume only two levels of representation: the articulatory- perceptual interface (PF) and the conceptual-intentional interface (LF) accompanied with the single notion of Full Interpretation.

The principle of Full Interpretation (FI) ensures that convergent derivations are only those where no uninterpretable element can remain at the point where the derivation enters the semantic component, cf.:

> Principle of Full Interpretation (FI):
> Interface representation must be fully interpretable for the relevant performance systems, in particular:
> i. A PF-representation may contain no symbol that is not interpretable for the articulatory-perceptual systems (A-P).
> ii. An LF-representation may contain no symbol that is not interpretable for the conceptual-intentional systems (C-I) (Chomsky 1995, 63)

Table 3: Principle of Full Interpretation (FI)

Since the function of the derivation is to generate sound-meaning pairs, more precisely, pairs of representations at the ARTICULATORY-PERCEPTUAL (A-P) and CONCEPTUAL-INTENTIONAL (C-I) interfaces, all features (grammatical information) must be interpretable at one or the other interface. In order to be interpretable, a feature must take the form of a type and a value. For example, plurality, interpretable at the C-I interface, would be represented on a nominal lexeme upon insertion in syntactic structure by the feature [Number: Plural]. On the other hand, there are semantically uninterpretable features (illegible at the C-I interface) which must be represented in the syntax, because (a) they are interpretable at the A-P interface (i.e., are PHONOLOGICALLY INTERPRETABLE), and (b) their value is determined by syntactic context. Examples include case and concord features on an adjective. This latter type of feature is
inserted into syntactic structure in the form of a feature containing a type without a corresponding value, such as [Case:] or [Number:]; the value of such a feature must be determined during the course of the derivation. Thus, features can be VALUED or UNVALUED. As a matter of definition, we will say that two instances of a feature MATCH if they contain the same type, regardless of their value.

Second, AGREE is a basic operation of the narrow syntax, implementing case assignment and predicate agreement (cf. Chomsky 2000; 2001). For our purposes, the following simplified definition is sufficient:

(15) Two categories Agree iff all of the following conditions are satisfied: • one of the categories c-commands the other; • each of the categories is ACTIVE (i.e., contains some unvalued feature); • there is at least one matching feature shared by the two categories; and • for each pair of matching features, at least one must be unvalued.

When two categories Agree: the value of any valued matching feature is copied onto its unvalued counterpart; and semantically uninterpretable features in the Agreeing categories are deleted from the Syntactic/Semantic derivation and passed on to Morphological Form.
For example, in the standard situation of establishing predicate agreement, the subject nominal phrase contains valued features for person and number, and an unvalued case feature (rendering it active); the Tense node representing predicate agreement contains unvalued features for person and number (rendering it active). The two categories can Agree because they contain matching features (for person and number), and unvalued features become valued: T is assigned values for person and number, and the subject noun phrase is assigned a value for case. The case feature, and the features for person and number on T are semantically uninterpretable and thus removed from the derivation of the C-I interface, but passed on to Morphological Form, because they will eventually find expression at the A-P interface.
Third, the new model differs from earlier models of generative grammar in interweaving lexical insertion and other syntactic operations in a single cycle. That is, rather than first creating a structure for the entire sentence ('D-Structure'), and then applying transformations proceeding from bottom to top, the new model creates lexical structure (by Merge) and applies operations to the resulting structure (by Agree) in a single cycle, from bottom to top. As a result, portions of the sentence's structure are passed on to Morphological Form before the higher syntactic structure containing these portions exists. This is the mechanism which accounts for 'island conditions', or opacity: when structure has been passed on to Morphological Form, it is no longer accessible to operations (Agree) applying higher in the tree.
Early minimalism, ranging from Chomsky (1989) to Chomsky's (1995) *Minimalist Program (MP),* incorporated a weakly derivational approach. The computational system (narrow syntax, $C_{HL}1$) manipulates a selection of lexical items (LI) by means of a step-by-step application of the operations Merge and Move, until Spell-Out occurs. Then, PF and LF are created, the two levels of representation interfacing with the syntax-external modules A-P and C-I, respectively: Chomsky's (2000) *Minimalist Inquiries (MI)* sought to reduce derivational complexity by chopping the lexical array (LA) up into sub-arrays, each feeding C_{HL} to derive a particular phase – a *derivational cycle.* The LA replaced the notion of numeration (NUM) from minimalist frameworks previous to MI (e.g. MP). Technically speaking, a LA is a NUM if it contains more than one occurrence of one and the same lexical item (LI), in which case this item's index is larger than '1'. *Phases* are well-defined chunks of a derivation – *vP, CP, and DP* (more on the reasons for this choice below) –, each of which, upon completion, is transferred to the interfaces, and thus does no longer bothers the computation with its weight. This entails a theory of *Multiple Spell-*

Out (cf. Uriagereka 1999 and Kosta, Krivochen 2012). The syntactic objects that qualify for phases are transitive v*Ps, (stars for transitive), which contain an AGENT or an EXPERIENCER as an external argument (to the exclusion of passive and unaccusative *vPs),* and CPs, which are specified for Tense and Force (Adger's Clause Type). Crucially, defective TPs and VPs are no phases. The reasoning behind this assumption is for one conceptual (phases represent natural, propositional objects, saturated expressions; *v*Ps* represent events, CPs full propositions), but also grammatical (pseudo-clefting is not possible with non-finite raising/ECM-complements, which are TP). CPs are complete clausal complexes and v*Ps are complete thematic complexes. DPs are considered phases, too (Chomsky 2005:17f.). Whether PPs are phases or nor remains to be investigated.

A rather nice conceptual argument for phases concerns the *uninterpretability of features*: If Spell-Out has to remove uninterpretable features to avoid a crash at the interfaces, it must know which features are interpretable, and which are uninterpretable. However, narrow syntax is supposed to be blind as a bat, and thus, would need to be able to *look ahead* (up the tree, to LF and PF) in order to determine the interpretability of a feature. A transfer of derivational chunks to the interfaces remedies this issue, *search space being reduced to a local* Domain (a Phase).

Some further important notions have to be added, assume Chomsky (2000 and successive works). The syntax of valuation: a feature (or a set of features) may either come with a specific value, or acquire it after the Agree operation has applied with a compatible valued feature. φ features on nouns have their own values (as property of the lexical entry); while φ features on verbs do not have their own value; φ features on verbs got valued once the head of I-V Agrees with its subject, cf.:

(16) [vP [NP John] [sleep] Agree → [IP John sleep-**s**]
φF[α] φF[u] φF[α] φF[α]

Once the head of I-V agrees with its subject, the φ features of I get the same value of the feature of the NP. The value of a feature is, conventionally, indicated between square brackets.

Empirical support for phases comes from the EPP-feature on T: how does C_{HL} decide between attracting a subject DP and merging an expletive there? Given the economic preference of Merge over Move (Move is more costly than Merge since Move ≈ Copy + Merge), an insertion of there should be expected in every instance, and Raising should never be possible. Phases circumvent this issue since lexical sub-arrays can be defined for every cycle. To get an idea of the technical side of this argument, first consider the following two examples, which illustrate *Merge-over-Move.* They share one and the same numeration, but one derivation yields the ungrammatical (18b).

(17) Num = {there1, T2, seem1, to1, be1, someone1, here1}

(18) a. There seems to be someone here.
b. *There seems someone to be here.

Let's take a closer look at the steps of the derivation of (18').

(18') a. A. [$_{TP}$T$_{[EPP]}$ to be someone here] – *Merge* T
B. [$_{TP}$ there T$_{[EPP]}$ to be someone here] – *Merge there & check EPP*

C. [$_{TP}$ $T_{[EPP]}$ [VP seems [$_{TP}$ there $T_{[EPP]}$ to be someone here]]] – *Merge T*
D. [$_{TP}$ there $T_{[EPP]}$ [VP seems [$_{TP}$ there $T_{[EPP]}$ to be someone here]]] – *Move there & check EPP*

And now let us compare the derivation (18'a) with the ill-formed derivation in (18'b):

b. A. [$_{TP}T_{[EPP]}$ to be someone here] – *Merge* T
B. [$_{TP}$ there $T_{[EPP]}$ to be someone here] – *Merge there & check EPP*
C. [$_{TP}$ $T_{[EPP]}$ [VP seems [$_{TP}$ there $T_{[EPP]}$ to be someone here]]] – *Merge T*
D. [$_{TP}$ there $T_{[EPP]}$ [VP seems [$_{TP}$ there $T_{[EPP]}$ to be someone here]]] – *Move there & check EPP*

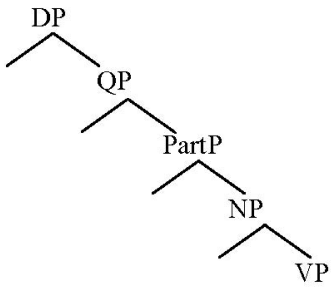
The derivational step B of (18b) violates *Merge-over-Move,* moving *someone* instead of merging the expletive *there* available in the Num, which is why the derivation produces an ill-formed sentence. Defining different sub-arrays for (2), provided the phasehood of *vP* and CP, can capture this issue derivationally:

(19) a. {{C, T}3 {seem, there, T, to}2 {be, someone, here}1}
There seems to be someone here.
b. {{C, there, T}3 {seem, T, to}2 {be, someone, here}1}.
*There seems someone to be here.
c. {{C, T}3 {seem, T, to}2 {be, someone, here}1}.
Someone seems to be here. *w/o expletive*

With these theoretical preliminaries out of the way, we now return to the morphosyntax of numeral phrases in Russian.
How can we account for the peculiar behavior of quantified NPs in Polish and Russian under the perspective of Valuation? Our working hypothesis is the following: In case of the homogeneous paradigm in Russian, the numerals behave like the A-class numerals (adjectival numerals) in Polish, ie they are modifiers of the N^0 in a functional projection above the NP, namely QP. Since the nominal head N^0 has valued Features for gender and number in the lexicon, the modifier of QP (Spec-QP) agrees in gender and number with N^0 by the operation Agree. This is the reason why the numerals of this class agree in gender and number with the nominal because the material inside of the NP (modifiers, complements) receives its F-features by the Operation Agree in Narrow Syntax from the nominal head N^0 (the former percolation of formal features). What about case? Inherent case is assigned to the nouns either by the lexical property of the lexical Verb (V^0) or/and lexical Preposition (P^0). This means, that the case in the homogeneous paradigm is assigned to the head of the NP because lexical Verbs and lexical Prepositions are assigned inherent (lexical) case in the lexicon. We can see this in the following examples (5) and (6) where, in an oblique context, the lexical Verb *obratit'sja* "to come along, to satisfy oneself with something" assigns the lexical case Instrumental to its complement. In example (6), the lexical Preposition assigns the case Prepositive to its complement. The Numeral in (5) behaves more like a Modifier (Adjective) agreeing in Case and number with the N^0 rubl'. However, the numeral itself has the morphology of a singular noun:
In case of the heterogeneous paradigm, the numerals ($\exists$ (x) $\geq$ 5) belong to the Polish Q-class just as much as the Quantifiers *mnogo, malo* etc. that are not valued in lexicon for case, and gender. They are modifiers of the QP with the semantic value of non-specified

big amount or a higher number than 5. They typically head a QP that quantifies over a Partitive Phrase (PartP) with either an empty $Part^0$ head (in articleless languages) or an $Part^0$ head with a partitive preposition that assigns the Genitive Plural to the embedded NP. We can see this under (20):

(20)



In order to justify such an analysis we can compare the situation in Russian and Polish with French and Bulgarian being languages with a DP. In French it is the preposition *de* that assigns the partitive Case to the DP used for all constructions with the Quantifier *beaucoup* or a mass noun (cf. *du beure*, *du lait*, *du pain*). In Italian it is the particle *di* which combines with the mass nouns. In Bulgarian nominal and numeral system which do not inflect for Case is not inflected anymore, the non composed higher numerals such as 5 assign the case silent (21) + Nominative or with the additive preposition *na* 'to' in composed higher numerals (*petnadeset*, litteraly five to ten = '15')) while the generalized Quantifier of the Q-class (*mnogo*) assigns the case with the preposition *ot* 'of' (cf. (22)

(21) Pjat' studentov govorili/ govorilo s professorom
Pięciu uczniów rozmawiało z profesorem
Pet studentite govoriha s profesora

(22) a. Mnogo studentov govorilo s professorom partitive
b. Mnogo ot studentite govariha s profesora
c. Molti degli studenti hanno parlato col professore

(23) a. Mnogie studenty govorili s professorom collective
b. Mnogo ctudenti govoriha s profesora
c. Molti studenti hanno parlato col professore

(24) a. Student el mnogo xleba
The/a student ate much bread_GEN SG PART
b. Studentat jal mnogo xljab
The/a student ate much bread_NOM SG[1]
c. L'élève a mangé beaucoup *de* pain
d. Lo studente ha mangiato un *sacco di* pane
"The student ate a bag of bread (= a lot of bread)"

[1] In modern BG the inflection is impoverished so that the partitivity and the case assignment is abstract like in English. The neutral default expression is he NOM case. The Case Quantitative is assigned by

If we assume that it is the head of the PartP which has a valued Case [Case: Quantitative][2] (Rappaport 2003, and this valued (*val*) but not interpretable uninterpretable (*uint*) feature combines with higher or Q-numerals standing in the Spec-QP position and bearing unvalued (unval) Case features [Case: Quantitative], we can trigger Merge of the higher numeral and all higher quantifiers by Move and Agree. We can then assume that the higher numeral and Q-numerals and the quantifiers *mnogo, malo* first merge with the Spec-Part and check their (unval) Case features with the (val) Case features before remerging (Move) tot he Spec-QP position above.
Empirical support for phases comes from the examples with the heterogeneous class of Q-Numerals and Quantifiers (ex. (21) and (22)) vs. homogeneous class of A-Numerals and Quantifiers (23)). How does C_{HL} decide between attracting attracting and merging the one or the other? Given the economic preference of Merge over Move (Move is more costly than Merge since Move ≈ Copy + Merge), an insertion of a Numeral should be expected in every instance, and Raising should never be possible. Phases circumvent this issue since lexical sub-arrays can be defined for every cycle. Thus, Q-Numerals belong to a class that have unvalued formal (F-Features), ie Case-feature [Case: Quantitative] in the lexicon and valued Case-feature [Case: Quantitative] on $PartP^0$. On the other hand, Q-Numerals and non-inflected Quantifiers of this class have interpretable semantic features (s-Features) with the meaning of "Partitivity" in the lexicon but uninterpretable s-Features on the head of the PartP. Neither $PartP^0$ nor Q-Numerals or non-inflected Quantifiers share any property that would allow for any other F-features except of Case which is to be expected from a purely Case assigning Phase. To get an idea of the technical side of this argument, first consider the following two examples, which illustrate *Merge-over-Move.* They share one and the same numeration, but one derivation yields the ungrammatical (25b):

(25) a. Mnogo studentov govorilo s professorom partitive
b. * Mnogo student govorili s professorom

Lexical Array Num = {mnogo, student, govorit', s, professor}
Let's take a closer look at the steps of the derivation of (27a).

A. [$_{VP}$ [govorilo s professorom]] – *Merge* V + PP
B. [PartP mnogo VP [govorilo s professorom]]– *Merge* VP + PartP
C. [$_{PartP}$ [$Part^0$ mnogo $_{NP}$ [N^0 studentov VP[V [govorilo s professorom]]]]] – *Merge Part P + NP & check Case*

And now let us compare the derivation (27a) with the ill-formed derivation in (27b):

(25) b. * Mnogo studenty$_{-NOMPL}$ govorili$_{-3PSPL}$ s professorom
Num = {mnogie, student, govorit', s, professor}

(25) b. is ungrammatical because the NP *studenty* is not assigned the proper case [Case: Quantitative]; instead it is wrongly assigned the Case [Case: Nominative], and a mismatch of Agree and Case features between the Modifier *mnogo* and *studenty* results in ungrammaticality. We assume that the reason is because the non-Agreeing Quantifier

[2] Rappaport (2003) assumes an 'abstract' QUANTITATIVE case for higher numerals as well but he analyzes and derives them in a more ad-hoc stipulative manner.

mnogo has moved to the Specifier of QP instead of Merge with the *PartP*. Since Merge-over-Move is the preferred solution for Economy reason, the example (25) b. crashed (is ruled out). Consider now the reverse option when a A-Quantifier of the inflected type is taken from the Lexical Array:

(26) Mnogie$_{\text{-NOMPL}}$ studenty$_{\text{-NOMPL}}$ govorili$_{\text{3PSPL}}$ s professorom *collective*
Many students spoke with (the) professor

Suppose, that the A-quantifier *mnogie* is already inflected for number in the lexicon receiving the valued feature φF[α], [α] = {PlurTantum}$_{\text{val/interpretable}}$ only in the process of Merge and Move via Agree. Because it is an adjective, it has unvalued features for Number, Gender and Case in the lexicon and it can valuate these unvalued features only in the process of derivation under the operation *Agree*. Since the PartP is not a Phase with Edge features for Agreement (in Spec-PartP), the A-quantifier must first *Merge* with the Spec-NP and only then, for Scope reasons and check, with the Spec-QP by cyclic overt Movement. Since the head of the NP has valued features (φF [α]) for Number, Gender and Animacy (cf. Rappaport 2003), it can percolate these F-Features to the A-quantifier in Spec-NP by the operation Agree. After having checked the unvaluated F-features it must check the s-Features of the QP in Q^0 via covert or overt Movement to Spec-QP. The derivation is shown in (27):

(27) A. [$_{\text{VP}}$V [govoril- s professorom] – *Merge* V + PP
B. [NP mnogie [N^0 studenty] $_{\text{VP}}$V [govorili s professorom]] – *Merge* VP + NP
C. [Spec-QP mnogie $_{\text{NP}}$[N^0 studenty]] [NP mnogie [N^0 studenty] VP[V [govorili s professorom]]]]] – *Move NP to QP & check F-Features and Q-features via Agree*

3.1 Interim Conclusion

So far we can see that higher numerals and the Quantifiers of the Q-type behave in the same way: morphologically, they are non-inflected forms with unvaluated features for Number, Gender and Case. Since they are by morphology non-inflected categories, they are merged with a $PartP^0$ that is neutral with respect to F-Features and Agree (Number, Gender) but which has a valuated Case feature [+Quantitative]. Higher numerals and the Quantifiers of the Q-type merge with the PartP in order to assign the Case [Case: Quantitative] to their NP complement. The numerals of the A-type as well as Quantifiers with the morphology and syntax of A-type, on the other hand, are inserted in Spec-NP and undergo Merge and Move to to QP in order to check F-Features and Q-features via *Agree.*

3.2 Animacy and maculine personal gender (hence virile V) in Numerals

An important change that affected all numerals in Polish (though the higher ones in a particular way) was the developing category of *masculine personal gender*, hence *virile* (V), as opposed to literally the rest: *non-virile* (NV). Its exponence entailed the introduction of ACC=GEN syncretism, which meant that ACC forms of virile nouns, pronouns and numerals modifying virile nouns were substituted with GEN ones.
The system of numerals in Slavic languages is highly developed and varied especially because of the above mentioned distinction of N-numerals, A-Numerals and Q-Numerals

but also because of the opposition between Gender (masculine, feminine and neuter) and the opposition of the subgender of Animacy - *masculine personal gender*, hence *virile* (V), opposed to literally the rest: *non-virile* (NV) (cf. Rappaport 2003b, Kosta 2003).
In grammars, the notion of "animacy" is two-fold: a concept that strictly refers to the language Polish (and a few other Slavic languages) and defines the categories of animacy as a subcategory of *masculine personal gender, hence virile*. Features of animate forms are assigned Gen-Akk in Sg in complement position (for example: *widzę tego*$_{Gen\text{-}AkkSg}$ *psa*$_{Gen\text{-}AkkSg}$ 'I see the dog') and Akk forms for non animate referents (for example, *widzę ten stół* 'I see this table'). In the Polish language, the category of animacy also divides to the category of virile animates, ie *męskoosobowość* (*masculine personal gender, V)* which shows Gen-Akk assigned not only on the Sg but also Pl in the structural position of a complement (cf.: *widzę tego*$_{Gen\text{-}AkkSg}$ *studenta*$_{Gen\text{-}AkkSg}$, *widzę tych*$_{Gen\text{-}AkkPl}$ *studentów*$_{Gen\text{-}AkkPl}$) and *non-virile* (NV), a form of complement in the accusative singular form of the Gen-Akk but the accusative plural form of the Nominative, cf.: *widzę tego psa, widzę te psy* 'I see that dog, I see these dogs').
Together with the *V* and *NV* sub-categories of the male declension type (ie masculine category of non-personal, but animate male referents "męskorzeczową"), the feminine and the neuter we talk about five Gender classes in Polish language (cf. Kosta 2003).
Similarly understood is the concept of animacy in Croatian and Serbian ("Kategorija živosti") The category of animacy, however, is not divided into *męskoosobową* (V) and *męskożywotną* (non-personal, NV), because there is a real form of the accusative in the plural, which is not identical to either of the forms of the nominative or genitive of the other forms. We deal only with the opposition regarding the singular masculine 'animate' (eg *Vidim studenta, psa* "I see the student/the dog") vs. "non-animate" (eg *Vidim stol /sto* "I see the/a table").
There are broader concepts of "animacy" as grammatical categories in which grammatical units are classified according to the criterion of "animate" vs. "non-animate" in all Genders and Numbers, ie in masculine, feminine an neutre gender, in Sg, Plur (and former Dual like in Old Russian) in East Slavic and very narrow concepts. By this understanding of the term one can specify different grammatical phenomena, animacy in this sense can be found in many languages, but it may relate to various phenomena. Learners especially of these three Slavic languages often define the numeral system as "the worst thing". Native speakers of Russian, SCB and Polish languages apparently don't have such problems with numbers. However, the use of language is changing. This also applies to the system of numerals. Recall the disappearance of duality in Polish, Czech and other Slavic languages between 12th and 17th century. I want to prove in this chapter some trends in the data that show a simplification and transition from nouns to functional categories in the numeral system of Polish. We want to demonstrate that in Polish the category of animacy has played a decisive role in the recategorization of the Case-Agree-System of numerals.

3.3 Classification of numerals in Polish (PL) and SCB and Animacy (V vs. NV)

Before I will deal with the case assignment of numerals in Polish, I would like to review their system. Given the importance of the numerals we devide them into the following groups

- cardinal numbers (eg PL: *dwaj*, *dwa*, *dwie*, *trzy*; SCB *dva*, *dvije/dve*, *tri*)
- collective numerals (eg PL.: *dwoje*, *troje*, *pięcioro*; SCB: *dvoje*, *troje*, *petoro*)
- Ordinal numbers (eg PL: *drugi*, *trzeci*; SCB.: *drugi*, *treći*))
- fractional numerals (eg PL: *jedna trzecia*; SBC: *trećina*))
- multiple numerals (eg PL: *dwukrotny, dwojaki*; SBC: *dvostruk, dvojak*).

Liczebniki główne				
	Liczba	Rzeczy, zwierzęta [m. -nieosobowy, n.]	Rzeczy, osoby płci ż., zwierzęta [ż.]	Osoby płci m. [m.-osobowy]
PL	2	dwa	dwie	dwaj / dwóch+D[13]
	3,4	trzy, cztery		trzej, czterej /-ech
	5 i wyżej	pięć		-/pięciu
HR/SR	2	dva	dvije/dve	-[14]
	3,4	tri, četeri		-
	5 i wyżej	pet		-

Table 4: Animacy (virilis non-virilis opposition) and numbers

In table 4, we can see that the category of animacy and *virilis* is crucial for the distribution and use of the cardinal numbers in PL. In *virilis* forms the numbers 2-4 are *dwaj*, *trzej etc.* , in non-personals - *dwie*, *trzy*. Crucial for our analysis in part 3 of this paper will be the fact that the virilis forms *dwaj*, *trzej, czterej* can be substituted by *dwóch, trzech, czterech* and *pięciu* that agree as genitive plural forms of two, three, four and five with the plural genitive form of the NP complement, but the finite form of the Verb is in the form 3.person singular. of the type non-personal form, cf.:

(28) a. *Czterej* *pancerni* *śpiewali*.
Four$_{\text{-virilis}}$ armored$_{\text{-NomPL}}$ infantry sang$_{\text{-3PsPL}}$
b. *Czterech* *pancernych*$_{\text{-GenPL}}$ *śpiewało*
Four$_{\text{-GenPL}}$ armored$_{\text{—GenPL}}$ infantry sang$_{\text{--3PsSgn}}$

This fact leads us to the conviction that the origins of the Case assignment must be close connected with the category of collectivity and partitivity. The genitive form we consider here as a partitive form of the genitive, the semantically referenced to a specific set of individuals or copies of a set. The form of the impersonal form is typical of impersonal forms of Slavic verbs (see Kosta 2009b).

We believe that in Russian Paucals the mismatch between Case and Number of the numeral and its modifier has the same source and thus deserves the same analysis. How can we account for the fact that in Russian the Noun agrees in Number with the former Dual grammaticalized or recategorized as GenSg but the Adjective has the form of GenPlur? Gilbert Rappaport (2003b) derives the form of the Adjective from a Feature Animacy assigned with the Gen-Akk. This would, however, presuppose that only animate male forms can be assigned the Gen-Akk., but never inanimate nouns. As we can see, this is not true, because also inanimate nouns such as inanimate masculine forms and feminine forms display the same case marking feature and mismatch when accompanied by an adjective (cf. (28)). We believe instead, that the apparent mismatch in Number can be

explained by the properties of functional heads of the Paucal Phrase (PaucP) heading a nominal Phrase (NP) but at the same time being dominated by a PartP.
It is quite obvious that the checked case GenSg (for PaucP) and the GenPlur (for PartP) is n structural, and structural cases are characteristic of functional heads rather than lexical ones. Let us suppose that numerals 5< have changed their lexical status and have become functional heads headed by a Quantifier Phrase for Scope reasons. Because they co-occur with NPs, we can assume further that they would be part of the extended projection of the counted noun (Miechowicz-Mathiasen 2012). This could definitely explain the mixed dependency relations, i.e. the nominal behavior of numerals would be thus expected, rather than surprising. Moreover, it would explain why they have lost their intrinsic agreement features: as functional heads, similarly to such heads as *v* or T, they can only take agreement on, rather than trigger it; also, their ability to check structural case goes through without stipulation.
After having clarified the status of the Case in the numeral *pięciu* , we turn back to the problem of the relation of Case assignment and Agree of lower numerals in Russian.

3.4 Lower Numerals in Russian ($NumP_{\sim pauc}$)

In Russian the genitive singular is assigned to nouns with plural referents after certain numerals in nominative case positions. We take this to be the defining property of the lower numerals: *dva* 'two', *tri* 'three', *četyre* 'four', and *oba* 'both'. Russian represents a marked situation, in contrast to Polish, for example, in which the corresponding numerals have no morphosyntactic effect and combine with the plural in whatever case the syntactic context requires; e.g., *dostałem {dwa / trzy / cztery / oba} listy*$_{\text{ACC=NOM PL}}$ '(I) received {two / three / four / both} letters'. The fact that the Quantitative Genitive is assigned after higher, but not lower, numerals in such a closely-related language suggests that in Russian the genitive after lower numerals is independent of that after higher numerals: Polish has the latter without the former. Lower numerals in Russian, then, can be treated as analogous to higher numerals, associated with an 'abstract' case expressed by syncretism, except that the value of that case differs in the two kinds of numerals. We assume a PAUCAL case for Russian, which is spelled out on the head noun $Pauc^0$ of a PaucP as the genitive singular. There is, incidentally, fragmentary evidence in Russian of a distinct phonological expression of the paucal category: four words have specially stressed oxytonal forms found only when they follow lower numerals:

nominative	ряд 'row'	час 'hour'	шаг 'step'	шар 'sphere'
genitive	ря́да	часа́	шага́	шара́
paucal	ряда́	часа́	шага́	шара́

Table 5: Paucal and oxytonal forms from former Dual (from Rappaport 2003)

The reason for the oxytonal accent of these four words is that the numeral 2 was in Old Russian Dual and the masculine nouns in Dual were originally oxytonal. This oxytonal accent has been generalized as the new masculine plural morpheme *–á*, cf. professorá, gorodá, učiteljá, beregá. These oxytonal forms contrast with the accent on the stem of the

forms of Genitive Singular, cf.: *profе́ssora, górода, učítelja, bérega*. The problem about these forms is when they appear after the paucal numerals (2-4) and in a NP with adjectives, the morphological form of adjectives in the paucal case is subject to variation. In the masculine gender, the paucal case of adjectives could take the form of either the nominative or the genitive-accusative case as recently as the nineteenth century, although the nominative is virtually impossible today. In the feminine, either case form is permissible for the paucal today. Thus:

(29) a. dva {malenkix-$_{\text{GEN-ACC PL}}$ / *malen'kie-$_{\text{NOM PL}}$} stola-$_{\text{GEN SG MASC}}$
'two small tables'
b. dve {malen'kix-$_{\text{GEN-ACC PL}}$ / malen'kie-$_{\text{NOM PL}}$} devočki-$_{\text{GEN SG FEM}}$
'two little girls'

If we compare the forms *dva* with the Old Russian and Old Polish forms in the course of historical development, we can see that they were historically old Dual forms. Common Slavic had a complete singular-dual-plural number system, although the nominal dual paradigms showed considerable syncretism, just as they did in Proto-Indo-European. Dual was fully operable at the time of Old Church Slavonic manuscript writings, and it has been subsequently lost in most Slavic dialects in the historical period.

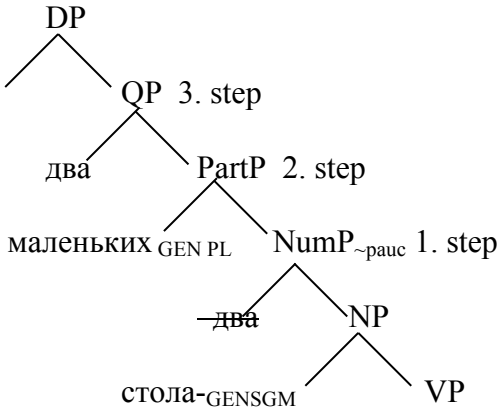
Of the living languages, only Slovene, Čakavian and Sorbian have preserved the dual number as a productive form. In all of the remaining languages, its influence is still found in the declension of nouns of which there are commonly only two: eyes, ears, shoulders, in certain fixed expressions, and the agreement of nouns when used with numbers.

In all the languages, the words "two" and "both" preserve characteristics of dual declension. The following table shows a selection of forms for the numeral "two":

As in the case of higher numerals, two options are made available in the lexicon for lower numerals. The case feature can be valued as [Paucal] on Merge, invoking *heterogeneous morphosyntax* (1a); the numeral itself is spelled out as a form of the paucal case.

Whereas Gilbert C. Rappaport (2003) tries to explain the apparent mismatch between number, case and gender (animacy) between the Paucal, the noun and the modifier with a special Case feature and with an ad-hoc stipulated animacy feature in addition with an ad hoc stipulated "Paucal Case Syncretism Readjustment rule", we believe to be able to give an analysis that does not need any additional rules. Furthermore, we believe that our analysis will be in line with the newest development of the Phase theory based on considerations of parsimony and economy. In Russian, the lower numerals *2-4* belong to the A-Class of numerals morphologically, that is they are inflected for Case in the homogeneous morphosyntax but, as opposed to Polish, they are not inflected for animacy and Gender. On contrary to Rappaport (2003), we do not just assume a Feature [Paucal] on Merge, invoking *heterogeneous morphosyntax* (1a), but a projection about the NP and below the PartP, called PaucP, cf.:

(30)



We assume that the head of the PaucP - PaucP^0 – becomes valuated for this Case Feature [Paucal] by merge:

Let's take a closer look at the steps of the derivation of (30)

A. [$_{AP}$ dva $_{NP}$stol-$_{[+SG +MAS]}$] – *Merge* {AP + NP}
B. [$_{PaucP}$ [$_{AP}$ dva $_{NP}$stola$_{[GEN +SG +MAS}$] –Merge {DP + {AP +NP}} *check EPP & assign GENSg in PaucP & Send to Transfer*
C. [$_{PartP}$ Part φF $_{[Quantitative]}$ malen'ki-} φF[ ]$_{]}$]– *Merge AP with PartP & assign GENPl in PartP & Send to Transfer*
D. [$_{QP}$ dva malen'kix stola] – *Remerge AP dva with QP & check s-Feature via Spec-Head-Agree & Send to Transfer*

Recall, that narrow syntax is supposed to be blind as a bat, and thus, would need to be able to *look ahead* (up the tree, to C-I and A-I interfaces) in order to determine the interpretability of a feature. A transfer of derivational chunks to the interfaces remedies this issue, *search space being reduced to a local* Domain (a Phase). Under this perspective, we do not need to be faced with the look-ahead problem in derivational approaches. All steps are licensed by valuation of unvaluated formal features that has to be checked in the searching domain of probe and goal. As soon as one phase is done, it is sent to the transfer and the rest of the structure can be build up bottom up.

4. Summary

In the present paper we have tried to give an analysis of numeral phrases based on valuation and interpretation of Case features and the operation *AGREE*. We have tried to demonstrate that most of the problems regarding the numerals that could not be resolved until now, within the former approaches of Government and Binding Theory and early Minimalism (Franks 1995, Rappaport 2002, 2003ab, Babby 1987, Kosta 2008), could be explained by the Phase based approach. External evidence from languages with impoverished morphology gave strong support in favor of a hierarchy of functional projections within the domain of numerals and quantifiers.
While previous analyzes of Russian and Polish numerals and quantifiers concentrated on the different Case assignment properties in *homogeneous* and *heterogeneous* paradigms and often needed ad-hoc formulated rules, our analysis descends from a simple mechanism within the theoretical assumptions of Phase Theory (Chomsky 2000) and the

Theory of Valuation (Pesetsky, Torrego 2004). It also seems to make sense as though the analysis presented here could explain several unresolved problems of Slavic syntax and possibly of the syntax of other Slavic languages in a very simple mechanism. A layer beyond the NP that is not necessarily DP is motivated by a number of, prima facie, unrelated numeral and quantifying constructions which seem to involve a functional layer projected immediately above NP. If present, the head hosts a formal feature that can be checked in one of the following ways:

- by Merging a Partitive Head with a nominal complement and assigning the abstract Case Quantitative with the F-features of Genitive Plural to its complement – heterogeneous pattern in structural case positions;
- by Merging a Paucal Head with its nominal complement via valuation of the Case-features of Genitive Singular;
- by merging a modifier - homogeneous pattern in oblique (lexical, inherent) case positions
- by merging a pseudo-partitive head (examples of the type 23b)
- by numeral and quantifier-raising of the numeral/quantifier in QP

The PartP configuration is likely to be involved in other nominal constructions but this issue requires further research. The model outlined above relies on the assumption that the Part° head is not associated with any fixed semantic value but rather with an abstract Case [Case: Quantitative] on $PartP^0$. This makes the proposed analysis less language-specific than an account proposed by Kosta (2008) and by Rutkowski & Progovac (2005). Thanks to subsuming a variety of nominal constructions under one label, the PartP model avoids unnecessary proliferation of functional layers in the region between DP and NP.
Moreover, it proves that the case assignment occurs early in the derivation as a result of merge, while the Valuation of non valuated formal features seems to run hand in hand with the operation Agree, which is thus subordinate to the process of Merge and Case assignment in Narrow Syntax. The good news for the present analysis is also that we can get rid of the problem of 'look ahead' or 'look back' (i.e. peering into narrow syntax by the interfaces) due to the Phase-Impenetrability Condition. After completion, the phase is inaccessible to further operations, as formally captured by *(PIC):* "In phase α with the head H, the domain of H is not accessible to operations outside α, only H and its edge are accessible to such operations" (Chomsky 2000:108).

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