A Note on Paucal, Agreement and Case

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This paper aims to contribute to the debate on the morpho-syntactic status of nominal forms licensed by the numerals "two", "three", and "four" in Serbo-Croatian (SC hereafter). It provides additional support for the intuitively plausible, though often challenged view, that nouns in these contexts require a special, paucal form. I also argue that the system presented here, which employs abstract binary features and markedness, offers a fairly simple explanation for some complex, puzzling facts regarding the distribution of SC quantifies and oblique case.

1. Paucal Numerals: Some General Facts

SC quantifiers can roughly be divided into two main groups: adjectival and non-adjectival quantifiers. The former are in terms of syntactic features (almost completely) dependent on the noun they modify, i.e., although they determine its number, they agree with the modified noun in case and gender, as illustrated in (1). The latter, on the other hand, do not show any agreement with the noun they modify; rather, the noun which combines with such quantifiers necessarily has the genitive plural form (genitive assigned this way is therefore often referred to as "genitive of quantification"). This is shown in (2):

(1) a. jedan /   svaki   čovek   - svi   ljudi
       one$_{NOM/MASC}$ every$_{NOM/MASC}$ man$_{NOM /SG}$ all$_{NOM/MASC}$ men$_{NOM/PL}$
    b. jednim/   svakim   čovekom - svim   ljudima
       one$_{INSTR/MASC}$ every$_{INSTR/MASC}$ man$_{INSTR/SG}$ all$_{INSTR/MASC}$ men$_{INSTR/PL}$

(2) a. pet/osam/nekoliko ljudi
       five/eight/some   men$_{GEN/PL}$

The quantifiers *dva* 'two', *tri* 'three, *četiri* 'four' and *oba* 'both', however, appear to display a mixed behavior: they impose a special form

on the noun, yet at the same time some of them (specifically, *dva* and *oba*) agree with it[1].

(3) a. dv-**a** /ob-**a**   čovek-**a** b. dv-**e**/ob-**e**   žen-**e**
    two$_{MASC}$/both$_{MASC}$ man   two$_{FEM}$/both$_{FEM}$ woman
  c. tri /četiri čovek-**a/** žen-**e**
     three/four man   woman

Concentrating on the masculine declension, most interesting in this regard, we see that the form 'čovek-a' in (3) triggers gender agreement on 'dva' and 'oba'. However, 'čovek-a' is special in that it is clearly not nominative singular (the nominative singular form is 'čovek', as given in (1a)), nor genitive plural (i.e., 'ljudi', see (2)).

    Although most reference grammars simply state that 'čovek-a' in (3) is genitive singular (since it is homophonous with the genitive singular form given in (4)), I argue that it is in fact nominative paucal.

(4) Slika   mladog(a) čovek-**a**.
   Picture$_{NOM}$ young$_{GEN/SG}$ man$_{GEN/SG}$
  'A picture of a young man'

1.1. Why Not Genitive Singular

Taken at face value the claim that 'čovek-a' in (3) is genitive singular may seem satisfactory. This proposal, however, runs into a couple of serious problems. The first one concerns the status of adjectives and other attributive modifiers in the structures under consideration. Namely, we expect prenominal adjectives in the scope of these quantifiers to take the genitive singular form as well, contrary to fact.

(5) Dv-a mlad-a /*mlado-g(a) čovek-a.
   Two young-?? young$_{GEN}$ man$_{GEN/SG}$

Although *mlad* 'young' in (5) takes a form ending in –*a*, the form in question does not typically represent genitive singular features. The standard genitive singular form of 'mlad' is 'mladog(a)', and this form is

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[1] The somewhat archaic *nekolika* 'some' also falls into this group.

unacceptable with quantifiers like 'dva', as shown in (5). This fact requires a separate stipulation under the hypothesis that 'čovek-a' in (3)/(5) is the genitive singular form.

Now, most SC adjectives come in two forms: long and short (see Despić 2011 for an overview of the relevant literature) and 'mlad-a' in (5) looks like the short genitive singular form. Thus, on the basis of this one may argue that for some unknown reason SC adjectives are limited to their short forms when they combine with quantifiers like 'dva' (even though the short form is on the decline in non-nominative cases in modern SC and is paradigmatically compromised). With this stipulation 'mlad-a' in (5) would still be the genitive singular form.

The problem is that not all SC adjectives/attributive modifiers have short forms, and even they necessarily end in –a when they are modified by 'dva'.

(6) slika   ✓mo(je)ga   /*moja   brata
    Picture   my$_{LONG/GEN/SG}$/ my$_{SHORT/GEN/SG}$ brother$_{GEN}$
    'Picture of my brother.'

Thus, the pronominal possessive adjective *moj* 'my' is limited to the long form in genitive, i.e., 'moj-a' is unacceptable in a typical genitive position, as shown in (6). However, even though 'moj-a' is clearly not the short genitive singular form of 'moj', it is the only possible form with a quantifier like 'dva':

(7) dva *mo(je)ga/ ✓moj-a   brat-a.
    two   my$_{LONG}$/   my$_{SHORT}$ brother

This raises an obvious question: if nouns in phrases with the quantifiers *dva* 'two', *tri* 'three, *četiri* 'four' and *oba* 'both' require the genitive singular form, why do adjectives behave differently in this respect?

The second problem concerns the participle agreement pattern displayed in constructions involving the quantifiers in question. When a phrase containing one such quantifier is in the subject position, the participle ends with –a (just like the noun and the adjective):

(8) Dv-**a** mlad-**a** čovek-**a** su   došl-**a**.
   Two young man   aux**3P/PL** arrived
   'Two young men have arrived.'

The sentence in (8) exhibits a typical subject agreement pattern, i.e., all agreeing elements in (8) including the participle are characterized by the same inflectional suffix, namely –*a*. This agreement type is further illustrated by the following examples:

(9) a. Mlad-**a**   žen-**a**   je   došl-**a**.
       Young$_{NOM/FEM/SG}$ woman $_{NOM/FEM/SG}$ aux$_{3P/SG}$ arrived $_{NOM/FEM/SG}$
       'A young woman has arrived.'
    b. Mlad-**e**   žen-**e**   su   došl-**e**.
       Young$_{NOM/FEM/PL}$ woman $_{NOM/FEM/PL}$ aux$_{3P/PL}$ arrived $_{NOM/FEM/PL}$
       'Young women have arrived.'
    c. Mlad-**i**   ljud-**i**   su   došl-**i**.
       Young$_{NOM/MASC/PL}$ men $_{NOM/MASC/PL}$ aux$_{3P/PL}$ arrived $_{NOM/MASC/PL}$
       'A young man has arrived.'

Only nominative subjects, however, trigger agreement on the participle in SC. The subject nominal in (10) is assigned genitive plural by the numeral *pet* 'five' and cannot therefore trigger agreement on the participle, i.e., the participle takes the neuter singular form, which is generally taken to be default.

 (10) Pet mladih   ljudi   je   došl-**o**.
     Five young$_{GEN/PL}$ men$_{GEN/PL}$ aux$_{3P/SG}$ arrived$_{NEUT/SG}$
     'Five young men has arrived.'

This suggests that the form *čovek-a* 'man' in (7) is nominative, since it triggers the same type of agreement on the prenominal modifiers and the participle. More precisely –*a* in (8) represents the features [nominative, masculine] and some number feature, which is neither singular nor plural. Following the consensus in the relevant literature I will call this number 'paucal'. In order to maintain the genitive singular hypothesis, on the other hand, one needs to explain why the participle in (8) has the form 'došl-a'. Since genitive subjects do not trigger agreement on the participle, the form in question would have to be feminine singular (see

the participle in (9a)) or neuter plural. That is, both the adjective 'mlad-a' and the participle 'došl-a' in (8) would on this proposal have to be analyzed as nominative feminine singular, or nominative neuter plural, even though the subject itself (i.e., čovek-a) is, by hypothesis, genitive masculine singular. I do not see how this proposal could be salvaged without making a number of dubious stipulations.

2. Formal Representation of Paucal

As discussed in detail in Corbett (2000), the paucal number is "used to refer to a small number of distinct real word entities" (Corbett 2000, 22). It is usually analyzed as an approximative number in the sense that there is no upper bound that can be put on its use (see also Harbour 2011). In Bayso, for instance, the paucal number is used to refer to a small group of individuals, from two to about six. In SC there appears to be an upper bound (namely, five) and this is perhaps one of the reasons why some authors hesitate to call the quantifiers in question paucals. Also, Corbett (2000) argues that the special form that appears with the numerals 'two', 'three', and 'four' in Russian, and which is almost always the same as the genitive singular, depends entirely on the presence of the numeral, and as such cannot be treated as part of the number system. Therefore the term 'paucal' is inappropriate in this case, according to Corbett. In SC, on the other hand, in addition to the numerals 'two, 'three' and 'four', the quantifiers *oba* 'both' and *nekolika* 'some' license the special form. The latter fits the "standard" definition of paucal, since it is similar to the English quantifier 'a few' in meaning, but it is sound quite old-fashioned.

The special form in question is diachronically a survival of the dual number, and is sometimes also referred to as the 'count form' (see Corbett 2000, 270). I will argue that synchronically this special form is due to the existence of a special number assigned by the quantifiers like 'two', which I will continue to call 'paucal' (to avoid any confusion). However, I will argue that in order to fully understand the nature of this number we need to decompose it into two features.

2.1 Number Features and Markedness

On the basis of the standard typological evidence for markedness, Nevins (2011) shows that plural is marked with respect to singular but unmarked

with respect to dual.[2] Since plural cannot be characterized as either a marked or an unmarked category of number, Nevins argues that we need two binary features to fully understand number categories. Nevins proposes the following decomposition of number categories into features (see also Harbour 2006, Noyer 1992):

(11)   a. Singular = [+singular,−augmented]
        b. Dual = [−singular,−augmented]
        c. Plural = [−singular,+augmented]
        d. The combination [+singular,+augmented] is impossible

In addition to the feature-based representation of number in (11) Nevins argues for the following markedness statements (Nevins 2011, 421):

(12) Context-free markedness statement:
    The marked value of [± singular] is −.
(13) Context-sensitive markedness representation:
     In the context [−singular], the marked value of [±augmented] is −.[3]

On this analysis the paradoxical behavior of plural with respect to markedness can be explained. Plural (as well as dual) is marked with respect to singular because it contains a marked feature-value that singular does not, namely [−singular] (see (12)). On the other hand, plural is unmarked with respect to dual (or, in other words, dual is most highly marked) because dual contains a marked feature-value that plural does not, namely [−augmented] (see (13)).

    As far as the proposed features are concerned, Nevins argues that [±augmented] has a special status since it is always relativized to another feature. He defines [+augmented] as follows:

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[2] What is meant here by 'markedness' is morphological rather than semantic markedness (see Despić 2010 and references therein for discussion of this distinction).
[3] As discussed in Nevins (2011), "the appeal to context-sensitive markedness in morphology parallels its use in phonology" (Nevins 2011, 421):

(i) Context-sensitive markedness of vowel color features:
   In the context [−back], the marked value of [±round] is +

(14) a. [+F] = ¬ [− F]

b. [+augmented] = λPλx∃y[y ⊂ x ∧ P(x) ∧ P(y)].

In other words, what [+augmented] means is, "given some predicate P that is true of some set *x*, *x* is [+augmented] if there is a proper subset of *x* for which P is also true" (Nevins 2011, 422). A set of cardinality such as 100, for example, is [+augmented] for its value of [± singular] (i.e., [−singular]) because there is at least one proper set of 100 which is also [−singular]. By the same logic, sets of cardinality 1 are always [−augmented] for their value of [± singular] (i.e., there is no proper subset of 1 which is also [+singular]).

Now, a set of cardinality 2, which is [−singular], is special because there is no proper subset of this set which is also [−singular]. For this reason, a set of cardinality 2 is [−augmented] for its value of [± singular].

Going back to paucal, I believe it should be formally represented in a similar way as dual. That is, in light of the facts given in the next section I argue that paucal is in SC most highly marked; in other words, plural is marked with respect to singular but unmarked with respect to paucal.

As far as the actual features are concerned, we may represent dual and paucal with the identical set of features: [−singular, −augmented] (e.g., Bailyn and Nevins 2008, Pereltsvaig 2010). However, this solution might not be completely satisfactory, since the definition of [+augmented] in (14) is aimed to semantically capture dual, not paucal. We could therefore try to either describe paucal in terms of iterative application of the feature [±augmented], or find another feature.

Harbour (2011) proposes the feature [±additive] to formally represent paucal. Assuming the lattice-based semantics, Harbour offers the following definition of [±additive]:

(15) [±additive] = λPλx (¬)∀y (Q(y) → Q (x ∪ y)) [4]

Presuppositions: Q(x), Q ⊂ P

(The set of elements of join-(in)complete subregion P)

The intuition behind Harbour's analysis is that the sum of two pluralities is always a plurality, but the sum of two paucities does not always give a

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[4] The parenthetic negation signifies ¬ that is present for the minus value, absent for plus.

paucity. In other words, the plural is closed under addition, the paucal is not. Thus, [+additive] yields the plural, wheras [−additive] the paucal. A language like SC would therefore employ the features [±singular] (or [±atomic] in Harbour's terminology) and [±additive]. The SC number categories would then be decomposed in the following way:

(16)   a. Singular = [+singular,−additive]
        b. Paucal = [−singular,−additive]
        c. Plural = [−singular,+additive]

(16) looks almost identical to (11); the only difference is that (16) uses [±additive] instead of [±augmented]. In terms of markedness, I argue that [±additive] behaves in the same way as [±augmented]. Thus, (17) and (18) parallel (12) and (13), respectively:

(17) Context-free markedness statement:
     The marked value of [± singular] is −.
(18) Context-sensitive markedness representation:
     In the context [−singular], the marked value of [±additive] is −.

The final assumption that we need to make here is that only the quantifiers *dva* 'two', *tri* 'three, *četiri* 'four' and *oba* 'both' can license [−additive], and therefore impose the paucal form on the modified nominal and agreeing elements. The suffix –*a* in (8), repeated here as (19a), thus stands for nominative, masculine [−singular,−additive]:

(19) a. Dv-**a** mlad-**a** čovek-**a** su   došl-**a**.
        Two   young   man   aux$_{3P/PL}$ arrived
        'Two young men have arrived.'
     b. /-a/ ⇔ [nom, masc, −singular, −additive]

2.2 Paucal and Oblique Case

A particularly interesting and at the same time confusing fact about SC paucal quantifiers is that they assign plural to the modified noun in oblique cases, as shown below:

(20)

Two men	
a. Nom/Acc	Dv-**a** čovek-**a**
b. Gen	Dva-**ju ljudi**
c. Dat/Loc/Instr	Dva-**ma ljudi-ma**

To deal with this issue I will assume that marked features can accumulate creating a type of "markedness overload", which in certain cases may be resolved by different postsyntactic operations (e.g., Calabrese, 2005, 2008, Despić 2010). For instance, oblique cases are more highly marked than non-oblique cases, paucal is more highly marked than plural, which is more marked than singular etc. In the case of oblique paucals in particular, two marked features are combined; oblique case and paucal number (i.e., [−singular, −additive]). One way of resolving a situations of this type is to delete a privative feature (i.e., *impoverishment*, see Halle and Marantz 1993). Another way is to switch a binary feature to the unmarked value (e.g., Noyer 1992). I propose that in this particular case [−additive], which is the marked value of [±additive] in the context of [−singular] (see (18)), is turned to the unmarked value, namely [+additive], in the context of an oblique case. This accounts for the emergence of plural in (20b/c). Furthermore, I propose that the suppletion rule which changes 'čovek' to 'ljud' applies in the context of [+additive], as illustrated in (21b). Obviously, the rule in (21a) has to be ordered prior to (21b):

(21) a. [−singular,−additive] →[−singular,+additive]/__ [oblique]
     b. √čovek → ljud / __ [+additive]

Now, I believe that a system set up this way offers a fairly simple explanation for certain well-known, puzzling SC facts, some of which are of considerable complexity. As discussed in a number of works (Franks 1994, 1995, 2002, Bošković 2006, 2008…), phrases containing quantifiers which assign genitive plural to their complements (the numerals *pet* 'five' and above, *mnogo* 'many' etc,) cannot occur as objects of oblique case assigning verbs. In (22) below the verb *upravljati* 'to manage' assigns instrumental case:

(22) *Marko upravlja pet kompanija.
     Marko manages five companies$_{\text{GEN/PL}}$
     'Marko manages five companies.'

The same quantifiers, however, are grammatical as complements of oblique case assigning prepositions, such as *sa* 'with', which also assigns instrumental:

(23) Marko razgovara sa   pet žena.
      Marko razgovara with five women$_{\text{GEN/PL}}$
      'Marko talks with five women.'

The paucal quantifiers behave somewhat differently in the same structural contexts. The phrase 'dve žene' as the object of the verb *upravljati* 'manage' in (24) necessarily takes the instrumental form (the nominative form is ungrammatical):

(24) a. Marko upravlja dvema   kompanijama.
         Marko manages two$_{\text{INSTR/PL}}$ companies$_{\text{INSTR/PL}}$
         'Marko manages two companies.'
     b. *Marko upravlja dve   kompanije.
         Marko manages two$_{\text{NOM/PAUC}}$ companies$_{\text{NOM/PAUC}}$
         'Marko manages two companies.'

However, as a complement of the preposition *sa* 'with', the same phrase can take either the instrumental or nominative form.[5]

(25) a. Marko razgovara sa   dvema   ženama.
        Marko razgovara with two$_{\text{INSTR/PL}}$ women$_{\text{INSTR/PL}}$
        'Marko talks with two women.'
     b. Marko razgovara sa   dve   žene.
        Marko razgovara with two$_{\text{NOM/PAUC}}$ women$_{\text{NOM/PAUC}}$
        'Marko talks with two women.'

This is summarized below:

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[5] The instrumental form sound somewhat old fashioned, but it is certainly acceptable (I come back to this in section 3).

(26)

	5 and above	Oblique Paucals	Nominative Paucals
Verb$_{\text{OBL}}$	*	✓	*
Preposition$_{\text{OBL}}$	✓	✓	✓

Now, to explain these facts we only need to make two simple, independently motivated assumptions in addition to the analysis developed so far. First, as discussed by a number of authors (e.g, Bošković 2006, Franks 2002, etc.) oblique case assigned by a verb (which I mark as OBL$_\text{V}$) is clearly different from the one assigned by a preposition (marked as OBL$_\text{P}$). I therefore propose (27):

(27) OBL$_\text{V}$ cannot be deleted.

Second, I assume that phrases containing the genitive plural assigning quantifiers (e.g., '5' and above) are simply incompatible with oblique case in general i.e., they cannot be assigned oblique case (there is a sort of "case conflict", as has been discussed extensively in the literature).

(28) OBL is incompatible with quantifiers which assign gen/pl.

Consider first (25a/b). The paucal object is assigned OBL$_\text{P}$ by the preposition *sa*. This creates a marked context involving two marked feature:

(29) *[[−singular,−additive] OBL$_\text{P}$] /+____]$_\text{W}$

This is resolved in one of the following two ways: (i) [−additive] which is the marked value for [±additive] in the context of [−singular] is turned to [+additive] (see (21a), repeated below as (30)), which results in the object phrase taking the instrumental plural form (see also (20b/c)), or (ii) OBL$_\text{P}$ is deleted, since unlike OBL$_\text{V}$ it can be deleted in marked contexts; consequently, the object takes the nominative paucal form.[6]

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[6] I assume that nominative here is the default case. See Despić (2010) for arguments that nominative in SC (and Slavic) is unmarked with respect to non-nominative cases. The fact that, in contrast to OBL$_\text{V}$, OBL$_\text{P}$ can be deleted can also be seen as a reflection of the

(30) [−singular,−additive] $\rightarrow$ [−singular,+additive]/__ [oblique]

The second option, however, cannot be applied in the case of (24), since OBL_V assigned by *upravljati* 'manage' cannot be deleted, by hypothesis (e.g., (27)). The only way to avoid the constraint in (29) in this case therefore is to switch [−additive] to [+additive], which changes the number from paucal to plural, without affecting the instrumental case.

The markedness constraint given in (29) does not apply in the case of (22) and (23) since there is no paucal number (i.e., [−singular, −additive]). The problem with (22) is that OBL_V assigned by *upravljati* is incompatible with the object phrase containing the numeral *pet* 'five', but due to (27) it cannot be deleted. Structures of this type are therefore always ungrammatical. OBL_p in (23), on the other hand, is also incompatible with the object phrase, but since it is assigned by an oblique case assigning preposition it can be deleted:

 (31) $OBL_P \rightarrow \varnothing /$]$_Q$___   where Q assigns gen/pl

Thus, the seemingly random facts given in (22)-(25) can be reduced to a handful of basic factors; i.e., the principles that underlie (22) and (23) essentially govern the contrast between (24) and (25) as well. The key observation, however, is that due to the nature of paucal and OBL_P the marked context in (25) can be resolved in two different ways: (i) by deleting the marked feature OBL_P, a strategy that also makes (23) grammatical in contrast to (22), or (ii) by turning the marked feature [−additive] to [+additive].

2.3   Paucal and Pronouns

The analysis presented here can also shed some light on the following contrast:

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fact that, unlike objects of oblique case assigning verbs, oblique case assigning PPs are in general optional. Thus, PP *sa dvema ženama* in (25) is optional, whereas the instrumental object of the verb *upravlja* in (24) is not.

(32) *[Dva njih]   /✓[njih   dva] su   došla.
        Two them_{GEN/PL} them_{GEN/PL} two aux_{3P/PL} arrived
        'Two of them arrived.'
(33) ✓[Pet njih]   / ✓[njih   pet] je   došlo.
        Five them_{GEN/PL} them_{GEN/PL} five aux_{3P/SG} arrived
        'Five of them arrived.'

As shown in (32), when SC pronouns combine with a paucal quantifier, they necessarily precede it. On the other hand, they may either precede or follow a non-paucal quantifier (e.g., (33)). In each case they take the genitive plural form. I propose that this is because pronouns in SC simply do not have the paucal form (or, correspondingly, they cannot have [−additive] assigned by the paucal quantifiers). This is not uncommon; Corbett (2000) observes that Bayso has the paucal number system in nouns, but not in its pronouns (Corbett 2000, 22). Since it cannot be assigned [−additive] by the paucal quantifier, the pronoun in (32) moves out of its scope, which explains the word order. This issue does not arise in (33), where both orders are ultimately possible.

3. Summary and Some Open Questions

In this last section I want to point out a few more interesting things about the paucal quantifiers in SC that deserve to be mentioned, but which due to space limitations I cannot discuss in detail.
    The SC oblique paucals behave quite exceptionally with respect to agreement. The agreeing paucal numeral *dva* expresses gender agreement on a separate morpheme in oblique cases, as shown in (34) and (35). For instance, the morpheme –*e*- in (34a) expresses feminine gender agreement, while –*ma* represents instrumental plural. This agreement pattern is very different from the standard SC *portmanteau* morphology, in which a single morpheme cumulatively expresses case, number, and gender:

(34) a. Dv - **e** - ma   žena-<u>ma</u>.   b. Dv - **a** - ma dečaci-<u>ma</u>
              | | | | | |
          [fem] [instr, pl]   [inst, pl]   **[masc]** [instr, pl] [instr, pl]
          'Two women'   'Two boys'

(35) a. Dv - **e** - <u>ju</u> žena. b. Dv - **a** - <u>ju</u> dečaka
           | | | |
      [fem] [genitive]   **[masc]** [genitive]
      'Two women'   'Two boys'

This morphological quirk may, however, explain why (25a) sounds old fashioned in comparison to (25b), and is not very productive in the modern language (this is simply not something that native speakers are used to nowadays). Since the morpheme that expresses gender agreement in (34)-(35) also expresses nominative case in nominative phrases (compare 'dv-**e**-ma ženama' to 'dv-**e** žene') a number of questions regarding the nature of case can be raised; i.e., "Is nominative featurally represented, or is it just the absence of case?", "Do (34) and (35) involve some type of case stacking?" (e.g., Pesetsky 2010, Richards 2007) etc… At this point I have to leave such questions for future research.

To summarize, I have argued in this paper that the nominal form that appears with the so-called "paucal" quantifiers in SC is indeed a special nominative form (not the genitive singular form). The form in question involves a special number (i.e., paucal) and triggers agreement just like the "regular" singular and plural nominative forms do. I have proposed a binary feature based model, in which paucal is represented by a combination of the features [−singular,−additive]. I have also discussed how the proposed analysis may improve our understanding of the interaction between numerically quantified phrases and oblique case in SC.

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