Case competition in Nanosyntax

A study of numerals in Ossetic and Russian

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Abbreviations

⁊	conjunction		GEN	genitive
#	number		IMP	imperative
1	1st person		INAN	inanimate
2	2nd person		INE	inessive
2ND	Declension II		INF	infinitive
3	3rd person		INIT	initiation
3RD	Declension III		INS	instrumental
ABL	ablative		K	case
ABS	absolutive		LOC	locative
ACC	accusative		M/MASC	masculine
ADDR	addressee		MIN	minimal
ADE	adessive		MOD	modifier
ADJ/A	adjective		N	noun
AGR	agreement		NEG	negation
ALL	allative		NEUT	neuter
ANIM	animate		NOM	nominative
AUG	augment		OBJ	object
AUX	auxiliary		OBL	oblique
CARD	cardinal (numeral)		P	phrase
CF	conceptual form		PART	participant
CL	classifier		PAST	past tense
CMPR	comparative		PF	phonological form
COM	comitative		PL	plural
COMPL/C	complementizer		POSS	possessive
D	determiner		PRES	present tense
DAT	dative		PROC	process
DECL	declension		REF	referential expression
DEF	definiteness		REFL	reflexive
DEM	demonstrative		RES	result
DIM	diminutive		SG	singular
DIR	direction		SPKR	speaker
DISTR	distributive		STD	standard
EQU	equative		SUBJ	subject
ERG	ergative		SUP	superessive
FEM/F	feminine		T	tense
			V	verb

1 Introduction

This book is about case competition: a situation where two cases meet on a single noun, and only one of them gets to surface. Grammars resolve such competition by a set of rules that decide which case wins, and which case loses. My main question is the following: what is the precise grammatical mechanism that is responsible for case competition? Do we need to postulate a special mechanism that regulates this process? Or can we reduce it to some independently needed grammatical mechanisms? The latter is of course preferred, and this book makes two specific proposals (each for a slightly different set of facts) about how such a goal can be achieved.

In order to provide some insight into this question, the book provides a detailed analysis of case competition in Ossetic and Russian (with some discussion of other languages where relevant). I will begin with Ossetic, because the particular properties of the language (and its dialects) allow us to see the underlying mechanism of case competition perhaps more clearly than other languages.

Ossetic is an Iranian (Indo-European) language with two major dialects, Iron and Digor. The particular type of construction within the language to be investigated is the numerical phrase. A set of examples is provided in (1) below.

(1)   Iron Ossetic (Abaev 1964: p.22)

   a.   dæs bon-y
        ten day-GEN.SG
        'ten days' (nominative/accusative)
   b.   dæs bon-æn
        ten day-DAT.SG
        'to ten days' (dative)
   c.   dæs bon-æj
        ten day-INS.SG
        'with ten days' (instrumental)

In (1-a), we see that when the full numerical phrase functions as a subject or object, the noun following the numeral is marked by the genitive case. This is a situation known from quite a few languages. Following a number of researchers

([Corbett 1978](#), [Corver 2001](#), [Corver & Zwarts 2006](#), [Kayne 2005](#), [Zweig 2006](#), [Ionin & Matushansky 2006](#); [2018](#), [Caha 2015](#)), I will be linking this to the nominal status of numerals: numerals (like nouns) want they complement to be in the genitive.

However, when the numerical phrase appears in the dative case (1-b) or in the instrumental cases (1-c), the genitive is lost. But the noun is not caseles, it carries the case relevant for the marking of the full phrase. And this is the phenomenon I want to understand: why is it that oblique cases replace the genitive in (1-b,c), while the nominative and the accusative don't in (1-a).

Such facts are well-known also from other languages, and they have been discussed on multiple occasions from a number of theoretical positions. For instance, a construction with very similar properties is found in Russian, as the example (2) illustrates (see [Corbett 1978](#), [Babby 1987](#), [Franks 1994](#), [Ionin & Matushansky 2006](#), [Pesetsky 2013](#), a.m.o.).

(2)   Russian, [Franks (1994](#): 600-13)

    a.   Pjať   krasivyx   devušek   prišli.
          five.NOM beautiful.GEN.PL girls.GEN.PL arrived.PL
          'Five beautiful girls arrived.' (nominative)

    b.   Ivan   kupil   pjat'   mašin.
          Ivan.NOM bought five.ACC cars.GEN.PL
          'Ivan bought five cars.' (accusative)

    c.   Ivan   vladeet pjat'ju fabrikami.
          Ivan.NOM owns   five.INS factories.INS.PL
          'Ivan owns five factories.' (instrumental)

    d.   o   pjati   knigax
          about five.LOC books.LOC.PL
          'about five books' (locative)

What we see here is that just as in Ossetic, the numeral requires the genitive on the counted noun in NOM and ACC (see (2-a) and (2-b) respectively). In the oblique cases, the GEN is lost and it is replaced by the relevant oblique case.

The proposal I want to make in this book is that these examples should be analysed in terms of case competition. This means that at an underlying level of representation, two cases are present in the numerical construction: (i) the genitive case required by the numeral and (ii) the case which marks the function of the full noun phrase. The two cases then compete for realisation, with the result that sometimes we see the case required by the numeral, and sometimes the case that marks the role of the whole noun phrase.

This proposal immediately raises two questions. The first question is how we

can be sure that there are two cases involved here. Why can it not be the case that only a single case is present in constructions such as (1) and (2)?[1]

The second question is the following: assuming that two cases are involved, what determines which case is realised?

The second question only makes sense once we are certain that two cases are actually involved. I therefore start with the first issue, especially because it turns out that Ossetic provides two interesting pieces of evidence (unnoticed so far) for the presence of multiple cases. Both pieces of evidence revolve around the fact that Ossetic is an agglutinative language, which is quite a rare property among the languages that have a numerical construction like the one in (2). This is why looking at Ossetic numerical phrases can give us unique insights.

1.1 Two arguments for two cases

The first piece of evidence for multiple cases comes from a construction referred to as suspended affixation. To see how suspended affixation works in Ossetic, consider the data in (3).

(3)   Iron Ossetic (Erschler 2012: 165)

    a.   bæx-t-imæ   æmæ gæl-t-imæ
            horse-PL-COM and   ox-PL-COM

    b.   bæx-tæ æmæ gæl-t-imæ
            horse-PL and   ox-PL-COM
            'with horses and oxen'

What we see in (3-a) is an ordinary coordination of two phrases, each marked by a plural marker and a case marker. Suspended affixation is then illustrated in (3-b). It is a type of a coordination where the comitative case marker is located only on the second conjunct, with no change in interpretation. The first conjunct simply bears no case marker in such cases.

Let me now turn to the issue of how suspended affixation plays out with numerical phrases. The relevant data is presented in (4).

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[1]The idea that there is only one case can ultimately be linked to the idea that NPs need case for licensing, and that they therefore only need one such case (Chomsky 1981 et seq.). This is maintained in a number of existing analyses, see, in particular Babby (1987), Franks (1994) or Norris (2018). There are also analyses based on the idea that multiple cases can be assigned, see, e.g., Brattico (2011), Pesetsky (2013).

(4)   Iron Ossetic (Erschler 2018: 25)

      a.   ærtæ læppu-jyl æmæ čyzg-yl
           three boy-ADE and girl-ADE
           'three boys and a girl' (adessive)

      b.   ærtæ læppu-jy æmæ čyzg-yl
           three boy-GEN and girl-ADE
           three boys and a girl' (adessive)

(4-a) is an ordinary coordination with the adessive case marker present on each conjunct. (4-b) is the suspended affixation construction, where the addessive case marker is present only on the second conjunct. Importantly, when this happens, the noun following the numeral in the first conjunct surfaces in the genitive. This shows that when the adessive marker is removed from the counted noun (though it still scopes over the whole coordination), the genitive resurfaces, and we see both case markers simultaneously.

Under the idea that only one case is assigned in numerical constructions, the appearance of the genitive on the first conjunct is surprising. If the adessive in (4-a) was the only case that the noun in the first conjunct has, we would expect that under suspended affixation, a bare noun will emerge. On the other hand, an account where the numeral always marks the counted noun by the genitive can easily account for this. It is enough to make sure that the genitive is eliminated only when immediately followed by another case marker. When it is not immediately before another case marker, it remains in place.[2]

An analogous argument comes coordinations where each conjunct corresponds to a numerical phrase. An example is in (5).

(5)   Iron Ossetic (Belyaev 2014: 40)

      a.   fondz tuman-y   æmæ æxsæz som-imæ
           five   chervonets-GEN and six   ruble-COM
           'with five chervontsy and six rubles' (comitative)

      b.   *fondz tuman   æmæ æxsæz som-imæ
           five   chervonets and six   ruble-COM
           'with five chervontsy and six rubles' (comitative)

In (5-a), what is conjoined are the phrases 'five chervontsy' and 'six rubles.' The comitative case marker is found only after the second conjunct, so this is yet another instance of suspended affixation. Starting from the first conjunct, we can

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[2]I will later argue that linearity is not the right notion, and that the relevant notion is c-command.

see that the genitive marker – required by the numeral on the counted noun – must be present here. This is what the contrast between (5-a,b) shows: in (5-b), the genitive marker is absent in the first conjunct, and the phrase is unacceptable.[3]

However, this is old news. The genitive marking inside the first conjunct is something that we already saw in (4). The new aspect of (5) is that the genitive in the first conjunct contrasts with the lack of one in the second conjunct (also after a numeral). Why should there be such a strange asymmetry between the conjuncts? Why are the conjuncts not parallel? And why is the example where parallelism actually obtains (namely (5-b)) degraded?

These issues disappear under the analysis where numerals *always* require the following noun to be in the genitive. Under this analysis, the genitive is actually present in both conjuncts (at an underlying level), but it is eliminated in the second conjunct due to case competition with the comitative. In sum, the suspended affixation construction provides us with reasons to think that the numeral always requires the genitive on the counted noun, and that in examples where we do not see it, this is because it has been eliminated by the oblique case suffix.

The second observation that supports an account along these lines pertains to the allomorphy of case. Consider first the fact (demonstrated in Table 1.1) that in the Digor variety of Ossetic, numerals and nouns have each their own declension (i.e., they each take different endings). For example, the noun has the ending *-i* in the locative, and the numeral has the ending *-emi*. The inflection shown in Table 1.1 is as found on nouns and numerals when they are used in isolation (i.e., the numeral without a noun, and the noun without the numeral).

Table 1.1: Numerals in Digor compared to nouns (Erschler 2018)

	two	horse
NOM	duuæ-Ø	bæx-Ø
ACC	duuæ-Ø	bæx-i
GEN	duu-ej	bæx-i
LOC (INE)	duu-emi	bæx-i
DAT	duu-emæn	bæx-æn
INS (ABL)	duu-emæj	bæx-æj
ADE	duu-ebæl	bæx-bæl
ALL	duu-emæ	bæx-mæ

---

[3]Other authors find that such examples are degraded, but not fully ungrammatical, an issue I shall return to in Ch. 2.

Crucially, when the numeral and the noun combine together, only the noun inflects and the numeral remains invariant. (This is another feature typical for agglutinative languages.) When we now look at the cases found on the noun, we realise that the paradigm shows a split. The regular nominal inflection is present only in NOM and ACC, but it disappears in the oblique cases. In these cases, the noun is followed by the case marker which is characteristic for numerals, as Table 1.2 makes clear. The endings characteristic for the numeral are in bold.

Table 1.2: Digor Ossetic numerical phrases (Erschler 2018)

	two horses (Digor)
NOM	duuæ bæx-i
ACC	duuæ bæx-i
GEN	duuæ bæx-**ej**
LOC (INE)	duuæ bæx-**emi**
DAT	duuæ bæx-**emæn**
INS (ABL)	duuæ bæx-**emæj**
ADE	duuæ bæx-**ebæl**
ALL	duuæ bæx-**emæ**

This behaviour provides evidence for the claim that in the boldfaced examples, the nominal case is eliminated, and it is replaced by the case belonging to the whole phrase (of which the numeral is the head). It seems difficult to explain this behaviour by saying that the noun is simply assigned the relevant oblique in these contexts: if that was so, we would have expected the regular nominal inflection then. In sum, Ossetic shows convincing evidence for the claim that two cases are present, and that in the oblique cases, the genitive assigned by the numeral is eliminated (unless suspended affixation interferes). The phrasal case (indicating the role of the full NP in the sentence) survives.

Let me now turn to the second question: assuming that two cases are present in the underlying structure, what determines the outcome of the competition?

1.2 Case strength

As highlighted above, I use the term case competition as a cover term for phenomena where two cases compete for realisation on a particular noun (or noun phrase), and only one of them gets to show up. What is important for us is that

when two cases α and β compete for realisation, the result is not random; given a particular environment, one of them will always win, and the other will always lose (as a function of that environment and the value of α and β). As a consequence, somewhere in the grammar, there will have to be a mechanism (or a simple statement) that determines whether α or β wins in a given environment. Suppose, for instance, that α wins over β, or, in other words, that α is realised, and β eliminated. In such cases, I will be saying that α is stronger than β, and use the mathematical 'bigger than' sign > to indicate this; in our case $\alpha > \beta$.

Consider now again the Russian numerical construction, repeated from (2).

(6)   Russian, Franks (1994: 600-13)

    a.   Pjať   krasivyx   devušek   prišli.
        five.NOM beautiful.GEN.PL girls.GEN.PL arrived.PL
        'Five beautiful girls arrived.' (nominative)

    b.   Ivan   kupil pjat'   mašin.
        Ivan.NOM bought five.ACC cars.GEN.PL
        'Ivan bought five cars.' (accusative)

    c.   Ivan   vladeet pjat'ju fabrikami.
        Ivan.NOM owns   five.INS factories.INS.PL
        'Ivan owns five factories.' (instrumental)

    d.   o   pjati   knigax
        about five.LOC books.LOC.PL
        'about five books' (locative)

What we see is that in the nominative and accusative, the genitive on the noun is unaffected. In the oblique cases (locative, dative and instrumental), the genitive is eliminated and the oblique is preserved. This can be stated using the scale of strength as in (7). For cases in curly brackets, their mutual strength cannot be determined on the basis of the data in (6).

(7)   The scale of case strength in Russian
    {NOM, ACC} < GEN < {LOC, DAT, INS}

My goal in this book will be to understand the nature of this scale. I will start in this task by noting that if case competition exists within grammars, as the facts seem to indicate, it would be strange if its use was restricted to a small niche of numerical constructions. That would be similar to a situation where grammars have recourse to syntactic movement, but use it only for the purpose of a single construction, e.g., for relative-clause formation. Even if this turned out to be true,

it should not be the null assumption; we expect that if grammar uses a particular device, this device is not construction specific.

With this idea in mind, let me look at Russian syntax more broadly and see what kinds of constructions there are that show some signs of case competition. Once we adopt this perspective, we find at least two more constructions which have been (implicitly or explicitly) described in terms of case competition. In both cases, the scale strength in (7) seems to be implicated.

The first phenomenon is the so-called genitive of negation. As Richards (2013: 42) (building on previous literature) points out, the "[g]enitive of negation replaces structural Case morphology (nominative and accusative) […], although it cannot affect DPs with inherent Cases (such as instrumental)." He illustrates his claim with the pair of sentences in (8).

(8) Russian, Richards (2013: 43)

    a.   Anna pišet pis'mo ručkoj.
         Anna writes letter.ACC pen.INS
         'Anna is writing a letter with a pen.'

    b.   Anna ne pišet pis'ma ručkoj.
         'Anna not writes letter.GEN pen.INS
         'Anna isn't writing a letter with a pen.'

The first relevant fact is that the accusative noun seen in (8-a) turns to genitive under negation in (8-b). The second relevant fact is that the noun marked instrumental in (8-a) cannot change to the genitive in (8-b) (the sentence would be ungrammatical).

In an overview article on the topic, Harves (2013) points out that the replacement of accusative morphology by the genitive of negation is not linked to objecthood specifically, since measure phrases, which carry the accusative in an affirmative sentence, may be also marked by the genitive of negation, as shown in (9).

(9) Russian, Harves (2013: 648)

    a.   Ivan spal odnu minutu.
         Ivan.NOM slept one minute.ACC
         'Ivan slept for one minute.'

    b.   Ivan ne spal ni odnoj minuty
         Ivan.NOM NEG slept not one minute.GEN
         'Ivan didn't sleep a single minute.'

Finally, the fact that the genitive of negation may also replace the nominative case is illustrated in (10).

(10) Russian, Harves 2013: 650

    a.   Odin stakan   upal so   stola.
           one   glass.NOM fell   from table
           'One glass fell off the table.'

    b.   So   stola ne upalo ni odnogo stakana
           from table NEG fell   not one   glass.GEN
           'Not a single glass fell off the table.'

If we decided to analyse these facts in terms of case competition (as Richards 2013 suggests, albeit in a different format), the account (following the idea of differing case strength) would look as follows. (i) All DPs are marked by the case they would be marked with in the corresponding affirmative sentence. (ii) In addition, each relevant DP is also marked by the genitive of negation. (iii) Case mismatches are resolved by reference to a scale of case strength like the one in (11).[4]

(11) The scale of case strength in Russian
     {NOM, ACC} < GEN < {LOC, DAT, INS}

Another construction that could be analysed in a similar way is the nominalisation. As has been noted by Chvany (1982: 140), the following rules apply for case realisation in this domain: "[i]n tenseless nominalizations, where the direct cases [NOM, ACC] are unavailable, subject and object relations are neutralized in the genitive […] form. Traditionally known as the subjective and objective genitives they are respectively illustrated in Чтение студенток [(12-a)] and Чтение Пановой [(12-b). T]he latter is situationally interpretable as objective but linguistically ambiguous between two readings - Читает Панова [(12-c)] and Читают Панову [(12-d)]."

(12) Russian

    a.   čtenie   studentok
           reading students.GEN
           'the students' reading' (= the students are reading)

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[4]It is irrelevant for the logic that only a subset of subjects (notably in unaccusative, passive and possessive clauses) turn genitive, since the relevant contrast is that NOM and ACC *can* become GEN, the other cases *cannot*. Therefore, more needs to be said about which argument and under what circumstances bears the genitive of negation (in addition to the case appropriate for its role in the sentence). Once this is decided, attraction applies blindly.

b. čtenie   Panovoj
    reading Panova.GEN
    'Panova's reading' (= Panova is being read)[5]

c. Čitaet Panova.
    reads Panova.NOM
    'Panova is reading'

d. Čitajut   Panovu.
    read.3PL Panova.ACC
    'They are reading Panova.'

What is interesting for us is that no such 'neutralisation of case distinctions' targets any other case. For instance, a dative found with a verb (see (13-a)) remains a dative in the nominalisation (13-b):

(13)   Russian (Zimmermann 2002: 280)

a. izmenit'   žen-e
    betray.INF wife-DAT
    'to betray the wife'

b. izmena žen-e
    betrayal wife-DAT
    'the betrayal of the wife'

Once again, it is possible to understand this in a way that when VPs are nominalised, their arguments are marked by the genitive case in addition to any other case they may have inherited from the VP. When the genitive case competes for realisation with the other cases, it will only be realised if it is stronger than the cases it competes with. Given what we have seen up to now, we expect that the genitive will only be able to outcompete the nominative and the accusative, in accordance with the strength scale in (14) (repeated from (11)).[6]

(14)   The scale of case strength in Russian
       {NOM, ACC} < GEN < {LOC, DAT, INS}

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[5]Vera Fyodorovna Panova was a Russian (Soviet) writer, so this leads naturally onto the interpretation 'Panova being read.' However, as Chvany points out, the phrase is really ambiguous.

[6]It is curious to note that this analysis echoes Benveniste (1962), which I will paraphrase here using a quote from Fillmore (1968): "[Benveniste] proposes that the so-called proper genitive basically results from the process of converting a sentence into a nominal. The distinction of meaning between 'genitivus subjectivus' and 'genitivus objectivus' constructions merely reflects the difference between situations in which the genitive noun is an original subject and those where it is an original object, the genitive representing a kind of neutralization of the nominative/accusative distinction found in the underlying sentences."

To sum up, it seems that the Russian grammar (at least potentially) contains a number of constructions where one and the same strength scale is implicated. In the next section, I set out to explore a correlation between the scale in (14) and the morphology of case in Russian, syncretism in particular.

1.3 Syncretism

Syncretism is a phenomenon where two distinct cases are marked the same. Consider, for instance, the nominative form of the noun phrase *éta gorá* 'this mountain' seen in (15-a), and compare it to the genitive *étoj gorý* in (15-b). What we see here is that both the demonstrative and the noun differ between the nominative and the genitive, each reflecting the case of the whole phrase. This state of affairs is traditionally described as case concord: the demonstrative and the noun agree in case, and their morphological shape reflects the particular case which the form has.

(15)   Russian (Timberlake 2004: 118,142)

  a. éta gorá
    this.NOM mounatin.NOM

  b. étoj gorý
    this.GEN mountain.GEN

  c. étoj goré
    this.LOC mounatin.LOC

Against this background, consider now the locative *étoj goré* in (15-c). What we see here is that the shape of the noun (*goré*) is different from (15-a,b), but the demonstrative is exactly the same as in the genitive. However, linguists usually do not think that the locative noun is modified by a genitive demonstrative. Rather, the demonstrative in (15-c) has traditionally been analysed as bearing the locative case just like the noun, and the only special thing in (15-c) is that the locative demonstrative is syncretic with the genitive. "Be syncretic with X" thus means "have the same form as X, but different grammatical features."

 The study of syncretism has revealed that syncretism in Russian exhibits interesting restrictions. Specifically, as pointed out by McCreight & Chvany (1991), case syncretism in Russian is restricted by a linear sequence. This means that if one orders the Russian cases in a linear sequence, then only contiguous regions are ever syncretic. In Russian, the sequence is NOM—ACC—GEN—LOC—DAT—INS. A couple of paradigms illustrating this fact is provided in Table 1.3.

Table 1.3: Syncretism in Russian

	window, SG.	teacher, PL.	both, M.IN.	book, SG.	this, FEM.SG
NOM	okn-o	učitel-ja	dv-a	knig-a	ét-o
ACC	okn-o	učitel-ej	dv-a	knig-u	ét-o
GEN	okn-a	učitel-ej	dv-ux	knig-y	ét-oj
LOC	okn-e	učitel-jax	dv-ux	knig-e	ét-oj
DAT	okn-u	učitel-am	dv-um	knig-e	ét-oj
INS	okn-om	učitel-ami	dv-umja	knig-oj	ét-oj

The cases in the table are ordered top-down in the sequence proposed by McCreight & Chvany (1991). Moving now from left to the right, we find pairs of syncretic cases that uniquely motivate this ordering. For instance, in the first column (just like in the neuter gender in general), NOM—ACC are syncretic to the exclusion of other cases, and hence, they must be next to each other. For masculine animates (illustrated in the second column), the ACC is always the same as GEN, and hence, GEN must come after NOM—ACC. Noun modifiers (adjectives, numerals, demonstratives) always exhibit GEN—LOC syncretism in the plural (here illustrated by the numeral 'two'), and hence, NOM—ACC—GEN must be followed by LOC. The logic then unfolds in an analogous fashion throughout the paradigm, with the result that the only ordering that accommodates all the syncretisms in the table above is exactly the one proposed by McCreight & Chvany (1991).

Interestingly, looking at the last column, we see that some cases that are non-adjacent (like GEN and DAT) may in fact be syncretic; this particular syncretism is found in the paradigm of 'this' in the FEM.SG. However, when this is the case, then all the linearly intervening cases (LOC) must be the same as the two non-adjacent cases. This shows that the restriction on syncretism cannot be understood in a way that non-adjacent cases cannot be syncretic. Rather, the restriction is such that there may be no syncretism that skips across a cell in a particular order. Bobaljik (2012) has devised a rather fitting name for such a restriction, calling it for a *ABA constraint. (Here the asterisk means 'unattested' and ABA is an abstract pattern where a distinct B intervenes between two identical As.) For clarity, I bring out the syncretism sequence as a separate numbered point below:

(16)   The syncretism sequence
         NOM—ACC—GEN—LOC—DAT—INS

The obvious point to make here is that the syncretism scale and the strength scale are one and the same scale. To show that clearly, I repeat the strength scale below in (17).

(17)   The scale of case strength in Russian
        {NOM, ACC} < GEN < {LOC, DAT, INS}

The relationship between the scales is the following: cases that are more to the left on the syncretism scale never outcompete those to their right. Case more to the right can outcompete cases on their left. The goal of this book is to take this correlation at face value and explain why it holds.

Before I get to the explanation, I want to establish the correlation between strength and syncretism more firmly. This is what I shall do over the next two sections.

1.4 On Icelandic and Classical Armenian

In this section, I turn to some cross-linguistic differences in the syncretism scale of individual languages. I argue that these differences correlate with differences in case competition. Such a correlation supports the claim that case strength and syncretism are two different reflections of a single underlying scale.

Let me start by the discussion of Classical Armenian. In this language, syncretism only occupies contiguous regions in the following sequence (Caha 2013):

(18)   *Syncretism sequence (Armenian):*
        NOM − ACC − LOC − GEN/DAT − ABL − INS

What is remarkable is the position of the locative to the left of the genitive (in Russian, the locative is to the right of the genitive). To see why this has to be so, consider the paradigms in the table 1.4. The table is organized in such a way that the cases are ordered top-down according to the sequence given in (18), i.e., NOM–ACC–LOC and so on. The shaded cells show pair-wise syncretisms of adjacent cases, and move gradually one notch down as we go in the table from left to right. In the nominal declension, Armenian makes no difference between GEN and DAT, and I thus conflate them into a single case.

Table 1.4: Case syncretism in Classical Armenian (Caha 2013)

	word (SG.)	nation (PL.)	nation (SG.)	river (PL.)
NOM	bay-ø	azg-kʻ	azg-ø	get-kʻ
ACC	bay-ø	azg-s	azg-ø	get-s
LOC	bay-i	azg-s	azg-i	get-s
GEN/DAT	bay-i	azg-acʻ	azg-i	get-ocʻ
ABL	bay-ê	azg-acʻ	azg-ê	get-ocʻ
INS	bay-iw	azg-awkʻ	azg-aw	get-owkʻ

The linear order is then established as follows. In the singular of the noun 'word,' NOM and ACC show syncretism to the exclusion of all other cases. From the perspective of linear ordering, this means that they must be neighbors in the linear order relevant for syncretism: NOM–ACC. ACC and LOC are the same in the plural, see the shading in the plural of 'nation.' This leads to NOM–ACC–LOC. LOC in turn must be adjacent to GEN/DAT on the basis of the syncretism in the singular of 'nation': NOM–ACC–LOC–GEN/DAT. ABL comes after these two cases, due to the syncretism in the plural (see 'river'). This leads to the ordering NOM–ACC–LOC–GEN/DAT–ABL. INS shows no syncretisms in Classical Armenian; it then comes either last or first. (It cannot come in the middle, because then it would disturb the needed adjacency between other cases.) I place it last.

Consider now the behaviour of case in a construction very similar to the Ossetic/Russian numerical construction, traditionally labelled as 'case attraction' (Plank 1995: 43, Blake 2001). To see what the construction looks like, consider the data in (19). In (19-a), we see that in Classical Armenian, the complement of a noun is 'normally' expressed by the GEN. However, if the head is in the ABL, the dependent GEN can be 'attracted.' Attraction consists in replacing GEN by the case which is carried by the head noun, see (19-b).

(19)   Classical Armenian (Plank 1995: 20)

     a.   i   knoǰ-ê   tʼagawor-i-n
           by wife-ABL king-GEN.SG-DEF

     b.   i   knoǰ-ê   tʼagawor-**ê**-n
           by wife-ABL king-ABL.SG-DEF
           both: 'by the wife of the king'

The same can happen when the head noun is in the instrumental, see (20).

(20)   Classical Armenian (Plank 1995: 43)

> [bazmutʻ-eamb [zawr-**awk**ʻ-n   Hay-ocʻ   ]]
>   crowd-INS.SG   force-INS.PL-DEF Armenian-GEN.PL
> 'with a crowd of the Armenian forces'

In (20), the head noun 'crowd' bears INS. The head has a complement, 'of the Armenian forces.' The head of the complement, 'forces,' would 'normally' occur in GEN. However, as a result of attraction, it bears INS (see the boldfaced affix).

Crucially, if the head noun is in any other case than INS or ABL, attraction is unattested (Plank 1995: 56). As Caha (2013) states it, it is then the case that "in the syncretism sequence in (18), cases to the right of GEN have the power to attract it, cases to its left cannot." This is remarkable because of the position of the locative case. In Russian, the locative is to the right of the genitive, and it can replace the genitive in the numerical construction. In Classical Armenian, the locative must be to the left of the genitive when it comes to syncretism, and – correlating with this – the locative also fails to replace the genitive in the case-attraction construction. The existence of such a correlation provides the strongest possible evidence for the relationship between case strength and syncretism.

As another example of such a correlation consider Icelandic. As Harðarson (2016) points out, Icelandic provides evidence for the conclusion that its syncretism scale has the dative ordered to the left of the genitive (cf. Starke 2017, Caha 2018):

(21)   *Syncretism sequence (Icelandic)*:
       NOM − ACC − DAT − GEN

The table 1.5 shows that when the order is as in (21), syncretism respects the *ABA:

Table 1.5: Syncretism in Icelandic (Harðarson 2016)

	'arm'	'land'	'queen'	'tongue'
NOM	arm-ur	land-Ø	drottning-Ø	tung-a
ACC	arm-Ø	land-Ø	drottning-u	tung-u
DAT	arm-i	land-i	drottning-u	tung-u
GEN	arm-s	land-s	drottning-ar	tung-u

Correlating with this is the observation (going back at least to Maling 2001),

that when a verb takes a dative argument in Icelandic (22-a), this argument turns genitive in nominalisation (22-b).

(22)   Icelandic (Harðarson 2016)

   a.   Astrid bjargadi skinkunni.
         Astrid rescued ham.DEF.DAT
         'Astrid rescued the ham.'
   b.   björgun skinkunnar
         rescue   ham.DEF.GEN
         'the rescue of the ham'

This is interesting, because in Russian, this is not so (recall (13)): the genitive could not replace the dative in nominalisations. This correlates with the fact that the genitive in Russian occupies a different place on the syncretism scale, which predestines it to be 'weaker' than the dative. In Icelandic, the genitive is ordered to the right of the genitive on the syncretism scale, which correlates with the fact that it can replace it in nominalisations.

In sum, it seems that as the syncretism scale varies from language to language, the strength scale that regulates case competition follows suit. This provides evidence for the hypothesis that both of these different scales should be ultimately derived from a single underlying scale.

1.5 Relative clauses

Another argument for the correlation between syncretism scale and the strength scale can be provided by free relative clauses. The free-relative construction is widely recognised as the prime example of case competition, and there is a lot of literature on the topic (see Harbert 1978, Harbert 1982, Pittner 1995, Vogel 2001, Grosu 2003, Bergsma 2019 among many others).

Free relatives are constructions where the relative clause has no external head, and we only see the relative pronoun, as in *He ate **what** I cooked*. In such free relatives, the relative pronoun (boldfaced) must (as the evidence suggests) simultaneously satisfy the case requirements of the verb inside the relative clause (*cooked*) and also of the verb in the matrix clause (*ate*). In this particular example, the cases are the same, and there is no conflict. However, in some cases (when the embedded verb requires a different case than the matrix verb), a case conflict arises.

In a number of languages, such case conflicts are resolved by overtly realis-

ing only one of the cases on the relative pronoun. As to which case gets to win, Pittner (1995: 200-1) summarises the facts as follows: "In each Case conflict, it is always one of the oblique Cases, that is, the genitive or dative, which is assigned, whereas the nominative or the accusative is left out." This would lead to a statement such as the one in (23), where each member of the set on the right (i.e., GEN and DAT) is stronger than each member of the set on the left (NOM and ACC).

(23)   The strength sequence
       {NOM, ACC} < {GEN, DAT}

Moreover, Pittner further notes that "not only can dative or genitive occur instead of nominative or accusative, but accusative can also occur instead of nominative," refining the 'strength' hierarchy even further to the one in (24):

(24)   The strength sequence
       NOM < ACC < {GEN, DAT}

To provide one example of how the strength scale operates, consider the Gothic example in (25):

(25)   [þaim   -ei   iupa sind] fraþjaiþ
       which.DAT COMPL above are   think on
       'Set your mind on (those) which are above' (Gothic, Harbert 1978)

In this example, I have enclosed in brackets the relevant relative clause. Inside the relative clause, we have the relative pronoun *þaim*, which corresponds to the subject of the verb inside the relative clause, namely *sind* 'are.' Based on this, we would expect the relative pronoun to be marked nominative, because this is the case that a subject would normally have. However, the relative pronoun is marked dative. The reason for this is that the whole relative clause (in brackets) is an object of the verb *fraþjaiþ* 'think on,' which requires the dative case on its complement. The relative pronoun, as a head of the relative, is thus marked dative under the influence of the matrix verb, its expected nominative lost with no trace left.

At the same time, it is not the case that the relative pronoun always carries the case required by the matrix verb. To see that, consider the relative clause in (26). Here the relative pronoun originates as the internal argument of the passive participle 'be forgiven' (something is forgiven *to someone*). The expected case of this internal argument is dative, and this is actually the case that the relative pronoun has:

(26) iþ [**þamm** -ei   leitil fraletada] leitil frijod
      but which.DAT COMPL little is-forgiven little loves
      'But (he) to whom little is forgiven loves little' (Gothic, Harbert 1978)

What is remarkable in comparison with (25) is that the case required by the matrix predicate 'love little' (which would be nominative) is not reflected on the relative pronoun (or the relative clause) at all. So again, the nominative is lost with no trace, and the dative prevails.

Obviously, then, in order to know what case the relative pronoun will have, we must consider both of the two relevant cases: the one required by the verb inside the relative clause, and then the one required by the matrix verb. The case which will ultimately appear on the pronoun is then determined by comparing the two cases in terms of 'strength:' the case which is stronger on some scale is realised, the other case eliminated.

The next observation to be made is that the sequence (24) basically reduces to the order NOM–ACC–OBLIQUE, which is a syncretism scale that 'everybody' who has ever looked at syncretism agrees with (Baerman et al. 2005, Caha 2009, Zompì 2017, McFadden 2018, Smith et al. 2019).

The main hypothesis that this book revolves around is therefore that within each language, there is a perfect match between the syncretism scale and the strength scale. Or put differently, they are one scale.

1.6 Case decomposition

Given this hypothesis, the main goal of this book is to reduce both the syncretism scale and the strength scale to a single underlying trigger. Specifically, I propose that the underlying cause of both hierarchies is the fact that cases are not atomic entities; they decompose into features. My goal is then to show that we can derive both the syncretism scale and the strength scale from what the features are, how they are assembled together, and how they interact with regular syntactic operations like Merge, move, ellipsis, spellout and the like. The system that I will move towards thus ultimately tries to reduce everything to the underlying case features plus standard syntactic operations. The hope is to show that this type of system leads to an insightful analyses of various phenomena where case competition arises.

Given the centrality of case features to this enterprise, I will now sketch here a particular understanding of the syncretism sequence in terms of a specific feature decomposition. In particular, following in part my previous work (Caha 2009;

2013, c.f., Starke 2009; 2017, Bobaljik 2012, Harðarson 2016, McFadden 2018, Van Baal & Don 2018, Smith et al. 2018, Zompì 2019), I propose that we can derive the linear contiguity constraint if we decompose case into privative features. The specific type of decomposition that allows us to do this is such that the number of case features monotonically grows as we move on the syncretism sequence left to right. The table (27) highlights this on the example of the Russian syncretism sequence (16), which is reflected in the table by the top-down order of cases. In this sequence, the number of features grows so that ACC has all the features as NOM plus one more, GEN has all the features of ACC and one more, and so on. The features are labelled in an abstract fashion, since their precise content (meaning) is not immediately relevant. Such a type of decomposition has sometimes been called cumulative and I will be using this term henceforth.

Table 1.6: Cumulative feature decomposition

CASE	FEATURES
NOM	F1
ACC	F1, F2
GEN	F1, F2, F3
LOC	F1, F2, F3, F4
DAT	F1, F2, F3, F4, F5
INS	F1, F2, F3, F4, F5, F6

The pronunciation of case features happens by means of realisation rules, which link particular sets of features to pronunciation. These rules are the lexical items of the language. In Nanosyntax (the framework I shall be using in this study), lexical items apply to feature sets not based on identity, but on the basis of a containment relation. This is similar to other late insertion frameworks (e.g., Distributed Morphology, Halle & Marantz 1993). Specifically for Nanosyntax, a lexical item may apply to (and hence pronounce) any case whose features it contains. This means that an entry like the one in (27) can apply in the genitive, accusative and in the nominative, because these are the three cases the that are contained inside the feature specification of the lexical entry (see Table 1.6).

(27) $\beta \Longleftrightarrow$ [F1, F2, F3]

The consequence of such an approach to matching is syncretism: lexical entries are not restricted to one particular feature set, but may, in fact, spell out multiple

cases. The precise set of cases to be spelled out by the lexical entry is determined by the insertion principle described above, and further restricted by competition among lexical items. This type of competition arises when multiple entries can be inserted in a given case (based on their specification). The winner is then determined by the so-called Elsewhere Condition (Kiparsky 1973) with the result that the best fit wins. This latter type of competition will be called here Item Competition, to stress the fact that it is a completely different type of competition than the one which is resolved on the basis of case strength.

To see what item competition looks like, consider the lexical items in (28). The lexical entry (28-a) applies only in the nominative, and in this case, it competes with β (which, recall, applies in GEN, ACC, NOM). In the competition for pronouncing NOM, α is more specific and wins. As a result, the rules in (28) lead to the insertion of α in NOM, and β in GEN and ACC.

(28)   a. $\alpha \Longleftrightarrow [\text{F1}]$
          b. $\beta \Longleftrightarrow [\text{F1, F2, F3}]$

A system with these properties is able to deliver the linear contiguity constraint as a theorem. Informally, we can understand this in the following terms. Suppose that NOM is spelled out as α and ACC as β. This means that β is a better fit for the ACC structure than α. This may (in principle) have various reasons, in the previous example (28), this was due to the fact that α was simply inapplicable in ACC. Crucially, if β is a better fit in ACC than α (which appears in NOM), α will never be a better fit for GEN than β, because GEN is more similar to ACC than to NOM. Therefore, NOM and GEN can never be syncretic to the exclusion of ACC.

As a result, cumulative decomposition represents the central component of the theory out of which the syncretism scale can be derived. The next question then becomes how to derive the strength scale from the same type of decomposition: how to make sure that the syncretism scale and the strength scale are one? As the first step, let me point out that once cases are decomposed in the fashion just described, the strength scale can be related to the syncretism scale by the following observation:

(29)   *The strength-syncretism correlation*
        When two cases compete, the one which has more features is always realised. The case whose features are all contained in the other case may be eliminated.

What (29) says is that when two cases meet on a noun, the larger case survives and the smaller case is eliminated. The crucial point is that if case competition

works as in (29), there is no way for case α to be ordered *after* β in a syncretism sequence, but *before* β in a strength sequence. That would lead to a contradiction since α would have to have both more and fewer features than β (more because of syncretism, fewer because of competition).

1.7 The road map

This book argues that (29) is not a primitive principle of the grammar, but something that can be derived from its more elementary mechanisms. In particular, I would like to investigate two independently needed grammatical mechanisms such that each of them has the property of being able to deliver the correlation in (29).

The first operation I am going to investigate as the culprit for eliminating 'the weaker case' is ellipsis under c-command and identity. I dedicate Part I of this book to this idea while investigating the empirical details of the Ossetic numerical construction. The reason why I chose to investigate this possibility is because ellipsis seems to have the right general outlook to execute competition: as a definitional property, it is an operation that deletes things, and we can thus use it to get rid of one of the cases that are in competition without stretching it a bit. Further, ellipsis must be recoverable, and therefore, it only applies when the elided object finds an antecedent that allows for the elided information to be recovered. This helps us explain why a case may only be deleted by a 'bigger' competitor: a 'bigger' case can be used to recover the content of the smaller case, but never the other way round. In the numerical construction, for instance, the genitive required by the numeral is deleted only in the context of a case larger than the genitive (or a case equal to it, as we shall see later on).

From a theoretical perspective, this type of approach to case competition can be characterised as a 'representational' approach: what is crucial for the deletion of the inner case is the representation of case. This type of approach contrasts with the traditional way of looking at this issue, that can be broadly described as 'derivational,' because it relies on the timing of operations. For instance, for Babby (1987), oblique cases were assigned at deep structure, and therefore took precedence on nouns over the genitive. The genitive was assigned later at surface structure and could not, therefore, override the obliques (which had already been assigned). A rather similar approach has recently been proposed by Norris (2018), though his idea is couched within the 'assignment hierarchy' of postsyntactic case-asignment theories in the spirit of Marantz (1991), McFadden (2004). In these theories, competition between cases is a matter of timing: the case which comes

first wins.

In Pesetsky (2013), a derivational approach closer to the one proposed here is explored. Contrary to the classical approaches (where only the 'early' case is ever assigned), Pesetsky's idea is that multiple cases can be assigned to the noun in the course of the derivation. His basic idea is that cases which are assigned later override those that are assigned earlier, though a number of independent factors may interfere with this basic preference.

My approach is yet different. Like Pesetsky (2013), I assume that two cases are assigned and that they compete. However, the competition is not resolved by timing, but by looking at the features of the cases, i.e., at their representation. The main interest of such a representational approach is that once the resolution of competition is linked to case features, it is immediately linked also to case morphology (which expresses those features). The reason why I adopt this approach is because it allows us to straightforwardly capture the correlation between case strength and case syncretism (which is unexpected on a derivational approach).

In fact, once we look at things this way, it would be difficult to *exclude* a scenario along these lines, as that would equal to somehow prohibiting grammars from using ellipsis. This is a position where one wants to be: we start from a phenomenon that seems marginal, murky and unexpected, and end up in a world where with fairly minimal assumptions about case features, a grammar *without* this phenomenon would be difficult to explain. So in this book, I will start from the claim that case competition is nothing else but an expected consequence of case decomposition plus the fact that the grammar allows for ellipsis.

Despite the initial plausibility of this account, the devil is always in the details. To make sure that the details add up, one has to get technical, and that is what I will do in Part II. My goal in this middle portion of the book will be to step back from the initial proposal and develop a detailed theory of spellout that will allow us to see that in some cases, ellipsis is not sufficient to derive all the facts that accompany case competition.

In Part III, I will, therefore, argue for a different account of case competition that relies on a specific implementation of the spellout procedure developed in Part II. In plain terms, I am going to propose that in some languages, lexical entries may in fact allow for both competing cases to be spelled out jointly in a single (portmanteau) morpheme, and that the elimination of the weaker case is in fact a result of it being swallowed by the entry of the larger case. The details of this proposal will become accessible only when the spellout technology is in place.

Part I

The ellipsis account

2 Introducing Ossetic

In this chapter, I start exploring the details of a theory that reduces case competition to ellipsis. To have a concrete example to work with, I will start by discussing numerical phrases in Ossetic.

Ossetic is an Iranian (which entails Indo-European) language spoken in the Republic of North Ossetia-Alania (Russian Federation) and the South Ossetic Region in Georgia (Abaev 1964, Isaev 1966, Thordarson 1989, Job & Schäfer 2006, Belyaev 2010, Erschler 2012; 2018; to appear(b)).[1] It has two major dialects, Iron and Digor. I will start by presenting the Iron variety first, and turn to some relevant differences between the dialects later on. [WARNING: The Ossetic examples are still full of typos. I am working on fixing this.]

The crucial dataset is repeated in (1) (originally in Ch. 1, numbered point (1)). These examples correspond to numerical phrases that have a genitive case on the counted noun when the whole phrase is either the subject, or the object, see (1-a). However, in the dative or in the instrumental case, the genitive disappears and it is replaced by the relevant oblique case, see (1-b,c).

(1)   Ossetic (Abaev 1964: p.22)

    a.   dæs bon-y
           ten day-GEN.SG
           'ten days' (nominative/accusative)

    b.   dæs bon-æn
           ten day-DAT.SG
           'to ten days' (dative)

    c.   dæs bon-æj
           ten day-INS.SG
           'with ten days' (instrumental)

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[1]The sources cited use different alphabets. I have tried to unify these as much as possible, using the type of notation that takes the Cyrillic alphabet (used, e.g., in Abaev 1964, Isaev 1966 or Belyaev 2014) as a starting point and transliterates it to roman letters. This strategy is also used in Thordarson (1989). The remaining sources use an IPA-based notation, which I tried to unify with the Abaev/Thordarson type of spelling as well as I could. See Erschler (to appear[b]) for a useful table that links these various notations together.

2 Introducing Ossetic

In order to understand the details of this construction, I will now introduce some relevant background facts.

2.1 The Ossetic declension

To see first what case marking looks like in this language, consider the paradigm in 2.1. What we see here is the noun 'head' in the singular and plural respectively. The contrast between the two columns shows that Ossetic expresses plural by the marker *-t(æ)*, which is found between the root and the case markers. The segment æ is in brackets, because it is deleted when a vowel-initial case ending follows. With the exception of the allative, the case markers are the same regardless of the number, and I use boldface to bring this out.

Table 2.1: Iron Ossetic declension, fragment (Abaev 1964: 19-20)

	head, SG.	head, PL.	
NOM	sær-**Ø**	sær-tæ-**Ø**	
ACC	sær-**Ø**	sær-tæ-**Ø**	
GEN	sær-**y**	sær-t	-**y**
LOC (INE)	sær-**y**	sær-t	-**y**
DAT	sær-**æn**	sær-t	-**æn**
INS (ABL)	sær-**æj**	sær-t	-**æj**
ALL	sær-**mæ**	sær-tæ-**m**	
ADE	sær-**yl**	sær-t	-**yl**
EQU	sær-**au**	sær-t	-**au**
COM	sær-**imæ**	sær-t	-**imæ**

I have relabeled here some cases compared to their traditional Ossetic names. For instance, what the grammars call ablative is a case that also has an instrumental function (just like the ablative in Latin). I have therefore called it 'instrumental,' because this is equally justified within the language itself and preferable on the grounds that it allows us to link this discussion easier to other languages. The same is true (*mutatis mutandis*) for the locative (which replaces the label inessive used in the grammar). The table above keeps track of this by placing the traditional labels in brackets.[2]

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[2]Some sources, e.g., Belyaev (2014), Erschler (2018) refer to Abaev's adessive case as the superessive case. I keep the label from Abaev (1964).

The accusative is often missing in descriptions (though some sources include it, see, e.g., Erschler 2018). The reason why the accusative is often missing is that it is a non-autonomous case (in the sense of Blake 2001). This means that it never has a dedicated marker of its own. For human-denoting nouns (and for pronouns), the accusative is always the same as the genitive. For inanimate nouns, it is always the same as the nominative. Non-human animates show differential object marking depending on definiteness and specificity: for definite animmates, ACC=GEN, for indefinite ones, ACC=NOM. I include the accusative in the table for clarity, so we can see what the object form looks like.

2.2 NP-structure in Ossetic

With the basics of case morphology in place, let me turn to the basic facts concerning the noun phrase in Ossetic and my assumptions about its structure. The first fact to note is that case and number are marked only once in the whole noun phrase; there is no concord whatsoever. I show this for case in (2). In (2-a), we have the phrase 'my old father' in the nominative. In (2-b), the dative case *-æn* is added to a noun phrase that is fully identical to the nominative one.

(2) Iron Ossetic (Abaev 1964: 124)

    a.   mæ zærond fyd
          my old   father

    b.   mæ zærond fyd-æn
          my old   father-DAT
          'my old father'

Number is also marked only once, and it comes between the noun and the case marker. As can be observed by comparing (3-a) and (3-b), the adjectival phrase stays invariant.

(3) Iron Ossetic (Erschler to appear(b))

    a.   tyng bærzond xox
          very tall   mountain
          'a/the very tall mountain'

    b.   tyng bærzond xæx-tæ-m
          very tall   mountain-PL-ALL
          'to the very tall mountains'

Demonstratives also precede the noun and remain invariant throughout the paradigm:

(4)   Iron Ossetic (Abaev 1964: 28)

    a.   acy bon
           this day
           'this day'

    b.   acy bon-tæ
           this day-PL
           'these days'

    c.   acy bon-t-y
           this day-PL-LOC
           'in these days'

The demonstrative precedes the adjective, as shown in (5). The order is strict.

(5)   acy styr (*acy) bel
       this big   this   spade
       'this big spade' (Iron, Erschler to appear(a))

What do these facts tell us about the structure of the NP in Ossetic? I will assume here a perspective on the noun phrase where phrasal modifiers as well as the suffixes are members of one single functional hierarchy. Building on the cross-linguistic studies by Cinque (2005), Svenonius (2008) and others, I am going to assume that the scopal hierarchy of the elements is as in (6). The numeral is suspiciously missing, I get to it later on.

(6)   K > Dem > Pl > Adj > N

In this hierarchy, the noun is the lowest element, the so-called 'lexical head.' It is first modified by adjectives, which correspond to phrasal specifiers. Simplifying, the basic idea is that the AP and the NP combine together (by intersection, 'subsection' and the like) and determine a set, to which number markers apply and tell us something about the cardinality of that set.

Before we continue our way up the hierarchy, the question arises how the surface order of these three elements is derived (i.e., of the noun, the adjective and the plural marker); recall that the adjective precedes the noun, but the number marker follows the noun, as in the example (7):

(7)   tyxdžyn læppu-tæ
       strong   boy-PL
       'strong boys' (Iron, Erschler 2018: 12)

I will assume that the plural marker in these cases is a phrasal affix, so that the structure of the example (7) is actually as shown in (8), where the plural marker does not attach to the noun in the narrow sense, but to a constituent with the noun as the final element. Proposing this bracketing is basically a consequence of adopting the hierarchy in (6).[3]

(8)   [[A N] PL]

Following (a.o.) Julien (2002), Koopman (2005), Muriungi (2008), Svenonius (2008), I understand structures such as the one in (8) as derived by movement. Specifically, I assume that in the base structure, shown in (9-a), the PL head (expressed by *-tæ*) is to the left of the phrase *tyxdžyn læppu* 'strong boy.' However, the plural marker (being lexically specified as a suffix) triggers the movement of its complement to the left, leading to the order seen in (7). The precise nature of this movement (in particular how the affix triggers it) will be made more precise in Chapter 4.[4]

(9)   a.
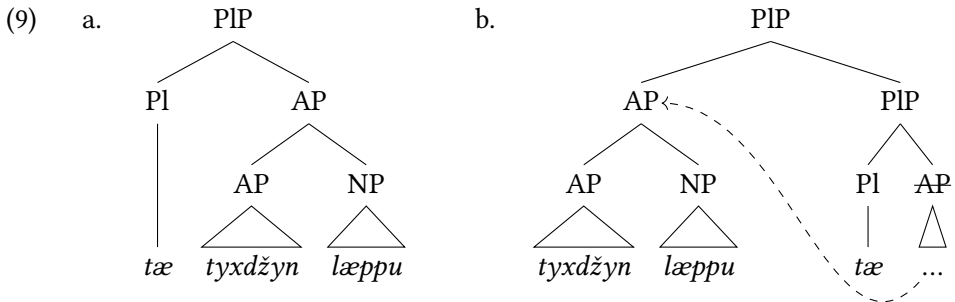
When the demonstrative is added, it attaches to the whole phrase in the form of a phrasal modifier, yielding (10):

---

[3]Note that in the structure (8), the noun and the plural marker (*tæ*) do not form a constituent to the exclusion of the adjective. In view of things to come (a phrasal lexicalisation model for portmanteau morphemes), it is worth pointing out that there are no irregular plurals in Ossetic of the type *foot—feet*, i.e., lacking the *-tæ*. Abaev (1964: 16) notes that kinship terms like *mad* 'mother' have irregular plurals (*mad-æl-tæ*), but such irregular plurals always keep the suffix *-tæ*. I mention this here in order to make it clear that portmanteau marking does not provide any difficulties for a hierarchy like (8) in Ossetic.

[4]Usually, the AP is introduced as a Spec of a functional head (Cinque 2005, a.m.o.). I simplify this here and attach the AP directly, and let it project at the top node, following the approach to Specifiers highlighted in Starke (2004). Nothing much hinges on this, and readers who are more comfortable with the more traditional proposal (AP is in Spec,FP) should feel free to mentally convert the trees into their format of choice.

(10)

DemP
├── Dem
│   └── △ *acy*
└── PlP
    ├── AP ⟵
    │   ├── AP
    │   │   └── △ *tyxdžyn*
    │   └── NP
    │   └── △ *læppu*
    └── PlP
        ├── Pl
        │   └── *tæ*
        └── ~~AP~~
            └── △ ...
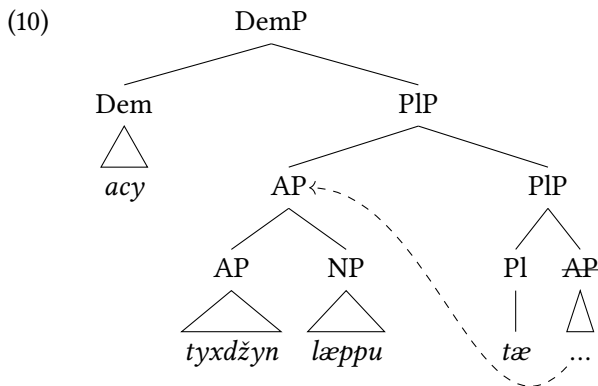
Finally, case applies to this whole phrase, which triggers movement again:

(11)

KP
├── DemP ⟵
│   ├── Dem
│   │   └── △ *acy*
│   └── PlP
│   ├── AP ⟵
│   │   ├── AP
│   │   │   └── △ *tyxdžyn*
│   │   └── NP
│   │   └── △ *læppu*
│   └── PlP
│   ├── Pl
│   │   └── *tæ*
│   └── ~~AP~~
│   └── △ ...
└── KP
    ├── K
    └── ~~DemP~~
        └── △ ...
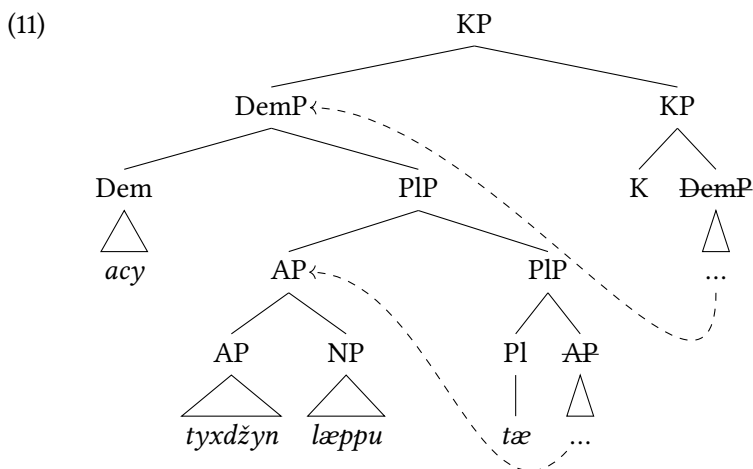
These derivations may look complex to the uninitiated, so before I make my point about the position of numerals in this structure, I will simplify it slightly in a way that the movements are ignored, but the same constituency is preserved. The result is shown in (12):

(12)

KP
├── DemP
│   ├── Dem
│   │   └── *acy* / DEM
│   └── PlP
│   ├── AP
│   │   ├── AP
│   │   │   └── *tyxdžyn* / strong
│   │   └── NP
│   │   └── *læppu* / boy
│   └── Pl
│   └── *tæ* / PL
└── K
    └── *æn* / DAT
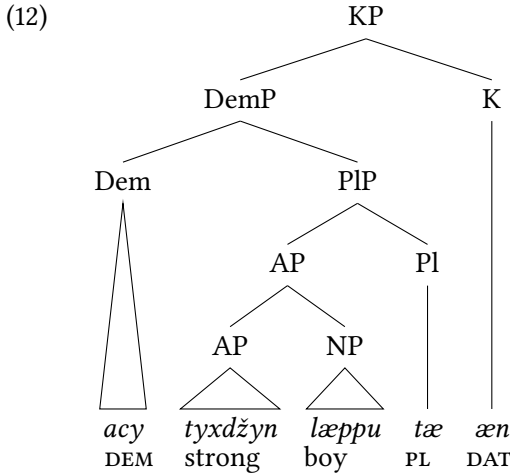
Note that in this structure, I am treating the case marker essentially as a case-expressing postposition, which follows the whole phrase.

2.3 Numerals in the NP

How do numerals fit in? The following data show that cardinal numerals (Card) appear between the demonstrative and the adjective, yielding a rather common order of the phrasal modifiers, namely Dem > Card > A > N:[5]

(13) acy dyuuæ say   qudž-y
      this two   black cow-GEN
      'these two black cows' (Iron, Erschler to appear(b))

In an influential approach by Cinque (2005), this order represents the base-generated, cross-linguistically default order of the modifiers under discussion. In Cinque's theory, this ordering arises as a result of generating the modifiers Dem, Card and A as specifiers of functional heads, as shown in (14). Recall from ftn. 4 that I am following the approach by Starke (2004), and I am simplifying these structures to the shape in (15). In the latter structure, the empty heads are left out and the phrasal modifiers project their label on top:

---

[5]I am abbreviating the cardinal numeral as Card (and not Num) to avoid confusion with markers for grammatical number.

(14)

$\mathrm{F}_{Dem}\mathrm{P}$
— DemP — $\mathrm{F}_{Dem}\mathrm{P}$
— F_{Dem} — $\mathrm{F}_{Card}\mathrm{P}$
— CardP — $\mathrm{F}_{Card}\mathrm{P}$
— F_{Card} — $\mathrm{F}_{A}\mathrm{P}$
— AP — $\mathrm{F}_{A}\mathrm{P}$
— F_{A} — NP

Dem   *Card*   *Adj*   *Noun*

(15)

DemP
— DemP — CardP
— CardP — AP
— AP — NP

Dem   *Card*   *Adj*   *Noun*
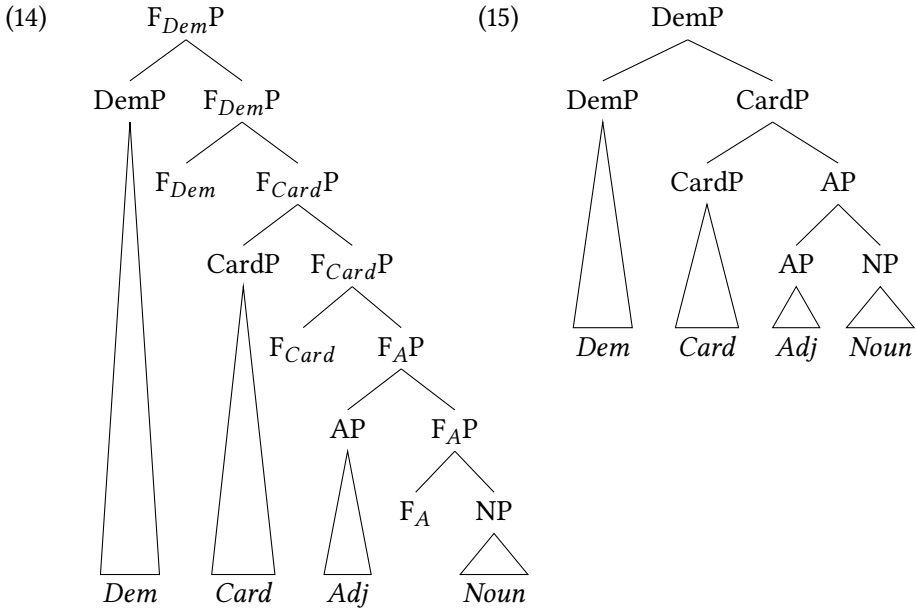
The structures in (14) and (15) do not, however, make justice to the remarkable property of Ossetic numerals, namely to the fact that their complement is marked by the genitive case. In the approach adopted here, where functional morphemes express functional heads, we need to add a K head somewhere in the structure. Where in the structure shall we place this case marker? In section 2.6, we will see evidence that the genitive case marker (required by the numeral) is lower than the numeral itself. The tree in (16) is a first attempt to capture this by introducing a K projection below CARD, but otherwise keeping everything the same, including the fact that CARD projects its label over the counted noun. The trees in (15) and (16) therefore differ only in that a K head is added in (16) below the numeral, which is what the data require me to do.

(16)

```
                    DemP
            ┌────────┴────────┐
           Dem              CardP
            │          ┌──────┴──────┐
            │         Card           KP
            │          │       ┌──────┴──────┐
            │          │       AP            K
            │          │   ┌───┴───┐         │
            │          │  AP       NP        │
            │          │  △        △         │
           acy       dyuuæ say    qudž       y
           DEM        two  black  cow       GEN
```
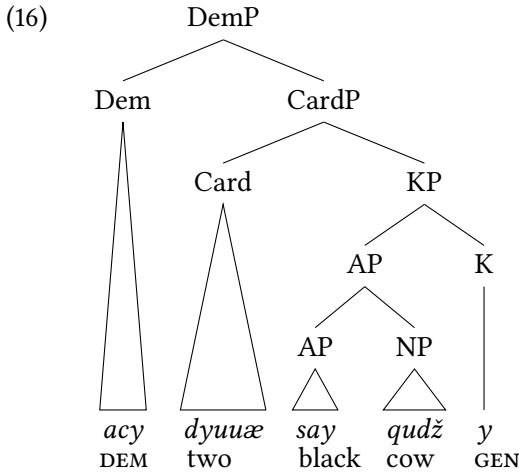
However, once we modify the structure like this, we arrive at a completely different type of structure than the original one given in (14) or (15). The reason is that the position of K below Card and above A is totally unexpected, because it leads to a projection line (from top down) as in (17).

(17)   DEM > CARD > K > A > N

However, such an order is suspicious both on cross-linguistic grounds and also on Ossetic internal grounds; we have already concluded that K should be above Dem, recall (12).

The paradoxical position of K in (17) suggests that the tree (16) does not correspond to a single functional sequence, but two independent sequences. This is in line with what has been proposed by a number of authors, who have concluded that numerals in a number of languages either are directly nouns, or at the least contain a nominal element inside them (e.g. Corbett 1978, Corver 2001, Ionin & Matushansky 2006; 2018, Caha 2015, a.m.o.). For instance, Kayne (2005) and Zweig (2006) propose that cardinal numerals are modifiers of the silent noun NUMBER. This proposal is depicted in a simplified fashion in (18-a), where I use the Ossetic numeral *dyuuæ* 'two.' This type of analysis will be later quite mechanically implemented in terms of phrasal spellout, see (18-b). The gist of the phrasal-spellout proposal (which I introduce in much more detail in Chapter 4) is that the whole constituent containing the CARD head and the noun 'number' are spelled out together inside the numeral.

(18)   a.

```
          Card
         /    \
      Card    NP
        |     /\
     dyuuæ  Number
```

b.

```
        Card
       /    \
    Card    NP
            /\
          Number
         dyuuæ
```
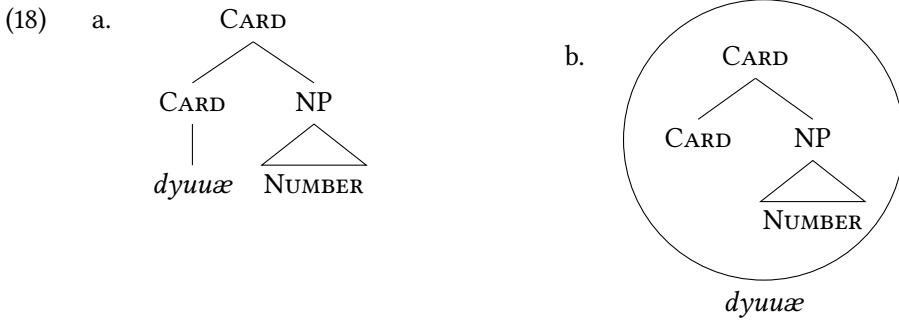
I understand a structure like the one in (18) to be present inside the complex triangle heading the CardP in (16). The numeral thus brings in a second nominal element which takes the counted phrase 'black cow' as its argument. The genitive case on the counted noun reflects the bi-nominal nature of this structure.

After we update the structure in (16) by adding a second noun (number) inside the triangle labelled Card, we get the structure in (19):

(19)

```
                    DemP
                   /    \
                 Dem    CardP
                        /    \
                    CardP     KP
                   /    \    /  \
                Card    NP  AP    K
                        /\  /\    |
                   Number AP NP   y
                         say qudž GEN
               acy  dyuuæ black cow
               DEM  two
```
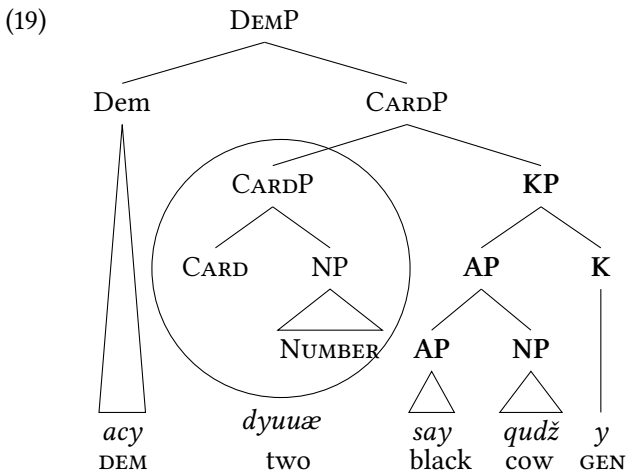
This structure contains two independent sequences, one consisting of Dem > Card > NP, and the other (boldfaced) of KP > AP > NP (both of them legal). This proposal thus solves the issue we noted above, but opens another one, which concerns the manner in which the two independent sequences are integrated.

In (19), the numeral's sequence provides the label for the whole tree, and so the numeral is the head and the genitive KP its argument. Such an argument would be expected to occupy either a complement of the NP number or a Spec position of some functional projection in its projection line. Had the genitive been to the

left of CARD, we could say that it is a regular Spec of the CARD head, where the head would be responsible for introducing the argument. However, given that the genitive is on the right, the story must be more complex. Since this issue is not central to my concerns at the moment, I will postpone the technical discussion until later, and simply adopt here the structure in (19) for the time being. The main point to remember is that the genitive noun is an argument inside the projection line of the numeral (a second noun), and its ordering is something that we need to look into in more detail later. I shall do so in section 2.9.

The whole phrase (19) may, of course, be subject to further case marking, leading to (20). Here we see two case markers, one after the other, but each belonging to a different noun. The lower case belongs to the noun 'cow,' the higher case belongs to the noun meaning 'number.'

In the structure, I also indicate that the inner case is eliminated due to ellipsis when the outer case requires this. I will turn to some evidence for this shortly.

(20)

```
                          KP
                    ╱            ╲
               DemP               K
             ╱      ╲             │
         Dem         CardP        │
          │        ╱      ╲       │
          │    Card         KP    │
          │     │         ╱    ╲  │
          │     │       AP      K │
          │     │     ╱    ╲    │ │
          │     │   AP      NP  │ │
          │     │   △       △   │ │
         acy  duuæ  say    qudž  ɣ  æn
         DEM  two  black   cow  G̶E̶N̶  DAT
```
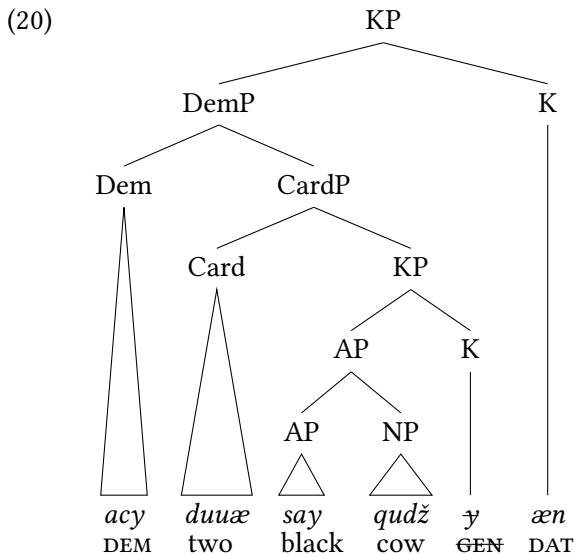
The main aspect of this structure that I shall be concerned with is the stacking of case markers, which arises as a consequence of the fact that the phrase actually contains two nouns. The lower noun is the noun 'cow,' and the higher noun is the noun NUMBER contained inside the cardinal. The lower case marker (the genitive) belongs to the lower noun, the higher case marker belongs to the higher noun. However, they are structurally separated by the numeral (and by the demonstrative). This is important since their structural non-adjacency (if correct) somewhat limits the types of tools we can use to model their interaction.

(Namely, we cannot use tools that require structural adjacency, whatever these tools might be.)

In order to make this point clear, it is useful to look at English for a second. Specifically, consider the English examples in (21):

(21)   President Obama and other supporters of this policy have repeatedly reminded the public that the NSA does not have access [**to** *these millions* **of** *phone calls.*]

The phrase which is of interest is in brackets. In contains a noun-like quantity expression *millions*. I assume that the Ossetic numerals represent similar type of quantity nouns.

In addition to the quantity noun, there are two case-like prepositions: *of* and *to*. In English, it is clear that these prepositions are not structurally adjacent: *of* sits on top of the phrase in the complement of the quantity noun, *to* is on top of the phrase headed by the quantity noun. What I am proposing is that in Ossetic, the syntactic position of the case markers (GEN and DAT) is exactly the same as that occupied by the prepositions in English: i.e., they are not structurally adjacent. The only difference between English and Ossetic is that these markers follow (rather than precede) their respective phrases, yet their interaction (whatever that interaction is) must respect the fact that they are not adjacent.

In order to see this better, let me draw the structure of the English construction. It is shown in (22).

(22)
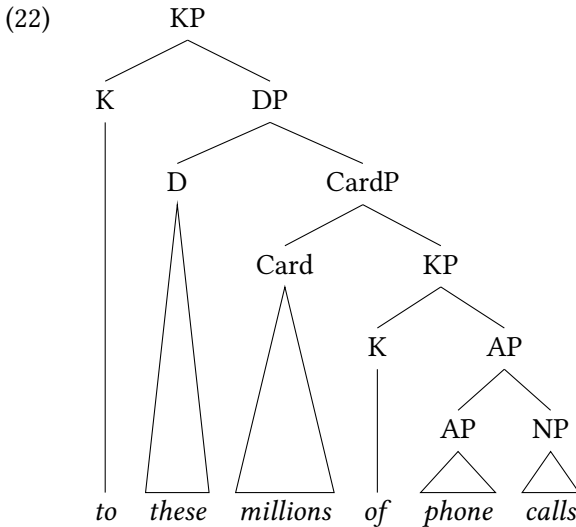
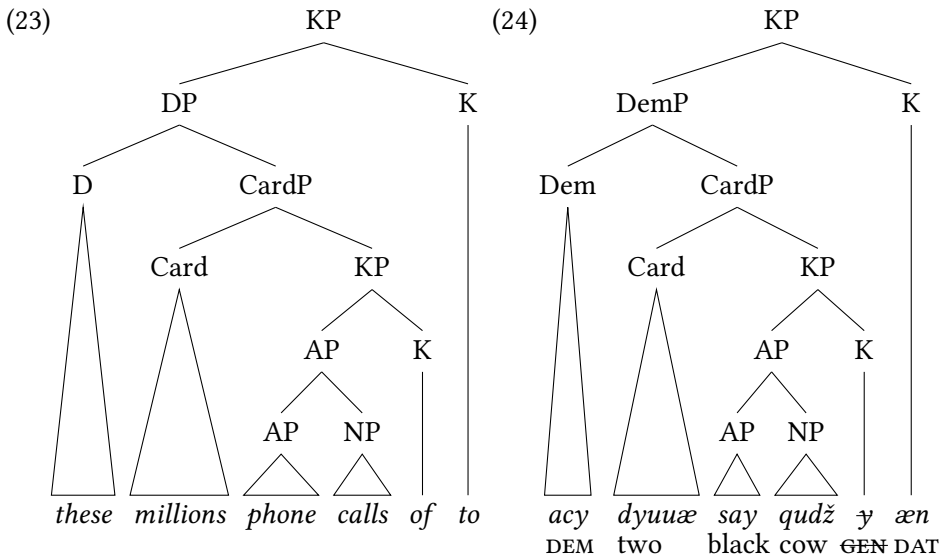I am following here the idea that the English preposition *of* is functionally equivalent to the Ossetic genitive case marker, and I therefore place it under a K head. The label is not important, it could easily be also P; the only important thing is the equivalence between *of* and the Ossetic genitive, which, recall, could easily be considered a postposition.

The position in the linear string where the prepositional case marker *of* appears makes it clear that it takes scope over the phrase [*phone calls*], rather than at any higher or lower place in the structure.

The preposition *to*, which is functionally equivalent to the dative case marker in Ossetic, is also analysed as a prepositional case marker, expressing the grammatical function of the full phrase 'these millions of phone calls.'

To see the parallel between (22) and Ossetic, consider the structure in (23). The only thing I did here (compared to (22)) is to change the direction of headedness of the English case-like prepositions and I turned them into case postpositions.

(23)

```
                    KP
                   /  \
                  DP    K
                 /  \    |
                D    CardP
                |    /    \
              these Card   KP
                    |     /  \
                 millions AP   K
                         / \    |
                       AP   NP  |
                       |    |   |
                     phone calls of  to
```

(24)

```
                    KP
                   /  \
                 DemP   K
                 /  \    |
               Dem   CardP
                |    /    \
              acy  Card    KP
             DEM   |      /  \
                 dyuuæ   AP    K
                 two    / \    |
                      AP   NP  |
                      |    |   |
                     say qudž  ɣ    æn
                    black cow  GEN  DAT
```

This step turns English into Ossetic, as can be clearly seen on the comparison between (23) and (24) (where the latter is the original proposal from (20)).

Beyond the ordering, the only important difference between the Ossetic example and the English one is that the Ossetic genitive is eliminated, while the English one isn't, which is what this book is about. I shall propose here an analysis according to which this deletion is to be understood as an obligatory ellipsis that takes place under c-command and identity (see Cinque in press for a similar

proposal concerning the derivation of relative clauses). However, before I start building a theory based on this assumption, I want to rule out the possibility that the deletion of the genitive marker *-y* is a simple instance of a phonological vowel-deletion rule.

2.4 Against phonological deletion

In order to show why the deletion of the internal genitive is not phonological, I will compare it with the behaviour of the plural marker *-t(ae)*. This marker is chosen as a representative example of what a phonological vowel deletion looks like (following Erschler 2012). Recall that the form of the plural marker depends on the phonology of the suffix. Namely, if the plural *-tæ* is followed by a vowel-initial suffix, its final vowel is deleted. In other environments, it is preserved. This idea is depicted in 2.2, where the underlying representations in the left-hand column are turned into the surface forms in the right hand column by deleting the *æ* of the plural before another vowel.

Table 2.2: The analysis of the plural

head, PL.	underlying	surface
NOM	sær-tæ-Ø	sær-tæ-Ø
ACC	sær-tæ-Ø	sær-tæ-Ø
GEN	sær-tæ-y	sær-t -y
LOC (INE)	sær-tæ-y	sær-t -y
DAT	sær-tæ-æn	sær-t -æn
INS (ABL)	sær-tæ-æj	sær-t -æj
ALL	sær-tæ-m	sær-tæ-m
ADE	sær-tæ-yl	sær-t -yl
EQU	sær-tæ-au	sær-t -au
COM	sær-tæ-imæ	sær-t -imæ

The behaviour of the plural *-tæ* in 2.2 raises the possibility that the deletion of the genitive *-y* in the numerical construction can be analysed along similar lines. The examples in (25) bring this possibility out.

(25)   A possible analysis of the numeral paradigm

        a.   dæs bon-y-Ø
            ten day-GEN-NOM

'ten days' (nominative/accusative)

b. dæs bon-ɏ-æn
    ten day-GEN-DAT
    'to ten days' (dative)

c. dæs bon-ɏ-æj
    ten day-GEN-INS
    'with ten days' (instrumental)

There are two reasons why (25) is not the right analysis. The first argument has to do with consonant initial suffixes and I present it in this section. The second argument has to do with suspended affixation, and I present it in the following section.

As Erschler (2012: 161) points out, an argument for a phonological deletion analysis in 2.2 comes from the behaviour of the consonant initial suffix -*m(æ)*. The suffix is shown in (26-a), where it is suffixed to a consonant final singular noun *bæx* 'horse.'

(26)   Iron Ossetic (Erschler 2018)

a. bæx-mæ
    horse-ALL

b. bæx-tæ-m
    horse-PL-ALL

When the allative suffix follows the plural marker, *tæ* surfaces, see (26-b). Given this fact, I conclude (following Erschler) that the variation between *tæ* and *t* is best expressed in phonological terms, such that vowel-initial suffixes lead to the deletion of *æ*.[6]

Now assuming on the basis of (26-b) that vowels never delete before the allative marker *mæ*, we make a prediction. The prediction is that in cases where the presumed inner GEN -*y* would be followed by this suffix, phonological deletion should not take place. Hence, if the deletion were to be phonological, we would expect to find cases like (27-a). However, this expectation is not confirmed, since (27-a) is ungrammatical. The genitive suffix is not present in such contexts, as (27-b) demonstrates.

(27)   Iron Ossetic (Abaev 1964: 22)

a. *dæs bon-y-mæ
    ten day-GEN-ALL

---

[6]I get to the difference between *mæ* and *m* shortly.

b. dæs bon-mæ
    ten day-ALL

This means that if there is a sequence of two case markers in numerical constructions, the deletion of the inner one cannot be explained by phonology.

I note that the argument concerning the plural in (26) is slightly compromised by the fact that the allative shows variation between *-mæ* in the singular and *-m* in the plural, which makes it hard to know whether the suffix in the plural is actually consonant initial. One could argue here that since it is in any case different from the singular marker, it could also be that the allative plural is actually *-æm*.

However, for the data in (27), this inconvenient fact is irrelevant. This is because in the numerical examples in (27), the counted noun is always in the singular. It is beyond doubt that the singular allative is a consonant initial marker *-mæ*, and so regardless of how the plural is resolved, it has no bearing on the fact that an account based on phonological deletion makes the wrong prediction in (27).

To sum up: vowel final suffixes in Ossetic may drop their final vowel when another vowel follows. However, such vowels are not dropped before consonant initial suffixes. In contrast, the presumed genitive marker is absent also before consonants. Therefore, if such a marker is present in the underlying structure, its deletion cannot be phonological.

2.5 Suspended affixation and the inner genitive

In this section, I am going to discuss another reason why phonological deletion would not work as an account of how the internal genitive is eliminated. The argument revolves once again around 'suspended affixation' (see, a.o., Orgun 1995, Pounder 2006, Kabak 2007, Guseva & Weisser 2018). Recall from Ch 1, example (3) that in suspended affixation, only the second conjunct has all the relevant inflectional markers, while the first conjunct lacks some of these.

An example is shown in (28). (28-a) is a 'regular' coordination, where each conjunct bears a full specification for number (plural) and case (comitative). In (28-b), however, the first conjunct has only the plural marker, and there is only a single case marker for the whole coordination. It can be found after the second member of the coordination.

(28)   Iron Ossetic (Erschler 2012: 165)

    a.   bæx-t-imæ   æmæ gæl-t-imæ
            horse-PL-COM and   OX-PL-COM

    b.   bæx-tæ   æmæ gæl-t-imæ
            horse-PL and   OX-PL-COM
            'with horses and oxen'

What is interesting about (28-b) is that the plural marker looks different in the first conjunct (*-tæ*) and in the second conjunct (*-t*). This difference makes sense if the underlying shape of the plural is *-tæ* and vowel deletion deletes the final vowel if and only if a vowel initial suffix follows.

    The example in (29) shows that the final vowel of the plural marker cannot be eliminated on the first conjunct. The reason is simply that no vowel initial suffix follows it, and so there is no trigger for the deletion.

(29)   *bæx-t   æmæ gæl-t-imæ
        horse-pl and   ox-pl-com
        'with horses and oxen' (Iron Ossetic, Erschler 2012: 165)

The behaviour of the plural marker contrasts with the behaviour of the inner genitive *-(j)y* in numerical constructions. The dataset in (30) shows this. In (30-a), we see a regular coordination without suffix suspension. (30-b) shows that when the adessive case marker is removed from the first conjunct, the genitive marker may re-surface. This effect could be unified with the behaviour of the plural *-tæ*: when the vowel initial case suffix *-yl* is suspended, the original vowel may resurface. (30-b) is therefore still compatible with a phonological deletion account.

(30)   Iron Ossetic (Erschler 2018: 25)

    a.   ærtæ læppu-jyl æmæ čyzg-yl
            three boy-ADE and   girl-ADE
            'three boys and a girl' (adessive)

    b.   ærtæ læppu-jy æmæ čyzg-yl
            three boy-GEN and   girl-ADE
            three boys and a girl.'

    c.   ærtæ læppu æmæ čyzg-yl
            three boy   and girl-SUP
            three boys and a girl' (adessive)

However, there is another option as to how the first conjunct can look like, and this option is in (30-c). Here the noun following the numeral appears without any marking; there is simply no trace of the genitive *-y* on the noun 'boy' in (30-c).

This shows that if the absence of the inner genitive is to be explained by deletion, this cannot be phonological deletion. That is because the conditions under which phonological deletion applies are not satisfied in (30-c), as the contrast with the behaviour of the plural marker indicates. (Recall that the final vowel of the plural cannot delete in (29).)

All summed up, a phonological deletion account along the lines suggested in (25) (repeated in (31)) is not satisfactory for two reasons. First, it does not predict the fact that deletion also happens before consonant initial suffixes. In addition, it does not predict that the deletion of the genitive can also take place long distance, namely when a suspended suffix still causes the deletion in the first conjunct.

(31)   A possible analysis of the numeral paradigm

    a.   dæs bon-y-Ø
       ten day-GEN-NOM
       'ten days' (nominative/accusative)

    b.   dæs bon-ɨ-æn
       ten day-GEN-DAT
       'to ten days' (dative)

    c.   dæs bon-ɨ-æj
       ten day-GEN-INS
       'with ten days' (instrumental)

Before I move on, let me turn to some unclear issues relating to suspended affixation. In particular, Belyaev (2014) reports cases where it is impossible to have a case-less counted noun in the first conjunct (a finding that potentially contradicts (30-c)). Belyaev's data are shown in (32). (32-a) is a suspended affixation structure with the comitative marker on the second conjunct only, and with the genitive on the first conjunct (the genitive due to the numeral). (32-b) (with a case-less counted noun) is given as ungrammatical.

(32)   Suspended affixation in Iron Ossetic (Belyaev 2014: 40)

    a.   fondz tuman-y   æmæ æxsæz som-imæ
       five chervonets-GEN and six   ruble-COM
       'with five chervontsy and six rubles' (comitative)

    b.   *fondz tuman   æmæ æxsæz som-imæ
       five   chervonets and six   ruble-COM
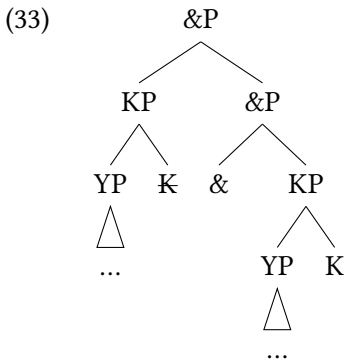   'with five chervontsy and six rubles' (comitative)

I am not sure what the reason for the contrast between (30-c) and (32-b) is. One

option is that the differences are due to speaker variation (some speakers are more permissive than others). Another option is that the status of the second conjunct is the culprit here. In particular, in (30-c), the second conjunct is a simple unmodified noun. In (32-b), it contains a numeral and a counted noun. I am not sure what is going on here, but I shall assume that it is in principle possible to have a case-less noun following the numeral in the first conjunct, and that the data in (32-b) are unavailable for some orthogonal reason.[7]

Let me now turn to a potential analysis of the data in (30). The basic analytic question is this: why is the deletion of the inner genitive suffix optional in the first conjunct, but obligatory in the second conjunct (as well as outside of coordination)? The answer I tentatively suggest here is that this bifurcation may relate to a c-command requirement on the relevant deletion. In particular, the suggestion is that outside of coordinations, the outer case suffix always c-commands the internal suffix, and deletion applies obligatorily. Similarly, I suggest that the external suffix always c-commands the internal one in the second conjunct. For the first conjunct, I suggest that there are multiple structures available. In some of them, there is no c-command between the external suffix and the internal one; in such coordinations, deletion does not apply. In a different type of a coordinate structure, the genitive case inside the first conjunct *is* c-commanded by the external case, and then deletion obligatorily applies.

I shall start by presenting three possible structures for suspended affixation that Erschler (2012) considers for Ossetic on the basis of what has been proposed in the literature. The first analysis says that suspended affixation arises from a regular coordination by deleting the case suffix inside the first conjunct. The analysis is depicted in (33), and it corresponds to the analysis which Erschler adopts.

---

[7]If this assumption turned out to be wrong, then I would need to conclude that suspended affixation always leads to the re-appearance of the genitive in the first conjunct. If that was the case, we would have even stronger reasons to think that the numeral *always* requires the genitive on the counted noun. And it would still be the fact that the genitive does not surface before the allative *mæ*, for which there is no phonological reason.
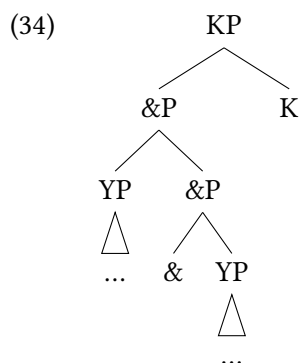
(33)

```
              &P
         ┌─────┴─────┐
        KP          &P
       ╱  ╲        ╱  ╲
     YP    K̶    &    KP
     ╱╲              ╱  ╲
    …              YP    K
                   ╱╲
                  …
```

The deletion of the oblique case marker inside the first conjunct is indicated by the strikethrough over K. This leaves only YP to be pronounced inside the first conjunct. The label YP is an abstract label: it corresponds to whatever it is that the oblique case markers attach to. In the cases we are interested in, YP corresponds to the combination of the numeral and the counted noun in the genitive case.

Let me now turn to the question of whether the genitive inside the YP is realised or not. Recall that I explore here the idea that this depends on c-command relations. Specifically, I suggest that if the YP (containing the genitive) is c-commanded by the external K, then the genitive is elided. If it is not c-commanded by the external K, it remains in place.

With this idea in place, let me turn to (33) again. In this structure, the overt K c-commands the second conjunct, hence we do not expect to see the genitive there (which we never do). The question now is what happens to the genitive inside the YP of the first conjunct. This conjunct is not c-commanded by any overt K, and it could therefore be the case that the genitive will surface in this structure. This, however, depends on whether the elided K node in (33) may (or may not) serve as a licensor for the deletion of the genitive inside the YP, so the fate of this structure is somewhat unclear.

The second possible analysis is that the case marker applies to the coordination of two YPs, as shown in (34).

(34)

```
                    KP
                   ╱  ╲
                 &P    K
                ╱  ╲
             YP    &P
             ╱╲    ╱  ╲
            ╱  ╲  &   YP
            …        ╱╲
                    ╱  ╲
                     …
```

In this structure, the external case c-commands both YPs. Hence, we do not expect to see GEN either in the first conjunct, or in the second conjunct (where we never see it). I therefore suggest that a structure like (34) is appropriate for examples where no conjunct has the internal genitive.

The third possible structure has K only inside the second conjunct (the conjunction is then called unbalanced, Johannessen 1998).

(35)

```
                &P
               ╱  ╲
             YP    &P
             ╱╲    ╱  ╲
            ╱  ╲  &   KP
            …        ╱  ╲
                   YP    K
                   ╱╲
                  ╱  ╲
                   …
```
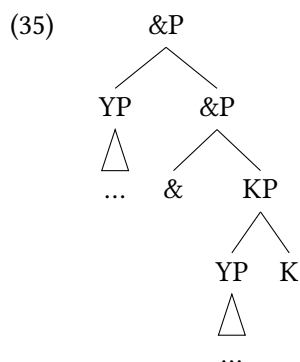
In this structure, the YP in the first conjunct is not c-commanded by the external K, and we therefore expect to see the internal genitive on the surface; no deletion is possible here. In the second conjunct, the external K once again c-commands the YP in the second conjunct, and we therefore expect ellipsis here.[8]

To conclude. What we have seen is that suspended affixation constructions

---

[8]Erschler (2018) argues against postulating this structure on the grounds that it (apparently) over-generates for 2nd person pronouns, where the unbalanced structure would (under Erschler's particular assumptions) predict the grammaticality of forms such as 'you-NOM and Madina-ALL,' which are ungrammatical (one has to use the 'oblique' pronoun instead). I return to this in Chapter 5, and show that under the analysis of the declension of the pronouns I shall propose, this issue does not arise.

provide evidence against phonological deletion of the internal genitive. The reason is that the deletion may operate long distance, and eliminate the genitive inside the first conjunct.

However, the deletion of the genitive inside the first conjunct is only optional, while inside the second conjunct, it is obligatory. I have tentatively suggested that this may be understood if we adopt two assumptions. (i) Deletion of the genitive requires c-command, and (ii) there are multiple possible structures for coordination. In all of these, the external case marker c-commands the genitive inside the second conjunct, and hence, deletion is obligatory here. In some of these structures, however, the first conjunct is not c-commanded by the overt K. And that is the reason why the deletion inside the first conjunct appears optional.

2.6 When the noun goes missing

Before I leave this chapter, I would like to test some additional predictions of the structure (36), originally (20).

(36)
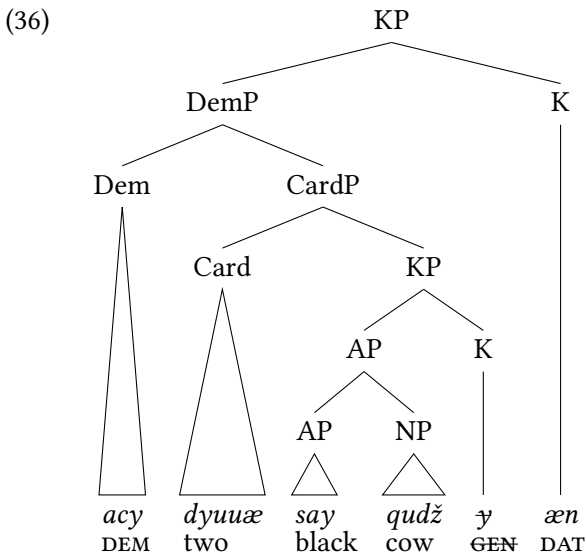
The particular aspect of the structure I will focus on is that the two case markers are not structurally adjacent, because they are separated by the numeral (and the demonstrative). This has interesting implications for the application of various processes, including NP-ellipsis. I turn to this in the current section.
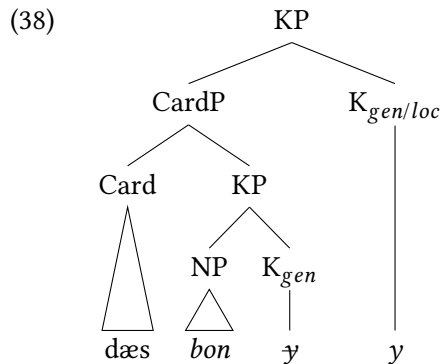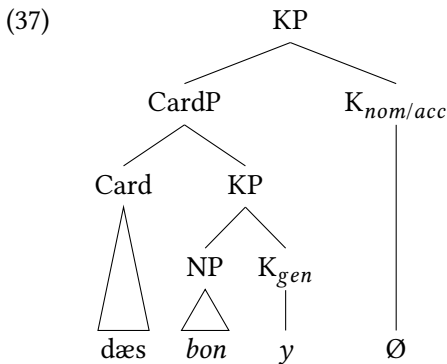
My starting point is that the structure in (36) leads to a particular analysis

of a syncretism pattern seen in the paradigm of the numerical phrase shown in Table 2.3. As we can see, the phrase 'ten days' has the same form *dæs bon-y* for four cases stretching from NOM-LOC. Recall in this context that ordinary nouns (represented in Table 2.3 by *bon* 'day') make a distinction between NOM/ACC on the one hand and GEN/LOC on the other hand.

Table 2.3: Iron Ossetic numerical phrases

	ten days	day
NOM	dæs bon-y	bon-Ø
ACC	dæs bon-y	bon-Ø
GEN	dæs bon-y	bon-y
LOC (INE)	dæs bon-y	bon-y
DAT	dæs bon-æn	bon-æn
INS (ABL)	dæs bon-æj	bon-æj
…	…	…

Under the theory sketched here, the ambiguity in the paradigm of the numerical phrase is not a straightforward instance of syncretism, but rather a case of structural ambiguity. In particular, as shown in (37), the case marker *-y* seen in NOM/ACC is an instance of the inner case marker, which belongs to the counted noun. The external NOM/ACC marker is Ø. On the other hand, in the GEN/LOC cell, the case marker *-y* is the outer case marker, belonging to the whole phrase. The inner case marker (belonging to the counted noun) is not present; my hypothesis is that it has been elided under identity and c-command. This is shown in (38).

(37)

```
                KP
         ┌──────┴──────┐
      CardP         K_{nom/acc}
    ┌───┴───┐           │
  Card     KP           │
   △    ┌──┴──┐         │
  dæs  NP   K_{gen}     │
        △    │          │
       bon   y          Ø
```

(38)

```
                KP
         ┌──────┴──────┐
      CardP         K_{gen/loc}
    ┌───┴───┐           │
  Card     KP           │
   △    ┌──┴──┐         │
  dæs  NP   K_{gen}     │
        △    │          │
       bon   y̶          y
```

It turns out that there is a way to show that this view is indeed correct, and that

the two (homophonous) markers occupy different structural positions, such that the lower case marker belongs to the noun, and the higher one belongs to (the phrase headed) by the numeral. In Ossetic, this is revealed in the way the marker -*y* behaves when the numeral is used without an accompanying noun.

Such constructions (when the numeral is not followed by a noun) can be understood in one of two possible ways (perhaps even both, where the correct analysis is chosen depending on the type of use). One possibility is to analyse such cases as instances of NP ellipsis. To see what NP ellipsis looks like, consider the sentence *Mary bought two green apples, and I bought four* ~~green apples~~, where NP ellipsis eliminates the full complement of the numeral *four*. This process leads to a numeral which is not followed by a noun, and therefore I consider it to be one of the possible ways in which a numeral-final noun phrases may be generated by the grammar. What we predict in such cases is that if ellipsis eliminates the full complement of the numeral, the four-way syncretism found in the declension of the numerical phrase will disappear. This is shown in (39) and (40).

(39)

$$
\begin{array}{c}
\text{KP} \\
\diagup \quad \diagdown \\
\text{CardP} \quad \text{K}_{nom/acc} \\
\end{array}
$$

(40)

$$
\begin{array}{c}
\text{KP} \\
\diagup \quad \diagdown \\
\text{CardP} \quad \text{K}_{gen/loc} \\
\end{array}
$$

CardP: Card (dæs), KP [NP (bon Ø), K_{gen} (y)]; K_{nom/acc} = Ø

CardP: Card (dæs), KP [NP (bon Ø), K_{gen} (~~y~~)]; K_{gen/loc} = y
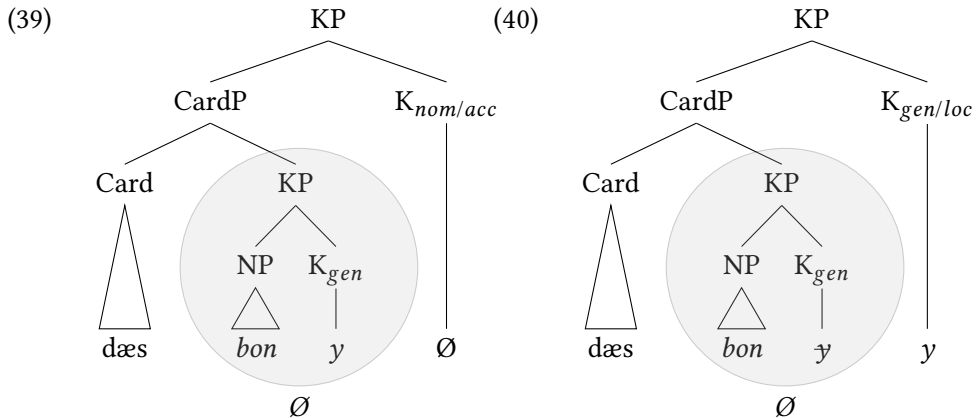
The trees in (39) and (40) show that only the external case is expected to survive the ellipsis. As a consequence, what we get is that two identical strings (*dæs bon-y*) pattern differently under NP ellipsis, a consequence of the structural analysis proposed here.

This prediction is born out. In particular, as Abaev (1964: 22) points out, "[i]n combinations of numeral […] plus noun, only the noun shows declension […] If the number is used by itself (without a noun), it is declined like any other substantive: *dæsy, dæsæn, dæsmæ, dæsæj*, etc." The paradigm of the numeral when used in isolation is shown in the first column of 2.4.

What is relevant about the inflection of the numeral in the first column is that

Table 2.4: Ellipsis in Iron Ossetic numerical phrases

	ten	ten days
NOM	dæs-Ø	dæs ~~bon-y~~ Ø
ACC	dæs-Ø	dæs ~~bon-y~~ Ø
GEN	dæs-y	dæs ~~bon-y~~ y
LOC (INE)	dæs-y	dæs ~~bon-y~~ y
DAT	dæs-æn	dæs ~~bon-y~~ æn
INS (ABL)	dæs-æj	dæs ~~bon-y~~ æj
…	…	…

we can no longer find the syncretism between NOM/ACC on the one hand and GEN/LOC on the other. This is exactly as predicted under the assumption that the forms of the numeral arise as a result of NP-ellipsis. This is shown in the second column, where I give the presumed full forms of the numerical phrase with the genitive complement. The genitive complement is in strikethrough, which indicates its ellipsis. The strikethrough affects an invariant string (corresponding to the complement of the numeral). The remaining morphemes neatly combine to produce the forms in the first column. Importantly, the identical sequence *dæs bon-y* behaves differently in NOM/ACC and GEN/LOC, which is due to the different position of the genitive marker *-y* in the two apparently identical sequences.

If the strings that form the input to the ellipsis contained only one case marker (reflecting the potentially competing idea that only one case is assigned), it would have been impossible to run an NP-ellipsis analysis that always affects the same string. Specifically, in NOM,ACC, deletion would have to eliminate the noun and its case marker. In oblique cases (sometimes containing an identical string), ellipsis would have to operate differently, so as not to eliminate the case marker, a solution that comes across as *ad hoc*. (In the current theory, the difference between the two kinds of case markers is simply their structural position.)

A full fledged example illustrating how ellipsis yields inflected numerals is in (41). (41-a) gives the full phrase, (41-b) indicates ellipsis, and (41-c) shows the output. The translation indicates that we are dealing with ellipsis here.

(41)   Iron Ossetic (Hettich 2002: 55)[9]

    a.   syppar tyxdžyn læppu-t-æj fætarstæn
             four   strong   boy-PL-INS become.afraid.of
             'I became afraid of the four strong young men.'

    b.   syppar ~~tyxdžyn læppu-t-~~æj fætarstæn
           four   strong boy-PL-INS become.afraid.of

    c.   syppar-æj fætarstæn
           four-INS   become.afraid.of
           'I became afraid of the four (ones).'

Now the second possibility of how numerals without a complement may be generated is by simply not generating their complement to begin with (e.g., *two multiplied by three is six*). Should this be the case, numerals would behave like ordinary nouns, and combine with a case marker that signals the role of the noun in the sentence. The only special thing about this numeral/noun is that when it actually has a complement, this complement intervenes between the noun and its inflection. In the end, this alternative also boils down to the same prediction, as indicated in (42) and (43), where the only difference consists in that the encircled

---

[9] Hettich (2002) is the only source where the noun following the numeral is in the plural. It does not seem to be a typo, since the author explicitly notes that when the NP in (41) undergoes an ellipsis, the numeral must be in the singular, which contrasts with the behaviour of NP-ellipsis with adjectival remnants:

(i)   Iron Ossetic (Hettich 2002: 55)

    a.   syppar tyxdžyn læppu-t-æj fætarstæn
          four   strong boy-PL-INS become.afraid.of
          'I became afraid of the four strong young men.'

    b.   syppar tyxdžyn ~~læppu~~-t-æj fætarstæn
          four   strong boy-PL-INS become.afraid.of

    c.   syppar tyxdžyn-t-æj fætarstæn
          four   strong-PL-INS become.afraid.of
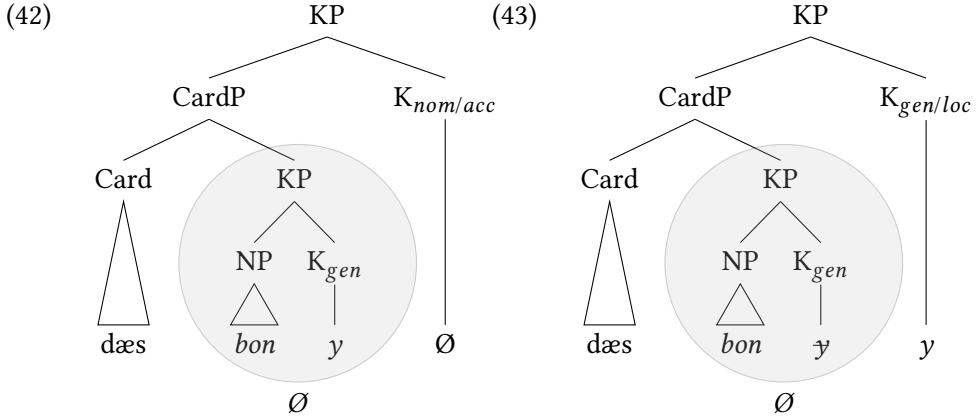   'I became afraid of the four strong young (ones).'

Hettich (2002) does not mention the source of her data, so it is difficult to see whether there is some dialectal variation on this. The cover of her thesis says the author has a prior degree from the North Ossetian State University.

    Taking the data at face value, it suggests that the ellipses can be captured using the hierarchy of elements as in (ii).

(ii)   [CASE [DEM [CARD [PLURAL [A N]]]]]

The reason why the plural is higher than the adjective is because NP-ellipsis cannot eliminate the sequence N+plural with adjectival remnants, recall (i). In (ii), PL and N do not form a constituent to the exclusion of the A, so this would be the reason. However, N+PL are elided under numerals; this is captured in (ii) since [N PL] form a constituent to the exclusion of the numeral. The plausibility of the hierarchy in (ii) is increased by the observation that it aligns with what Svenonius (2008) reports for his sample of languages.

noun does not correspond to an elided noun, but to an optional complement that may simply fail to be generated.

(42)
```
                    KP
              ┌──────┴──────┐
           CardP          K_{nom/acc}
         ┌───┴───┐           │
       Card      KP          │
        △      ┌──┴──┐       │
       dæs    NP   K_{gen}   │
              △      │       │
             bon     y       Ø
                     Ø
```

(43)
```
                    KP
              ┌──────┴──────┐
           CardP          K_{gen/loc}
         ┌───┴───┐           │
       Card      KP          │
        △      ┌──┴──┐       │
       dæs    NP   K_{gen}   │
              △      │       │
             bon     y       y
                     Ø
```

Crucially, no matter which of these approaches to complement-less numerals is correct (possibly both, depending on the particular context of use), we predict that the *-y* in NOM/ACC has a different status than the *-y* in GEN/LOC. This is because the *-y* in GEN/LOC is not a case marker belonging to the noun, but a case mark belonging to (a phrase headed by) the numeral. This point (which really is a consequence of the trees in (42) and (43)) is important and I list it as a separate numbered point:

(44)   *The status of the case marker in oblique cases:* In oblique cases, the case markers we find in the numerical construction on nouns are predicted *not* to be case markers that belong to the counted noun, but case markers that belong to (the phrase headed by) the numeral.

The prediction is clearly confirmed by data from a different variety of Ossetic called Digor, to which I turn now.

2.7 An excursus on the Digor variety of Ossetic

As a first step, consider the data in the table 2.5. What we see here is a comparison of an Iron noun (left) and a Digor noun (right). The comparison shows that the inflection on nouns is rather similar in the two varieties.

It will shortly become relevant that vowel-final stems in Digor have slightly different allomorphs of the case markers. An example of a vowel-final stem is in

2 Introducing Ossetic

Table 2.5: 'Horse' SG. in two Ossetic varieties (Erschler 2018)

	Iron	Digor
NOM	bæx	bæx
ACC	bæx-y	bæx-i
GEN	bæx-y	bæx-i
LOC (INE)	bæx-y	bæx-i
DAT	bæx-æn	bæx-æn
INS (ABL)	bæx-æj	bæx-æj
ADE	bæx-yl	bæx-bæl
ALL	bæx-mæ	bæx-mæ

the second column of Table 2.6, a consonant final stem (which we have already seen) is in the first column.[10]

Table 2.6: Consonantal and vocalic stems in Digor (Belyaev 2014: 33)

	'horse'	'rat'
NOM	bæx	uru
ACC	bæx-i	uru-j
GEN	bæx-i	uru-j
LOC (INE)	bæx-i	uru-j
DAT	bæx-æn	uru-jæn
INS (ABL)	bæx-æj	uru-jæj
ADE	bæx-bæl	uru-bæl
ALL	bæx-mæ	uru-mæ

I will understand the variation in the shape of the endings to be only phonological in nature. Most importantly, I understand the ACC/GEN/LOC *-i* (in the declension of 'horse') to be really the same morpheme as the *-j* in the declension of 'rat.' For the moment, it is immaterial what the direction of change is. There can be an underlying *-i*, which is realised as *-j* after vowels, or an underlying *-j* that surfaces as *-i*, when following a consonant. For what follows, the only relevant thing is that such a versatility between *-i* and *-j* exists. (I will later have more to say about this.)

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[10]Similar facts can be also observed in the Iron variety.

Similarly, I understand *-æn* after a consonant as the realisation of the same morpheme that shows up as *-jæn* after a vowel. Again, this could be because *-j* is inserted as a hiatus breaker, or it could be that the *-j* is underlyingly present in the dative ending, but deleted before consonants; this is hard to say.

Let me now turn to numerals. Despite the fact that the two varieties of Ossetic have a rather similar declension, they differ in the inflection of the numeral (when not followed by a noun). In Iron, as we have already discussed, the numeral inflects exactly like a noun. In Digor, the numeral has a special set of endings characteristic for numerals. These are shown in the first column. Their inflection is different from nouns, represented in the second column by the paradigm of 'horse.' I defend my segmentation (to be enriched) as the discussion unfolds. In essence, I am assuming that the *æ* (seen in the nominative of the numeral) is a floating vowel, which drops before the vowel initial endings (on analogy with the *æ* that is a part of the plural marker, recall 2.2).

Table 2.7: Numerals in Digor compared to nouns (Erschler 2018)

	two	horse
NOM	duuæ-Ø	bæx-Ø
ACC	duuæ-Ø	bæx-i
GEN	duu-ej	bæx-i
LOC (INE)	duu-emi	bæx-i
DAT	duu-emæn	bæx-æn
INS (ABL)	duu-emæj	bæx-æj
ADE	duu-ebæl	bæx-bæl
ALL	duu-emæ	bæx-mæ

Through several steps of reasoning, I will adopt here an analysis where the numeral paradigm is actually not so irregular as it seems at the first look; in particular, what I propose is that the numeral (in the oblique cases) takes exactly the same endings as nouns, with the difference that it has an extra morpheme between the root and the endings, which I shall call an augment. The shape of the augment is *-e(m)*, with *m* realised before vowels, and deleted before consonants. This is stated in (45):

(45)   *The morphological structure of the oblique numeral:*
        ROOT-*e(m)*-CASE

Such a template is crosslinguistically common; special stem markers appear in oblique cases in a great number of languages, see, e.g., McFadden (2018). In order to see how the template captures the actual forms, consider the segmentation in the following table, where I have split the Digor numeral into the root, the augment and the residual case marker.[11]

Table 2.8: Segmented numerals in Digor compared to nouns

	two			horse
NOM	duuæ-		Ø	bæx-Ø
ACC	duuæ-		Ø	bæx-i
GEN	duu-	e	-j	bæx-i
LOC (INE)	duu-	em	-i	bæx-i
DAT	duu-	em	-æn	bæx-æn
INS (ABL)	duu-	em	-æj	bæx-æj
ADE	duu-	e	-bæl	bæx-bæl
ALL	duu-	e	-mæ	bæx-mæ

The first thing I want to draw attention to is that at the right edge of the numeral's oblique forms, we can now see the 'regular' oblique case markers (going bottom-to-top we have *-mæ, -bæl, -æj, -æn, -i, -j*). These are identical to the noun's endings. Note that this statement presupposes that we interpret the *-j* found in the genitive of the numeral as a regular phonological realisation of the morpheme realised as *-i* in the genitive of *bæx-i* 'horse.'

Once we recognise that the forms of the numeral contain the oblique case markers, and with the root *duu(æ)* segmented, we get a special morpheme in between. I will call it the augment. The augment is either *-e* or *-em*. In principle, I could have not separated the augment from the root, and treat a form such as *duuem* as a suppletive allomorphs of the root. However, the same augment shows up after other numerals (and after nouns as well, as we shall see). Because of this, the augment must be considered an independent marker, and the oblique forms are therefore decomposed into three pieces.

The variation between *-e* and *-em* is interesting. Disregarding the genitive for now, it may be observed that we find *-e* before consonants and *-em* before vowels.

---

[11]The difference between the accusative forms (of the noun and the numeral) is not covered by the template. Here the difference is caused by the fact that inanimates (including the numeral) have the object form always the same as the nominative, while animates ('horse') show Differential Object Marking (Aissen 2003), and their accusative may be the same as the genitive.

I will consider this a kind of a liaison-type of effect, such that the augment is -*e(m)*, with *m* realised only when a vowel follows.

This brings us to the genitive. On the surface, we see here an augment of the shape -*e* followed by the consonant ending -*j*. This is as expected: if the ending is consonantal (-*j*), -*e* is what we expect.

What is, however, initially unexpected is the contrast between the genitive and the locative. To see the issue, consider the following reasoning. Looking at the paradigm of 'horse', it appears that there is just a single ending in GEN and LOC. If this ending is an underlying -*i* (which may become -*j* if forced to), we expect to find -*em-i* in both GEN and LOC of the numeral. If the ending were -*j* (which may become -*i* if forced to), then we expect the numeral to have -*e-j* in both GEN and LOC. The reasoning is summed up below:

(46)   a.   If the ending is *i*, we predict -*em-i*
       b.   If the ending is *j*, we predict -*e-j*

The fact that we are getting both *em-i* and -*e-j* in the paradigm of the numeral, leads to the logical conclusion that there are two different endings: the genitive -*j* (which yields -*e-j*), and the locative -*i* (which leads to -*em-i*). In the nominal declension, the endings are versatile: -*i* will turn to -*j* after vowels, and -*j* will become an -*i* after consonants. This leads to a fake homophony in the nominal declension, because the nouns end in a stable consonant/vowel that cannot elide. But when the two different endings (-*i*/-*j*) appear after a suffix with an unstable consonant (-*e(m)*), the difference shows up, because they can influence the shape of the base instead.[12]

To sum up, what I conclude here is that the declension of the numeral is indeed special, but its shape can be deduced from the morphological template shown in (47), plus the assumption that in Digor, GEN is an underlying -*j*, and LOC an underlying -*i*.

(47)   *The morphological structure of the oblique numeral:*
       ROOT-*e(m)*-CASE

The way I will interpret this in syntactic terms is that the projection of the numeral in Digor includes a functional head, call it X, which is spelled out by the augment -*e(m)*. I will not discuss here what happens to this projection in the

---

[12]An alternative is that the ending -*j* is special for the numeral, and not found in the nominal paradigm. I do not know how to decide between the options. In the absence of evidence, I am assuming a simpler analysis where the endings are the same between the nominal and the numerical paradigm.
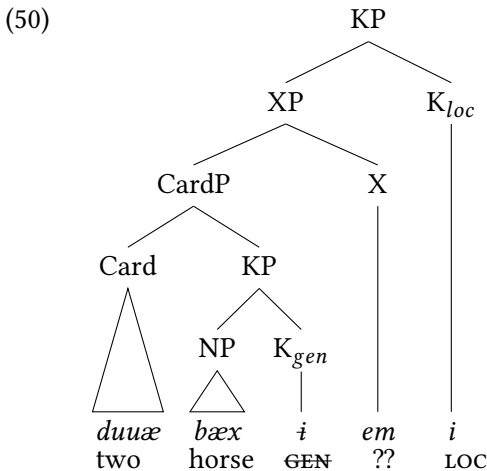
structural cases, whether it is present in Iron etc., but return to the topic in Chapter 5.

(48)

```
              KP
            /    \
          XP      K
         /  \     |
     CardP   X    |
      /\     |    |
    duuæ   e(m)  CASE
```
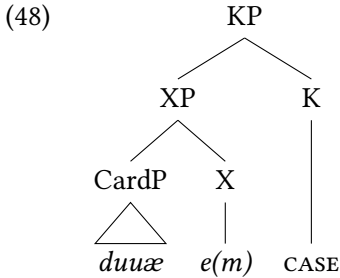
With the background clarified, let me now turn again to the prediction (44), repeated below:

(49)   *The status of the case marker in oblique cases:* In oblique cases, the case markers we find in the numerical construction are predicted to be case markers that do *not* belong to the counted noun, but case markers that belong to (the phrase headed by) the numeral.

The prediction arises because in the syntactic structure, the counted noun is the sister of the Card node, see (50). As a consequence, it appears linearly between the root of the numeral and its inflection.

(50)

```
                        KP
                      /    \
                    XP      K_{loc}
                   /  \      |
               CardP   X     |
               /  \    |     |
            Card   KP   |     |
            /\    /  \   |     |
          /   \  NP  K_{gen}|     |
        duuæ  bæx   i    em    i
        two   horse GEN  ??    LOC
```

Now as a consequence of this representation, we predict that in the oblique cases (where the noun's inflection is eliminated), the noun will fail to show its usual case markers, and it will show the numeral's case markers instead. As bizarre as

this may sound, this prediction is confirmed by the facts, as Table 2.9 shows:

Table 2.9: Digor Ossetic numerical phrases (Erschler 2018)

	two horses (Digor)
NOM	duuæ bæx-i
ACC	duuæ bæx-i
GEN	duuæ bæx-e-j
LOC (INE)	duuæ bæx-em-i
DAT	duuæ bæx-em-æn
INS (ABL)	duuæ bæx-em-æj
ADE	duuæ bæx-e-bæl
ALL	duuæ bæx-e-mæ

What we see here is that in NOM/ACC, the noun 'horse' has its own regular gen-
itive ending (the genitive ending of the numeral would be different). From the
genitive on, the noun all of a sudden drops its own endings, and it is followed by
the endings which are characteristic for the numeral (when in isolation). In an
approach where only a single case is ever assigned, this is absolutely bizarre: we
would need to describe this by saying that the noun, when it follows a numeral,
inflects like a numeral, except that in NOM/ACC, the noun has its regular genitive.

This is of course very strange, but becomes absolutely unremarkable under
the present approach where two cases are present. The numeral root is a type
of a noun that takes a complement ordered to its right. The counted noun has
its own genitive case. After it combines with its complement, the numeral also
combines with the same old affixes it would always take. In the structural cases,
these are silent and moreover, fail to license the deletion of the inner case. In such
an environment, we see the genitive belonging to the noun. In oblique cases, the
internal case is eliminated and we see the numeral's affixes. The only surprising
thing is that the suffixes of the numeral are separated from the numeral by the
counted noun. In other words, the counted noun appears as if in the middle of a
string composed of the numeral and its affixes. Such an unusual intertwining of
phrases and suffixes is, of course, interesting, but not exactly unexpected under
an approach where all composition is, in fact, syntactic.

Finally, note that just like in Iron, the internal case marker (elided in (50)) sur-
faces in affix suspension structures, where (as I assume) the genitive on the first
conjunct is not elided due to a lack of c-command from the inessive marker. (Just
like in Iron, it is also marginally possible to drop the GEN on the first conjunct,

which can be captured by proposing multiple possible structures for such coordinations.)

(51) ærtæ kizg-i   æma duuæ bicceu-e-bæl
      three girl-GEN and two   boy-AUG-INE
      'three girls and two boys' (Digor, Erschler 2018)
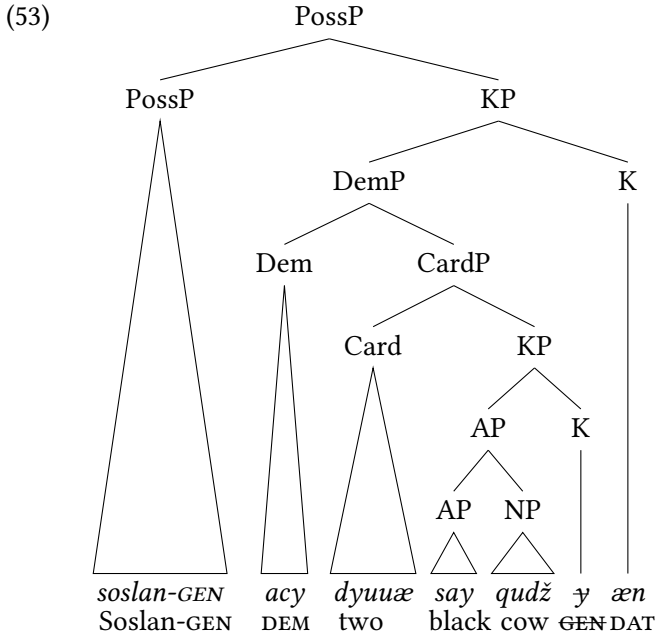
2.8 Possessors

This section is dedicated to possessors. Possessors, like counted nouns, are marked by the genitive case in Ossetic. The example (52) shows this. It contains both a possessor (*Soslan-y*) and a counted nooun (*qudž-y*), both marked by the genitive.

(52) Soslan-y   asy dyuuæ sau   qudž-y
      Soslan-GEN this two   black cow-GEN
      'these two black cows of Soslan's' (Iron, Erschler to appear(b): ex. 30)

While marked in the same way, possessors and counted nouns contrast when it comes to their position in the string. Specifically, possessors have to precede the demonstrative and are found on the very left of the noun phrase. On the other hand, the counted noun phrase ('black cows') follows the numeral and hence, also the demonstrative.

Another contrast between the two genitive phrases is that the genitive on the possessor is never elided, as far as I am aware, while the genitive on the counted noun is obligatorily elided when the whole phrase is marked by an oblique case. This is the contrast which is most relevant for the present concerns: why can the genitive on the possessor not be elided in the same way as the genitive on the counted noun?

I find it uncontroversial that the contrast in the placement of the genitives must be accounted for by proposing that possessors and counted nouns occupy different structural positions. In the the ideal case, the difference in the structural position will also explain why the genitive case on the possessors cannot be elided. One way we can achieve this is shown in (53).

(53)

```
                                    PossP
                          ┌───────────┴───────────┐
                       PossP                       KP
                         │               ┌──────────┴──────────┐
                         │             DemP                      K
                         │        ┌──────┴──────┐
                         │       Dem           CardP
                         │        │        ┌─────┴─────┐
                         │        │       Card         KP
                         │        │        │      ┌─────┴─────┐
                         │        │        │      AP          K
                         │        │        │   ┌───┴───┐      │
                         │        │        │   AP      NP     │
                      soslan-GEN  acy   dyuuæ  say    qudž   ɣ̵    æn
                      Soslan-GEN  DEM   two    black  cow   GE̵N̵   DAT
```

What I propose here is that the possessor attaches to the noun phrase above the case projection. I leave it aside whether this is a base-generated position, or whether the possessor reaches this position via movement (probably the latter). As a consequence of obligatorily occupying the high structural position, the possessor is found (obligatorily) on the very left. At the same time, it is not c-commanded by the K head, which marks the case of the whole noun phrase. The tentative suggestion I make here is that this is the reason why the genitive case of the possessor is never elided. In particular, if the obligatory ellipsis of the kind I am interested here requires c-command, then this type of ellipsis can never apply to the case marker of the possessor in (53).

In contrast to the possessor, the counted is in the complement position of the cardinal in the structure (53). As a consequence of this position, it follows the cardinal, and it is also c-commanded by the case marker belonging to the full phrase. As a result, ellipsis eliminates the genitive of the counted noun.

In sum, the proposal is that possessors and counted nouns differ in their structural position, and it is their position in the structure what decides whether their case marker can or cannot be eliminated. I leave it an open question whether it is always possible to differentiate between the two classes of genitives this way, or whether something more needs to be said. Given the type of analysis I have laid out up to now, the approach based on c-command difference appears to me to be

the simplest solution to the analytical challenge of how to distinguish between genitives that can/cannot be elided.[13]

2.9 Predicate inversion

Before I leave this chapter, let me come back to the issue of how the numeral and the counted noun combine together. Recall that in the structure we have been working with, the issue is that the counted noun seems to occupy a Spec of CARD position, branching unexpectedly to the right.
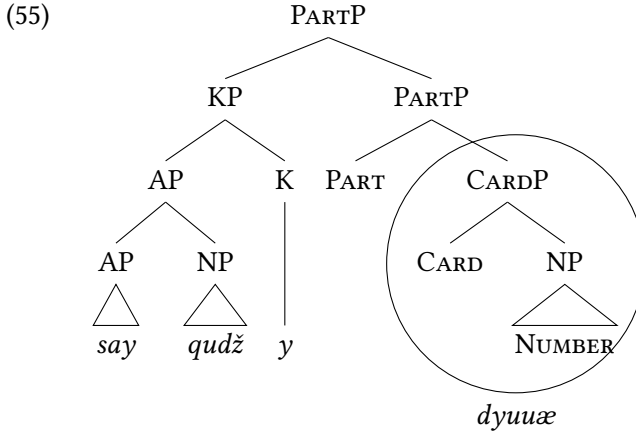
(54)
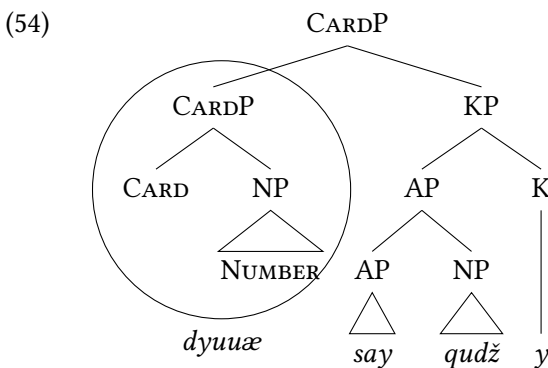
The KP Spec contrasts with other specifiers also when it comes to the way it is introduced in the structure. Other specifiers are either introduced in the Spec of a dedicated head (as in Cinque's approach), or they project their label to the main *fseq* (as in Starke's approach). This can be seen in (53), where all the specifiers (adjectives, demonstratives, possessors) project their label to the top. This is different in (54), where the CARD projects.

In sum, there are two odd aspects of the structure in (54): the first one is the linear position of the counted noun, and the second odd thing is that it is the only phrasal specifier in the extended DP whose label is not reflected on the main projection line. The strategy to resolve these apparent paradoxes will be to say that the structure in (54) is a 'surface' structure that arises as a result of movement applying to an underlying structure where no oddities arise. The type of movement I will propose has been investigated in the literature under the label 'predicate inversion' (see, e.g., Den Dikken 2006 for an extensive discussion of relevant cases).

---

[13]Pesetsky (2013) proposes that possessors correspond to separate phases, and that is why they are immune to the effects of case competition.

The first step is therefore to provide the base structure out of which (54) will be derived. In the base structure, the counted noun (in the genitive) will be introduced as a specifier of a dedicated functional head, just like adjectives, demonstratives etc. I will call the relevant head PART, see (55). This head is analogous to the APPL(icative) head in the verbal domain: its role is to introduce an argument in the functional structure of the nominal NUMBER.

(55)

```
                        PartP
                   ┌──────┴───────┐
                  KP            PartP
               ┌───┴──┐      ┌────┴──────┐
              AP     K    Part      CardP
           ┌───┴──┐                ┌───┴───┐
          AP     NP             Card      NP
          △      △                       △
         say    qudž   y                NUMBER

                                      dyuuæ
```

I call the head PART, because the syntactic behaviour of counted nouns is similar to the behaviour of pseudo-partitives (like *a bouquet of flowers*). For instance, Norris (2018) shows that pseudo-partitives in Estonian are marked the same as counted nouns (namely by the partitive case), and they behave the same as counted nouns in oblique cases (the partitive is replaced by the relevant oblique). The label PART is intended to bring out this parallel.[14]

This standard rendering of argument-introduction would, in a model like that of Starke (2004), again require the elimination of the empty head. In Starke's system, the feature PART would be located somewhere within the genitive KP, and projected to the top node, as in (56).

---

[14]It should be mentioned that an approach where nominal arguments are introduced as specifiers has been recently defended in Adger (2012), though the details of implementation differ.

(56)

PartP
- KP
  - xNP
    - ... Part ...
  - K
    - *y*
- CardP
  - Card
  - NP
    - Number

dyuuæ
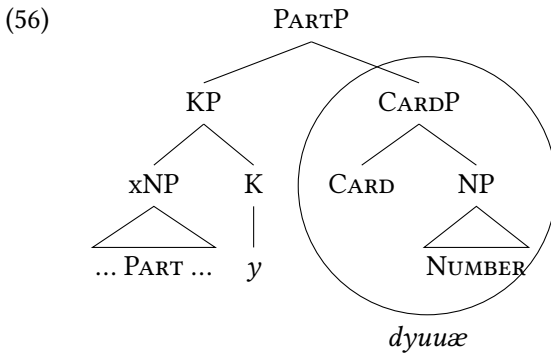
In this tree, xNP stands for 'the extended NP,' and the Part under the trian-
gle means that somewhere within this extended NP, the feature Part must be
present. (It could potentially correspond also to the top-node of the extended
NP, but I leave this open here.) This feature is then used as the projecting feature
and labels the whole constituent in the same way as all the other specifiers. So
the only new thing here compared to the other modifiers that we have already
seen is that the label does not correspond to the top node of the specifier, but
may in fact be present somewhere lower down in the Spec.

The need to introduce such a structure is, however, independent of the case at
hand. The structure (56) simply mimics Starke's approach to *wh*-phrases, shown
in (57). In this diagram, we have the phrase *which pasta* that behaves as a DP in
the base position, but when it is moved, it simply projects its *wh*-property to the
top node. The tree (57) corresponds to ex. 2 in Starke (2004):

(57)   I wonder ...

C_{wh}
- DP_{wh}
 - **wh**-ich pasta
- TP
  - the boys ate *t*
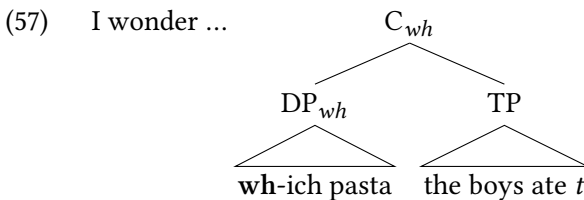
Now regardless of whether (55) or (56) is chosen as the relevant format (I will
assume (56) here), we now have structures that neatly represent the bi-nominal
nature of the numerical construction. In (55), the counted noun is introduced as
the Spec of a dedicated functional head. (56) is the equivalent of such a structure
in Starke's (2004) approach to specifiers.

Taking these structures for granted, we would now expect the counted noun
(occupying the Spec of Part) to be to the left of the numeral, which is empiri-

cally wrong; the numeral is to the left of the counted noun. This ordering issue is (once again) not something that would be somehow specific to my proposal about Ossetic numerals. As pointed out by Corver (2001) (working on similar data in Romanian), this issue 'reduces' to the venerable problem of the so-called predicate inversion. Specifically, Corver's idea is that in the structure (55), the encircled numeral is a (cardinality) predicate that specifies the quantity of the argument in Spec,PartP. Once this is realised, the derivation of the order Cardinal > Noun is an instance of a derivation where a predicate (the numeral) precedes the subject (the counted noun). And that is why such constructions have been dubbed 'predicate inversion,' see Den Dikken (2006) for a recent thorough discussion.

In line with this larger area of research (and very much along the lines proposed by Corver 2001), I will assume that predicate inversion involves a step of movement which brings the predicate – CardP – across its argument. In a standard theory with heads and specifiers, the derivation looks as in (58). The movement targets the Spec of a higher head F, called a linker in Den Dikken's work on predicate inversion.[15]
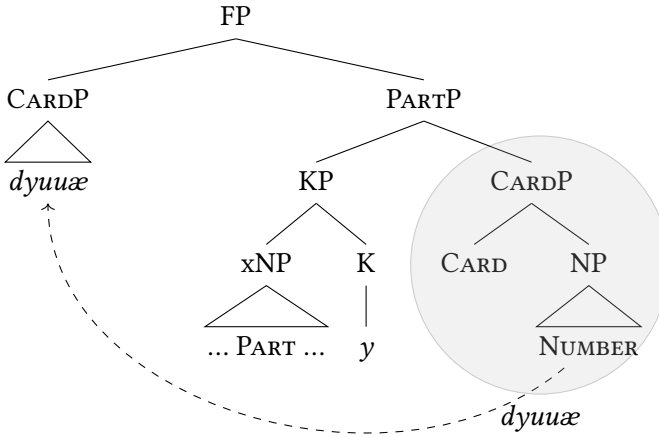
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[15]In Adger (2012), a structure like this is base generated. In Corver (2001) (following the general guidelines of predicate inversion as described in Den Dikken 2006), the genitive case is located under F. Adger (2012) (like me) places the genitive within the argument introduced by Part.

(58)
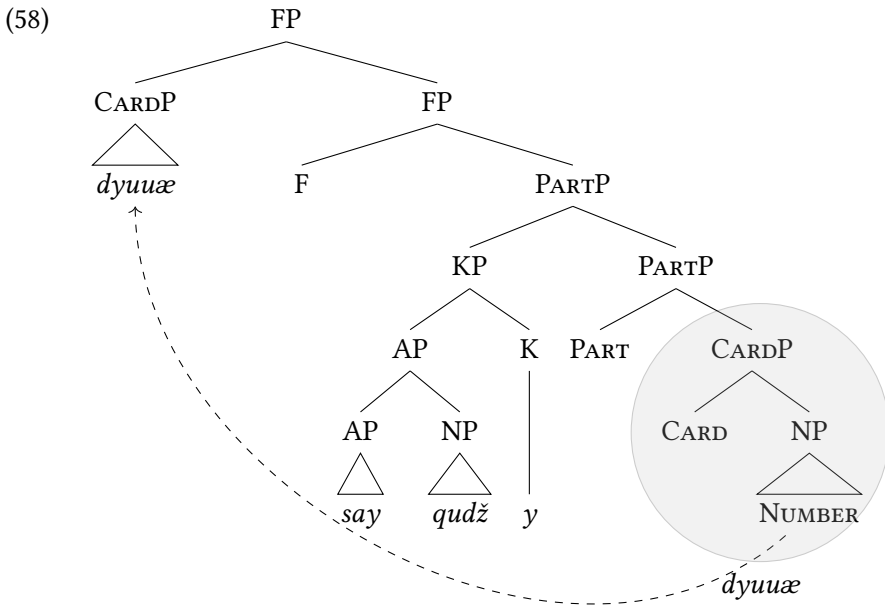
I will adopt here an approach to traces that aligns with that of Chomsky (1995: 185), where the "trace left behind is a copy of the moved element, deleted by a principle of the PF component in the case of overt movement. But at LF the copy remains, providing the materials for 'reconstruction'." I will mark copies by shaded circles.
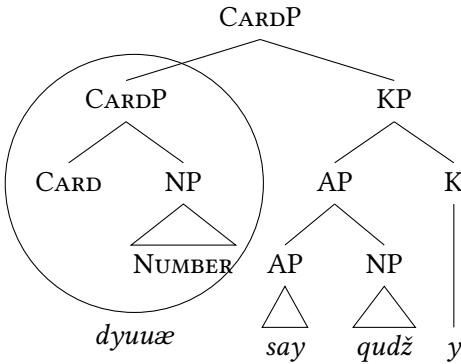
In Starke's system, as illustrated in (57), such movements are motivated by the need to provide a feature to the top node. In (57), the reason why the *wh*-phrase moves from the base position is to provide the label *wh* to the root node. A derivation like the one in (58) will therefore be again interpreted as a movement that will label the whole projection line, transforming (56) to (59). Here the label F must be provided from within the projection of the cardinal.
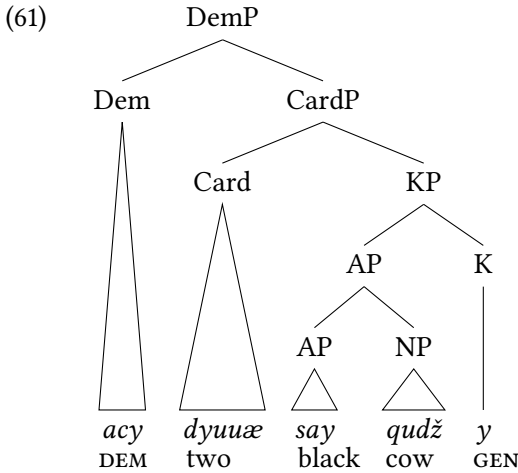
(59)

```
                              FP
                 ┌────────────┴──────────────┐
              CardP                        PartP
               △                 ┌──────────┴──────────┐
             dyuuæ               KP                   CardP
                            ┌────┴────┐          ┌──────┴──────┐
                          xNP         K        Card           NP
                           △          │                        △
                      … Part …        y                     Number

                                                             dyuuæ
```

Through predicate inverison, we have now reached a structure that is very reminiscent of our initial structure (54), repeated in (60) for convenience.

(60)

```
                                   CardP
                   ┌───────────────┴───────────────┐
                CardP                              KP
             ┌────┴────┐                    ┌──────┴──────┐
           Card        NP                  AP             K
                        △            ┌─────┴─────┐        │
                     Number         AP          NP        y
                                     △           △
                  dyuuæ             say         qudž
```

The similarity pertains to the fact that the numeral indeed is merged as a projecting specifier and labels the root node. The only difference between the structures is the nature of the complement. In (60), there is just the KP in the complement position. In the predicate-inverison derivations, the numeral merges with a more complex constituent, which contains (in addition to the genitive) a copy of the numeral.

Where possible, I will be taking a shortcut and represent the relevant aspects of the structure through the original diagram (16), repeated in (61) for convenience. However, we should keep in mind that this structure is the result of the numeral having moved across the counted noun, which is introduced as the Spec of a dedicated position in the tree.

(61)

```
                      DemP
              _____|_____
             |                 |
            Dem              CardP
             |         _____|_____
             |        |                 |
             |       Card               KP
             |        |           _____|_____
             |        |          |             |
             |        |          AP             K
             |        |      ____|____          |
             |        |     |         |         |
             |        |     AP        NP        |
            acy     dyuuæ   say       qudž       y
            DEM     two     black     cow       GEN
```

2.10 Summing up

In this chapter, I have argued that there are reasons to think that in the numerical construction in Ossetic, we observe two different types of case markers: the 'internal' genitive, required by the numeral on its complement, and then an external case marker, which signals the role of the whole phrase.

We have seen data which show that under certain circumstances, both of these markers may be present simultaneously, as under suspended affixation in (62-b).

(62)   Suspended affixation in Iron Ossetic numerals (Erschler 2018: 25)

    a.   ærtæ læppu-jyl æmæ čyzg-yl
            three boy-ADE   and   girl-ADE
            'three boys and a girl' (adessive)

    b.   ærtæ læppu-jy æmæ čyzg-yl
            three boy-GEN and   girl-ADE
            'three boys and a girl'

Given that both markers may be simultaneously present, the question is what causes the deletion of the inner genitive (when only the oblique case is present). We have seen reasons to think that this deletion is not phonological, and settled on the idea that we are dealing with a morphosyntactic process that seems to be sensitive to c-command. This helps us explain why the genitive of the possessor is never deleted, and why there is an asymmetry between the first and second conjunct in examples such as (62-b). (The asymmetry is that the genitive inside

the first conjunct is not deleted, but it is deleted in the second conjunct).

In considering the nature of this process, it is further relevant that the two case markers, even though linearly adjacent, are in fact structurally relatively far apart, residing each in a different extended projection, very much like in comparable English examples of the sort *to these millions of phone calls.* In the following chapters, I am therefore going to develop an account of case competition based on ellipsis under identity and c-command, in part inspired by Cinque's (in press) analysis of relative clauses.

3 On the identity requirement

The starting point of this chapter is the conclusion that numerals in Ossetic always require their complement to be marked by the genitive case. When the whole phrase—containing the numeral and the noun—serves a particular function, it is marked for case once again. When the conditions are right, the inner genitive can get deleted under c-command from the outer case. In this chapter, I address the precise content of the phrase 'if the conditions are right.' In other words, I will start asking the question of why it is that the oblique cases license the deletion of the genitive, but the structural case don't (the essence of the strength scale).

3.1 Case stacking

In order to get a wider perspective on what the phrase 'if the conditions are right' means, I want to put my analysis of Ossetic in a larger perspective. In particular, the underlying structure I propose for the numerical construction (as it plays out in Ossetic) is a special instance of a phenomenon referred to variously as 'double case,' 'suffix stacking' or 'suffixaufnahme' (see Plank 1995). The defining characteristic of this construction is that the possessor in the noun phrase is followed by two cases: first, it has the genitive suffix, which is appropriate for its role as the possessor. The second (outer) case reflects the role of the full noun phrase. An example of the relevant construction is given in (1).

(1)   Ngunha   yana-nyja nganaju-rla marnti-yu-rla   ngurra-rla
        that.NOM go-PAST   1SG.DAT-ALL father-DAT-ALL camp-ALL
        'He went to my father's camp.' (Jiwarli, Austin 2015: 61)

The sentence comes from the Australian language Jiwarli. The relevant part of the sentence is the phrase *marnti-yu-**rla** ngurra-**rla*** seen at its very end, meaning 'to father's camp.' In this phrase, the possessor of the 'camp,' i.e., the 'father,' is marked for case twice. The first case marker (the one closer to the root), indicates the possessor function. This case would be 'normally' called the genitive, but in Jiwarli, possessors are marked the same as recipients and so the case which in-

dicates the possessor function is (somewhat arbitrarily) called the dative. I will adopt this usage but keep in mind that this case is equivalent to a genitive, expressed by a marker that also has other functions.[1]

Crucially, following the possessive GEN/DAT marker, the noun *marnti-yu-rla* 'father' has an additional case marker, namely *-rla*. This is an allative marker, and its presence on the noun 'father' is due to the fact that the noun is a possessor of the noun 'camp,' which is in the allative. In other words, the possessor 'father' agrees with the head noun in case, and the second case marker is therefore a concord marker.

This construction is relevant for two reasons. First of all, it shows that there are languages which wear the Ossetic underlying structure so to speak 'on their sleeve.' Second of all, it shows that simply juxtaposing two case markers is not something that inevitably leads to case competition. In examples such as (1), the two case markers peacefully coexist. Our understanding of case competition must also cover cases like these, where a genitive can be followed by an allative. (This is unlike what happens in Ossetic.) In other words, we have to understand not only examples where case competition takes place, but also those where it doesn't. In this section, I will not be able to address this issue in full, but I would nevertheless like to indicate how the lack of competition may fit in into the overall theory of case competition.

In order to be able to say something about this, let me stay with Jiwarli for a little longer. The fact that possessors are followed by an agreement marker is quite regular in Jiwarli. The following example shows the possessor 'my' followed by an accusative marker. The presence of this marker is triggered by the fact that the head noun 'camp' is in the accusative case in (2).

(2) warn nganaju-nha ngurra   panyi-ma
     not   I.DAT-ACC   camp.ACC disturb-IMP
     'Don't disturb my camp!' (Jiwarli, Austin 1995: 372)

There is, however, one exception to the rule that the possessor is always followed by an agreement marker. The exception is that when the agreement marker would be identical to the possessive marker, one of them is deleted. As a consequence, there are never two identical markers one after the other. The following example shows this:

(3) thuthu-wu purrarti-yi(*-yi)
     dog-DAT   woman-DAT(*-DAT)

---

[1]GEN—DAT syncretism is a relatively common syncretism in the languages of the world.

'(of/to) the woman's dog' (Jiwarli, Plank 1995: 68)

The reason why this is disallowed is not that agreement is impossible when the head noun is in the dative. The following example shows that such agreement *is* in fact possible, as long as the two datives are realised differently. The relevant phrase to look at in (4) is the phrase *thuthu-**wu** yakan-ku-**wu*** 'of (my) wife's dog', where the possessor of the noun 'dog' (which itself is in the GEN/DAT case) is marked for DAT twice:

(4) juma   jirrilarri-a   thuthu-wu nganaju-wu yakan-ku-wu
     child.ABS be.afraid-PRES dog-DAT   I.DAT-DAT   spouse-DAT-DAT
     'The child is afraid of my wife's dog' (Jiwarli Austin 1995: 373)

Given the existence of such examples, what seems to block the two datives in (3) is that they would be identical (a conclusion that I take over from the literature cited). One of them is therefore deleted due to 'haplology,' which is nothing but deletion under identity:[2]

(5) Deletion under identity: NOUN-α-α → NOUN-α

So the conclusion to be drawn here is that for deletion to take place, Jiwarli requires full and complete identity of the markers.

In other languages (Ossetic among them), such deletions apparently do not operate under strict identity of either form or function. For instance, as Plank (1995: 68-9) notes, there are a number of cases where locatives, instrumentals and other 'relationship-identifying cases' (as he calls them) interact with the possessive marker in a similar way like the Ossetic cases, triggering its deletion. An example of this phenomenon from the language Kungarakany is in (6).

(6) lok   ngirrpa(*-kini)-wu
     place 1.SG(*-DAT)-LOC
     'to my place' (Kungarakany, Plank 1995: 69)

(6) (and other examples like that) are the most interesting examples for me, because they look like Ossetic, as I have described it in the preceding chapter: they show evidence of case stacking followed by a deletion that does not require the sameness of markers.

On the surface, such languages obviously contrast with the generalisation op-

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[2]Austin (1995) describes the distribution of allomorphs of the DAT case as partly governed by morphology and partly by phonology.

erative in Jiwarli, namely that deletion requires identity. This is expressed in (7), where instead of having α license the deletion of another α, we have β licensing the deletion of α:

(7)   Deletion under non-identity: NOUN-α-$\beta \rightarrow$ NOUN-β

One of the goals of this book is to show that deletions such as those in (6) do not need to be expressed as in (7), but can be reduced to deletions under identity, i.e., of exactly the same sort as seen in (5). The first step on this path is the adoption of a case decomposition like the one introduced in Chapter 1 in Table 1.6. I repeat it in 3.1 for convenience.

Table 3.1: Cummulative feature decomposition

CASE	FEATURES
NOM	F1
ACC	F1, F2
GEN	F1, F2, F3
LOC	F1, F2, F3, F4
DAT	F1, F2, F3, F4, F5
INS	F1, F2, F3, F4, F5, F6

Recall that representations like these are needed independently to derive restrictions on syncretism such that in the sequence of cases given in the table top down, syncretism only targets adjacent cases.

In such an independently needed decomposition, the possessor case (GEN) is characterised by the features [F1, F2, F3]. The locative contains the features [F1, F2, F3, F4]. If this is adopted, we can avoid formulating the deletion process in (6) in terms of surface forms (which leads to the uninsightful deletion in (7)), but we can instead describe the deletion in terms of the underlying feature sets. This leads to the description in (8):

(8)   NOUN - [$\boxed{\text{F1, F2, F3}}$] - [$\boxed{\text{F1, F2, F3,}}$ F4] $\rightarrow$ NOUN - [F1, F2, F3, F4]

What we achieve by stating the deletion observed in (6) as in (8) is that the deletion of the possessive case by the locative case now becomes a matter of identity again: this is what the boxes in (8) are intended to bring out. Since the locative in fact contains the possessive case, the possessive case can be deleted under identity with a proper subpart of the locative.

And this is the goal I want to move towards: I want to see what it takes to interpret every deletion of the sort in (7) as a deletion of the sort in (8). This means that whenever we have a deletion of one case caused by the presence of a different case, I will understand this as deletion under identity with a proper subpart of the licensing case.

The issue that nevertheless must remain in the background is the issue of over-generation. Once we allow for a general deletion of a genitive by a locative, what is going to make sure that in Jiwarli (where strict identity is needed), equations such as (8) are never operative? So this will ultimately be a balancing act: how can we allow for deletions using the identity of features in some cases, and at the same time be able to disallow them in other cases? I will postpone the discussion of this issue all the way towards the end of this chapter, because the solution will emerge from sharpening the formalism in (8), which is one of the next things on my agenda.

3.2 Syncretism in Iron Ossetic

I shall begin by some basic empirical issues. First of all: assuming that case competition is to be handled by deletions along the lines of (8), we must posit the following strength scale:

(9)   Strength scale (Ossetic)
      { NOM, ACC } < GEN < { LOC, DAT, INS, COM, ... }

A scale like (9) will have consequences for the morphology of case. Specifically, in order to allow all the oblique cases to delete the genitive, all the obliques must contain the genitive. At the same time, the genitive cannot be contained in the nominative and the accusative (because nominative and accusative never delete the genitive). Once we reinterpret (9) through this perspective, the prediction is that syncretism in Ossetic must obey a scale that looks exactly like its strength scale.

(10)   A predicted constraint on syncretism (Ossetic)
       { NOM, ACC } – GEN — { LOC, DAT, INS, COM, ... }

The scale in (10) predicts that no oblique other than the genitive can show syncretism with NOM/ACC (unless the GEN does as well). With the basic idea in place, let me come back to the Ossetic declension, and see whether the facts support this kind of approach. After I am done with this, I will come back to the issue of

why such abstract case containment relations may still fail to yield deletion in other languages.

The main point of discussing the Iron paradigms is to verify the hypothesised correlation between the order of cases as revealed in syncretism (the syncretism sequence) and their behaviour in case competition (the strength sequence). So when I shall discuss syncretism, my goal will be to determine the order in which cases come so that syncretism is restricted to adjacent regions in the proposed ordering.

The exhaustive record of attested nominal syncretisms is given in Table 3.2. Shading in the table marks syncretism. Two of the syncretisms are related to the fact that the accusative case (defined here as 'the form of the direct object') is a non-autonomous case in Ossetic (see Blake 2001 for the term). This means that it never has a distinctive realisation of its own. With inanimates, represented in the first column by the noun 'head,' it is always the same as the nominative. For humans (represented in the table by the noun 'father'), it is always the same as the genitive (and locative, though we shall see later that the link to the genitive is stronger than the one to the locative). The final syncretism found in the nominal declension is one between the genitive and the locative case.[3]

Table 3.2: Iron Ossetic declension

	head, SG	father, SG	head, PL
NOM	sær-Ø	fydØ	sær-tæ-Ø
ACC	sær-Ø	fyd-y	sær-tæ-Ø
GEN	sær-y	fyd-y	sær-t -y
LOC (INE)	sær-y	fyd-y	sær-t -y
DAT	sær-æn	fyd-æn	sær-t -æn
INS (ABL)	sær-æj	fyd-æj	sær-t -æj
ALL	sær-mæ	fyd-mæ	sær-tæ-m
ADE	sær-yl	fyd-yl	sær-t -yl
EQU	sær-au	fyd-au	sær-t -au
COM	sær-imæ	fyd-imæ	sær-t -imæ

All facts summed up, the syncretism scale in Ossetic must look as in (11). We

---

[3]With non-human animates, there is variation, and it seems that definiteness/specificity has a role to play here, though it plays no role for humans and inanimates. I do not treat differential object marking here, though see Starke (2017), Caha (2018) for a treatment of this phenomenon within Nanosyntax.

have the nominative at one end, and we need it to be adjacent to the accusative because of the inanimates. We need ACC to be followed by the pair GEN/LOC, which are non-distinct in nouns.[4] After them, additional oblique cases come in an order that is impossible to determine by only looking at Table 3.2.

(11) *Syncretism scale (Ossetic, to be expanded)*
      NOM – ACC – { GEN, LOC } – { DAT, INS, … }

Let me now turn to pronouns given in 3.3. Their main import consists in separating the genitive and the locative case; specifically, the genitive must precede the locative. This is because all the pronouns have the same form for the accusative and the genitive in Iron, while the fate of the locative varies. In 1st and 2nd person pronouns, the paradigm does not include the locative form, and the meaning 'in me' has to be circumscribed by an adpositional phrase. In the 3.SG, the locative pronoun is sometimes given as a part of the paradigm (Belyaev 2014), but it does not mean 'in it' (which would be expected) but 'there.' Opinions therefore vary whether this form should be included in the paradigm; I include it for completeness. In any event, the order NOM – ACC – LOC – GEN seems problematic, because then the LOC would illegally intervene between the GEN and ACC, which are always the same in pronouns.

Table 3.3: Iron Ossetic pronouns (Belyaev 2014)

	1.SG.	1.PL	3.SG
NOM	æz	max	uy-j
ACC	mæn	max	uy-j
GEN	mæn	max	uy-j
LOC (INE)	—	—	uy-m
DAT	mæn-æn	max-æn	uy-m-æn
INS (ABL)	mæn-æj	max-æj	uy-m-æj
ALL	mæn-mæ	max-mæ	uy-mæ
ADE	mæn-yl	max-yl	uy-u-yl
EQU	mæn-au	max-au	uy-j-au
COM	mæn-imæ	max-imæ	uy-imæ

---

[4]For Digor, I have argued in section 2.7 that the syncretism between the genitive and the locative is accidental. This had to do with the form of the case on numerals. In Iron, numerals inflect the same as nouns, and there is no evidence for differentiating LOC and GEN, as far as I am aware.

Therefore, the sequence (11) can be sharpened into (12), where we are certain of the order among the first four cases, and unsure as to how the paradigm should unfold later on.

(12)   *Syncretism scale (Ossetic, to be expanded)*
       NOM − ACC − GEN − LOC − { DAT, INS, … }

Before we look into this, note that the ordering in (12) (ultimately feeding into cummulative decomposition) is further confirmed by the containment patterns we find in the paradigms in 3.3. In particular, we see that the genitive form of the 1st and 2nd person pronouns is literally contained in the oblique forms, supporting—on the face of it—the idea (relevant for ellipsis) that the genitive form is contained inside the obliques. The story will become slightly more complicated later on, but the fact should be noted.

In the 3rd person pronouns, the locative form is contained inside the dative and the instrumental (and perhaps the allative), though this is hard to interpret given the unclear status of the locative here.

Finally, when we turn to clitics, we find some evidence for singling the instrumental out of the group of the remaining obliques and placing it next to the locative, as the Table 3.4 illustrates. What we see here is the rather surprising fact that the instrumental/ablative clitic and the locative clitic pattern alike, though this syncretism (of locative and ablative to the exclusion of the allative) is exceedingly rare, see Pantcheva (2010; 2011) and the references there.

Table 3.4: Iron Ossetic pronouns (Belyaev 2014: 39)

	1.SG.	3.SG
NOM	—	—
ACC	mæ	æj
GEN	mæ	æj
LOC (INE)	mæ	dzy
INS (ABL)	mæ	dzy
DAT	myn	(j)yn
ALL	mæm	(j)æm
ADE	myl	jyl
EQU	—	—
COM	—	—

Because of this syncretism, there is a difference here between the order in Russian (which has DAT before INS) and Ossetic (INS before DAT). This order is quite rare, and raises the question whether some kind of a phonological explanation could be available. For instance, observing pairs such as ***mæn-yl*** (full pronoun) vs. *m-yl* (clitic), one could, for instance, speculate that the expected ablative form could be an underlying *m-æj (cf. the full form ***mæn-æj***), where the hypothetical *m-æj is phonologically reduced to *m-æ*, but I will not dwell on this here.

The main point is that once all syncretisms in Ossetic are considered, we are able to map all the homophonies onto a linear sequence of cases given in (13), with not a single *ABA violation.

(13)   *Syncretism scale (Ossetic, final)*
        NOM − ACC − GEN − LOC − INS — { DAT, ALL, ADE, … }

This fact deserves attention in its own right. In a system with 10 cases (like Ossetic), there are 1013 logically possible syncretisms among the cases (I am using here the formulas given in Caha 2009: 8). Any linear constraint brings this number down to 45; i.e., there are 45 possible syncretisms that can be arranged on a particular linear scale with ten members. Therefore, the fact that case that syncretism can be restricted in a linear fashion is something that vastly reduces the space of possible languages. The fact that this reduction can be achieved by adopting a cumulative decomposition along the lines of Table 3.1 should be therefore a welcome result.

Furthermore, the syncretism scale that we have established is one of those that are compatible with the strength scale, which we need for ellipsis under identity to run properly, and which I repeat in (14).

(14)   Strength scale (Ossetic)
        { NOM, ACC } < GEN < { LOC, DAT, INS, COM, … }

The conclusion I shall draw from this discussion is that in Ossetic, the strength scale (as observed in numerical phrases) and the syncretism scale converge and open the possibility to implement a solution where the ellipsis of the inner case (i.e. case competition) is nothing but ellipsis under c-command and identity.

3.3 Structuring the bundle

In the preceding sections, I have simplified things as much as I could to present my strategy of how to reduce non-identity deletions to identity deletions. How-

ever, such a simplification is not innocent and leads to some issues that I now want to remedy by offering a more full-fledged version of the proposal. Ultimately, this line of reasoning will lead to a proposal as to how we may prevent case deletions in languages where they do not occur.
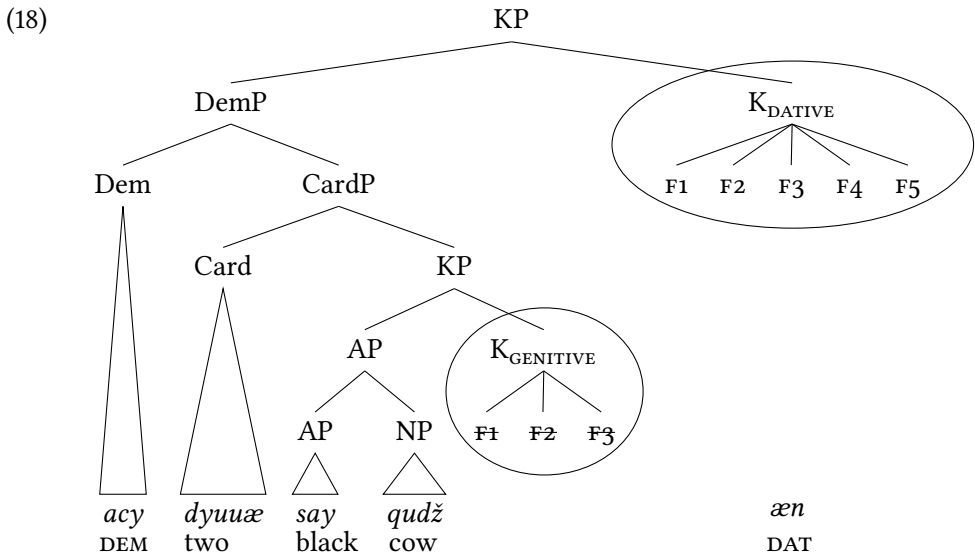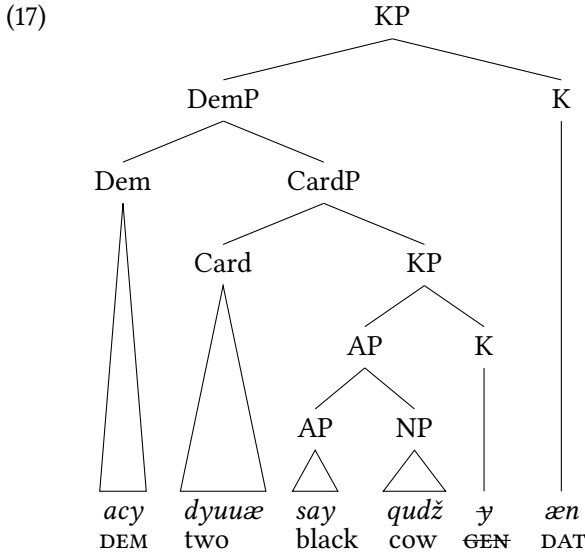
The thing I want to focus on is how exactly ellipsis operates on the type of feature structures that were sketched in Table 3.1 and used in rules like (15) to re-interpret non-identity as identity at the level of morphosyntax.

(15)   NOUN - [| F1, F2, F3 |] - [| F1, F2, F3, | F4] → NOUN - [F1, F2, F3, F4]

To see the issue, consider the fact that if cases correspond to simple non-structured sets of features (as the table in 3.1 suggests), their representations look as in (16). (16-a) is a representation of the GENITIVE, because the genitive corresponds to a set (the top node in (16-a)) containing the features F1, F2 and F3. The representation of the LOCATIVE, as per the proposal in 3.1, is shown in (16-b). The locative again corresponds to a set—represented by the top node—that contains the features F1 to F4. Similarly, the representation of the dative case (according to the same table) would be as in (16-c).

(16)   a.   GENITIVE   b.   LOCATIVE   c.   DATIVE

           F1   F2   F3   F1   F2   F3   F4   F1   F2   F3   F4   F5
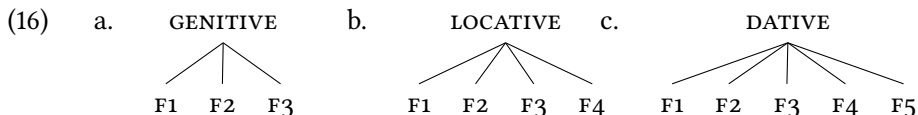
These feature structures represent a more elaborate version of a simple non-decomposed K head that we used in Chapter 2. If we now update our previous structures with the new proposal, then instead of using representations like the one in (17) (repeated from Chapter 2, numbered point (20)), we should more correctly use the representations in (18).

(17)

KP

DemP — K

Dem — CardP

Card — KP

AP — K

AP — NP

acy — *dyuuæ* — *say* — *qudž* — ɣ — *æn*
DEM — two — black — cow — ~~GEN~~ — DAT

(18)

KP

DemP — K_{DATIVE}

F1 F2 F3 F4 F5

Dem — CardP

Card — KP

AP — K_{GENITIVE}

F1 F2 F3

AP — NP

acy — *dyuuæ* — *say* — *qudž* — *æn*
DEM — two — black — cow — DAT

The big difference here is that in (17), we do simple surface deletion. A genitive marker is deleted because of a higher dative marker. This deletion does not apply under identity, because it eliminates α due to the presence of a higher β. We can stipulate a set of βs such that they license the deletion of α, but that's about it.

The representation in (18) is an important update. What we are doing here is not that we are deleting the actual genitive case marker *y*, we are targeting the

individual case features and delinking them from their phonology. The feature F1 inside the genitive is delinked because of a higher F1 in the dative, etc. As a result, there is no feature left inside the genitive that would be linked to phonology, and the case marker is silent. The improvement is that we have replaced an arbitrary rule "delete α in the context of β" by an operation based on identity.

However, the feature structures under the case nodes in (18) do not provide the optimal representation for the delinking analysis. This is because every feature of the genitive has to be targeted separately. This is shown in (19), where I simply show what the genitive in (18) ends up looking like:

(19)   GENITIVE

          ~~F1~~ ~~F2~~ ~~F3~~
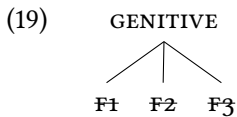
The reason why we have to apply ellipsis in this manner is that while it is true that the higher dative contains every feature of the genitive, it does not, strictly speaking, contain the genitive.

This proposal is therefore not particularly elegant. It ends up looking like what would happen if we were trying to do a VP ellipsis in a theory without a VP. To see the parallel, suppose that the structure of a sentence were flat, lacking a VP as in (20-a). If that was so, the only way in which we could elide the (nonexistent) VP is by deleting the object and the verb separately as in (20-b).

(20) a.   SENTENCE   b.   SENTENCE

           John   will   eat   potatoes   *Mary   will   not   ~~eat~~   ~~potatoes~~*
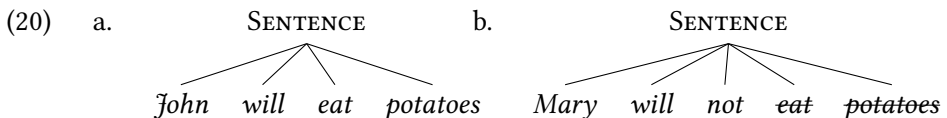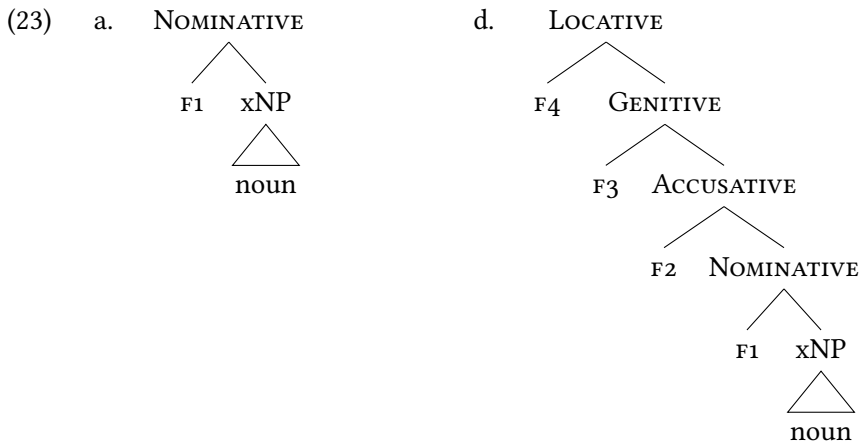
The conclusion is that if we do not want to end up with a theory of case ellipsis that would be as ridiculous as the ellipsis in (20), the structure of the dative has to look as in (21-a), where the dative contains not only each individual feature of the genitive, but rather the genitive as a whole. In addition to the genitive, it of course still has the features F4 and F5. With this updated representation in place, the application of ellipsis is no longer ridiculous, see (21-b).

(21) a.   DATIVE   b.   ~~GENITIVE~~

          F5   F4   GENITIVE   F1, F2, F3
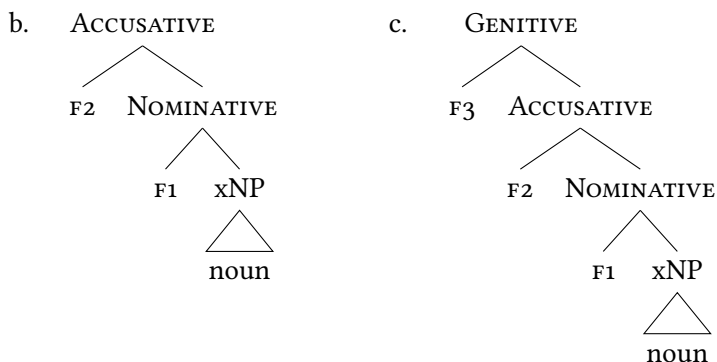
                    F1, F2, F3
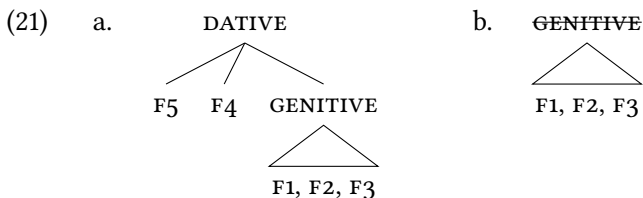
If the structures look as in (21), the ellipsis of the genitive is unproblematic, because the elided constituent in (21-b) is literally contained in the locative. This is exactly what happens when we introduce the VP in the structure of the sentence, as in (22). The sentence structures are still of course only half way towards accuracy, but the point is to introduce only the amount of structure for which there is evidence coming from VP-ellipsis. This is similar to (21), where we only introduced the amount of structure required by the particular example under discussion.

(22) a.

```
              Sentence
        ┌────────┼────────┐
      John     will      VP
                       ┌───┴───┐
                      eat   potatoes
```

b.

```
                  Sentence
        ┌──────┬──────┬──────┐
      Mary   will   not     V̶P̶
                            ┌───┴───┐
                           eat   potatoes
```
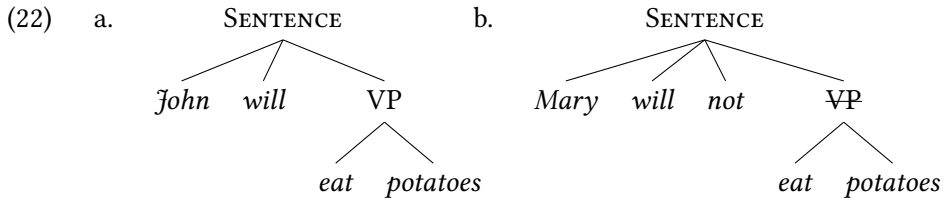
Now recall that the very same issue arises for all the pairs of cases on the strength scale. For instance, in order to be able to handle the genitive of negation (recall (8) from Ch. 1) by ellipsis, the genitive must contain the accusative in the same way in which the genitive contains the locative, and so on. Generalising this approach, I will adopt here the proposal that the relationship between all the neighbors on the scale should be modeled as in (21) rather than as in (16). The consequence of adopting this approach is that feature structures of individual cases look as in (23), with each case feature an independent syntactic head. (The picture that I am proposing here is identical to the one argued for in Caha 2009 on the basis of a different set of considerations.)

(23) a.

```
        Nominative
        ┌────┴────┐
       F1       xNP
                 △
                noun
```

d.

```
           Locative
        ┌──────┴──────┐
       F4         Genitive
                 ┌────┴────┐
                F3     Accusative
                       ┌────┴────┐
                      F2    Nominative
                            ┌────┴────┐
                           F1       xNP
                                     △
                                    noun
```

b.   Accusative
     F2 Nominative
         F1 xNP
              noun

c.   Genitive
     F3 Accusative
         F2 Nominative
             F1 xNP
                  noun

The xNP in the trees represents the extended projection of the noun, containing minimally the noun, but potentially also its modifiers (as we shall see later). On top of the noun, the case features are merged. The nominative in (23-a) has just a single case feature on top of the xNP, namely F1.

The accusative in (23-b) adds the feature F2 on top of the full NOMINATIVE constituent, yielding an extended xNP with two case features on top, namely F1 and F2. These two features exactly correspond to the features proposed for the accusative when the cumulative decomposition was first introduced in 1.6. What is new here is that the features do not correspond to an unstructured set, but are added incrementally on top of the xNP by the regular structure building operation Merge F (Chomsky 1995).

Similarly, (23-c) shows the updated structure of the genitive, and (23-d) corresponds to the locative case. These changes bring the cases in neat containment relations, where ellipsis operates in the same way as it does in phrasal syntax.

3.4 Movement

At the same time, the new structures require some clarifications. All the potential issues revolve around the fact that in (23), the case features no longer form a constituent on their own (as they did in (16)). After they have been re-organised, the only constituent that contains them all (i.e., F1+F2+…) also contains the extended noun phrase (the xNP). Note that even though the issue is worth mentioning, it is hardly surprising or unique to case. Given that case is a functional category (Bittner & Hale 1996, Bayer et al. 2001), splitting it in multiple projections will always lead to the type of representation where the case features (now residing in multiple functional heads) no longer form a constituent to the exclusion of the lexical head. This is an inevitable consequence of all 'split XP' proposals applied

to the functional domain (ever since Pollock 1989).

The reason why the new constituency is an issue is that such a state of affairs makes it (initially) difficult to see how we can elide the actual genitive case—consisting of the features F1, F2 and F3—without eliding simultaneously the noun. The type of ellipsis we would like to see requires that the features of the genitive (i.e., F1, F2 and F3) form a constituent to the exclusion of the noun. But there is no such constituent in (23-c).

The second issue is how case features are pronounced. In the simplified theory we have started from, all the features formed an unstructured set and could have been easily located under a single terminal node. As a consequence, they could have been spelled out as one morpheme without any particular difficulties. In the new setting (which, recall, is just a standard version of a 'split XP' proposal), they correspond to multiple heads. This, on its own, is not an obstacle for a joint pronunciation. It has been argued many times that if we allow for constituent lexicalisation, also known as phrasal spellout, it is possible to pronounce multiple heads by a single morpheme (see in particular Starke 2009, cf. McCawley 1968, Weerman & Evers-Vermeul 2002, Neeleman & Szendrői 2007). However, this again leads to the same issue: in order to pronounce all the case features together by a single morpheme (without affecting the noun to which the case markers attach), we must somehow make sure that the case features form a constituent to the exclusion of the noun. If we had such a constituent, there would be no problem. But there is no such constituent in (23).

The final issue concerns morpheme order. In Ossetic, case markers follow the noun. Assuming that morphemes are mapped onto linear order by c-command (as has become standard since Kayne 1994), it is difficult to see how morphemes expressing case end up following the noun, if the structures look as in (23).

It turns out that all the three issues point in the direction of a single solution, namely movement. The idea is that the structure of the cases—as given in (23)—is the so-called base-generated structure, which shows the order in which features are merged. However, it has been convincingly argued in Cinque's (2005) work that such base-generated hierarchies may also surface in different orders, because the underlying merge order may be altered by movements. I will not review Cinque's proposal here in its technical details; let me just mention the reason why it is an attractive solution. The reason is that in Cinque's approach, movements are of a restricted type, which allows one to generate only a limited number of permutations of the base order. Importantly, as Cinque shows, there is a perfect match between the set of 'allowed' orders ('allowed' in the sense that they can be generated by such a grammar) and the set of 'attested' orders (in the

sense of there being a language that has that order). Therefore, using Cinque style
movements in the domain at hand seems to be an option that is well grounded
in the research on what the set of possible human languages looks like. In fact, it
seems that if we did not allow for such movements, we would be introducing an
unmotivated restriction specific to the domain at hand, namely case. So it seems
only natural to expect that the same movements that Cinque uses must in fact
be available (and active) in the domain at hand.

Adopting this view, I am led to propose that in Ossetic (and other languages
like that), movement applies to the extended noun phrase, represented in our
trees by the xNP constituent. The movement places the noun on top of the case
features. Such a movement is illustrated in (24) on the example of the genitive
case. Note that the GENITIVE label is extended to the root node, because this con-
stituent still corresponds to the genitive case, since the movement of the noun
does not change the nature of the relevant constituent.

(24) (25)
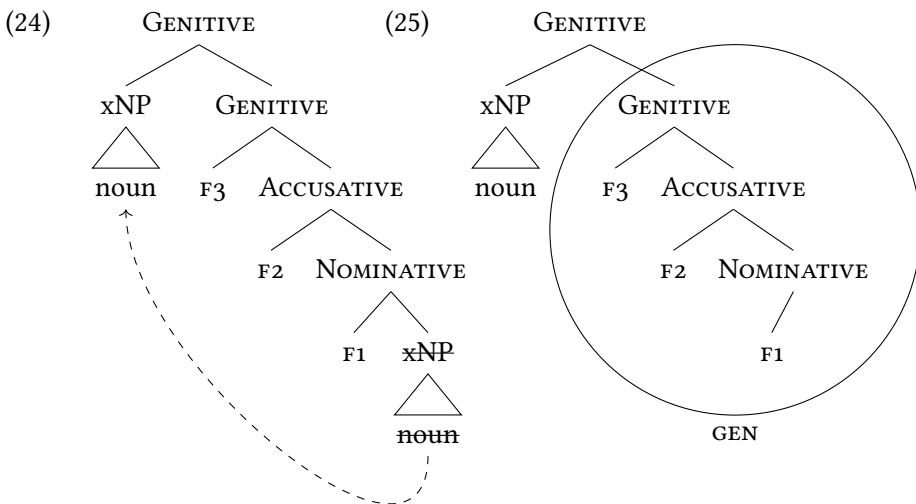
The effect of the movement is shown in (25), where I ignore the base-position of
the noun (its trace). What we see here is that all the case features now form a
constituent to the exclusion of the noun, which resolves all the three issues at
once. To see that, consider the following reasoning.

The first thing we achieve is that the case features now form a unit that may
be spelled out by a single morpheme (without affecting the noun). This is indi-
cated by placing a circle around the relevant constituent in (25) (more details on
insertion will follow). The second thing we achieve is that the noun precedes the
case marker, because it has moved to a position that c-commands it (this is as

in Kayne's 1994 system, where the Spec asymmetrically c-commands each of the features inside the genitive marker). Finally, the features now form a constituent that can be targeted by ellipsis to the exclusion of the noun.

Importantly, in such representations, case features may not only *be* elided, they may also *license* ellipsis. In order to see the last point, consider the representation for the locative case after movement of the xNP takes place. The structure is shown in (26). What we see here is that the genitive is literally contained in the locative (as indicated by the shading), and the locative in (26) may therefore license the ellipsis of the genitive in (25) operating on the basis of strict identity. (Whether strict identity is actually needed for ellipsis in general is a different matter, one which I do not want to discuss here. The point is simply that for this story to work, strict identity is working fine.)

(26)
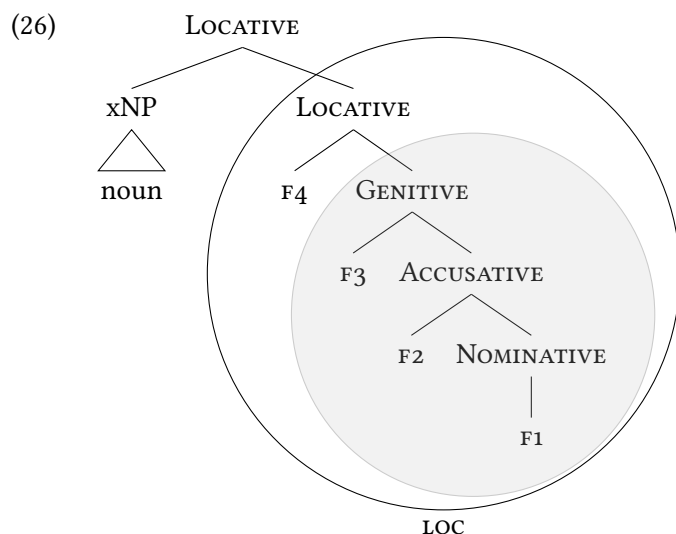
Note, finally, that proposing movement of the xNP across the K head is something that I had to assume anyway in order to get the correct linear order of morphemes in Ossetic, as discussed in chapter 2. The only new thing in (26) is therefore the fact that the number of heads that the movement crosses is larger. That, however, does not 'enrich' the toolbox in any relevant sense; the difference is one of quantity (there are more heads), not of quality (the type of operations is still the same).

3.5 The road ahead

This, in essence, is the main story as to how case competition in Ossetic is to be implemented. While the theory may look technical to a reader unfamiliar with the case decomposition and the phrasal spellout machinery, there are both theoretical and empirical reasons why I find it a promising candidate for a successful account.

The theoretical reasons have already been mentioned. In particular, if what I propose is on the right track, we move from statements of the sort in (27-a) to a statement of the sort in (27-b).

(27)   a.   In a language X, delete the case marker α in the context of a following case marker β, if β is higher than α on the scale of case strength. [Requires in addition the strength scale: ...]
       b.   Ellipsis applies under identity and c-command.

Of course, such a move requires one to say something about the structures on which the ellipsis operates etc., but this is just business as usual. To show that, let me enumerate here what I think are the noteworthy ingredients of my account:

(28)   The ingredients of the current theory
       a.   case decomposes into features (largely, if not fully identical across languages)
       b.   features are syntactic heads
       c.   syntactic heads are ordered in a hierarchy
       d.   nouns move in the manner described in Cinque (2005) (to be elaborated upon)
       e.   structures are pronounced by phrasal spellout (or equivalent machinery)

These proposals are nowhere close to the initial statement (27-a) in their arbitrariness. And most importantly, all of them (or some near equivalent) have to be a part of the theory of syntax and morphology regardless of whether (27-a) is postulated or not. For instance, case decomposition has been a standard part of linguistics ever since the work done by Jakobson (Jakobson 1962), and a theory based on (27-a) still needs this to account for restrictions on case syncretism (*ABA).

(28-b-d) are nothing but standard Cartography (Cinque & Rizzi 2008). One may of course have an opinion as to whether these assumptions are needed, in what form they are needed, or how to do away with them. However, it is safe

to conclude that the statement (27-a) has absolutely no relevance to this debate; whether we have it or not is completely orthogonal as to whether (and if, then how) we should recast the assumptions (28-b-d).

As far as phrasal spellout is concerned, the situation is the same. Even theories which do not have it (like some versions of DM, see Halle & Marantz 1993) have tools whose power is equivalent to it (Fusion). And so once again, the principle in (27-a) is absolutely irrelevant for the debate.

So the point is that by moving from (27-a) to (27-b), we make a real progress: for the first time, we have an account of case competition that has no rule of case competition, and relies only on assumptions that are completely independent of it. The beauty of this is that an apparently weird quirk of grammar turns into something that is predicted: in fact, it would be difficult to prohibit case competition from happening once assumptions like (28) are in place.

Such a theory is not only elegant, but it comes with all the benefits that theories have compared to arbitrary statements. In particular, it makes predictions. These come about as a result of the constraints on what an ellipsis can do and what it can't do.

To see that, consider, once again, the pre-theoretical implementation of how we can understand case competition in terms of deletion under identity.
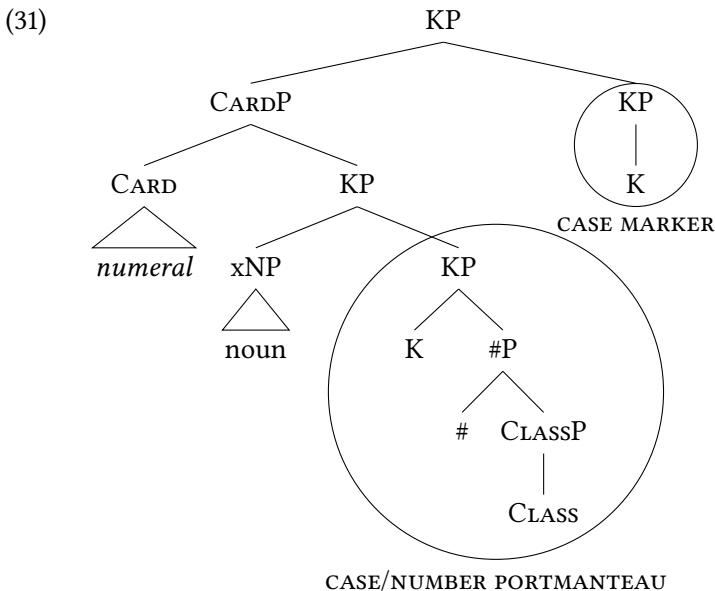
(29)   NOUN - [F1, F2, F3] - [F1, F2, F3, F4] → NOUN - [F1, F2, F3, F4]

In order to see how this statement differs from the theory we have now, consider, for instance, the fact that there are languages where case markers spell out not only case (K), but also number (#) and/or nominal class. In such languages, as I will argue, spellout forces the bare NP to extract from below the case features without the class and # projections. These are then spelled out together with case inside a portmanteau marker in a way that is schematically depicted below:

(30)

KP

xNP
△
noun

KP

K   #P

CLASSP

CLASS

CASE/NUMBER PORTMANTEAU
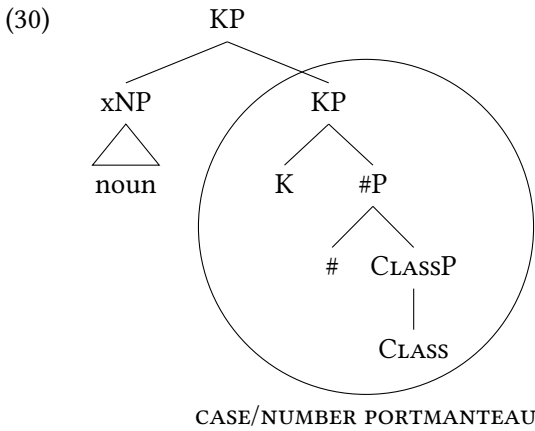
Obviously, in such languages, the issue is going to arise as to how a case marker like this can be elided by the outer one, which may be specified for a different gender and/or number, or for no gender/number all. For instance, if the outer genitive marker spells out only case, as shown in (31), ellipsis is predicted to be impossible:

(31)

KP

CARDP

CARD
△
numeral

KP

xNP
△
noun

KP

K   #P

CLASSP

CLASS

CASE/NUMBER PORTMANTEAU

KP

K

CASE MARKER

And this is very different from a theory based on (29), let alone (27-a). Whether this prediction is born out or not, and how can we find this out is a different matter; the point for now is that once we have a theory, we make predictions. When

we had (29), we had no theory, and as a consequence, we had no predictions.

As for the content of the prediction, there are reasons to think that considerations like these may help us understand a part of the data we have already seen. So recall that in our discussion of Jiwarli, we have noted that case competition applies only under complete identity (as in (32-a)), and it does not apply when the two dative markers differ (as in (32-b)). A rule of deletion like the one in (29) would have hard times teasing these apart. But under a theory where different allomorphs of the dative spellout constituents with a different 'bottom,' so that one can't elide the other, we can get a potential handle on examples such as these.

(32) a. thuthu-wu purrarti-yi(*-yi)
          dog-DAT   woman-DAT(*-DAT)
          '(of/to) the woman's dog' (Jiwarli, Plank 1995: 68)
      b. juma   jirrilarri-a   thuthu-wu nganaju-wu yakan-ku-wu
          child.ABS be.afraid-PRES dog-DAT   I.DAT-DAT spouse-DAT-DAT
          'The child is afraid of my wife's dog' (Jiwarli Austin 1995: 373)

Whether this analysis is correct or not for Jiwarli remains unclear; it would require us to have more information on the distribution of the various allomorphs, for which there is not enough data.

I will, however, provide a detailed study of how different allomorphs of the dative differ in Russian, and I will argue that ellipsis is indeed impossible in such cases. This will require me to formulate a different account of how case competition (as manifested in numerical phrases) works in Russian. In order to be able to address these issues in sufficient detail, I must first explain quite a lot of details about the spellout machinery that I shall be assuming. And that is the content of the next part of this book.

Part II

How spellout works

4 The basics of spellout

In the preceding part, I have sketched an approach to case competition where individual cases decompose into features, each feature a head. The case features merge with the extended NP in a way that individual cases stand in a syntactic containment relation, revealed through restrictions on syncretism and, crucially for this book, also through restrictions on case competition.

In this part, my main focus will be on presenting and developing a procedure—the spellout algorithm—that maps these complex structures onto actual paradigms (building on Starke 2018).

In the current chapter, I will start the discussion from the paradigms we find in Ossetic and provide step-by-step derivations for the whole numerical phrase. I will argue that the cyclic nature of the spellout algorithm resolves certain issues relating to the c-command relation between the external and the internal case. In Ch. 5, I shall investigate the augment found on numerals in Digor. In Ch. 6, I will put forth a specific proposal as to how prefixes are derived.

The discussion forms an important background towards the discussion of numerical phrases in Russian (which are treated in Part III of this book). Specifically, I will be lead to conclude that the ellipsis theory of case competition is insufficient for Russian, and I shall move towards what one could call a 'co-spellout theory' of case competition. This theory crucially relies on the concepts to be introduced shortly.

4.1 On lexical entries, matching and competition

In general terms, Nanosyntax is a late insertion model, whose basic architecture is as depicted in 4.1 (from Vanden Wyngaerd et al. 2019). In this model, syntax is a device that starts from atomic features and produces complex syntactic trees. These trees are fed into the lexicon and 'translated' by means of lexical items onto two syntax-external representations, namely the Phonological Form (PF) and the Conceptual Form (CF).

In this book, I am mainly concerned with the pronunciation part (i.e., translation onto PF) and I will have only very little to say about the CF. In order to see
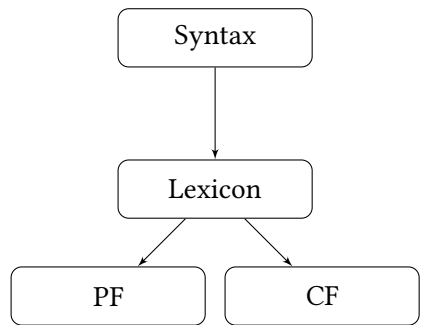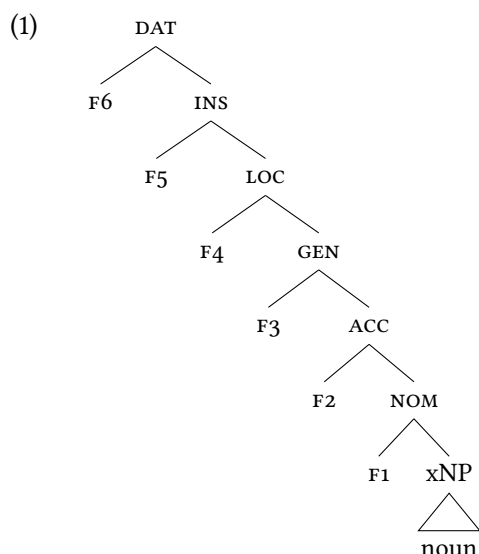
Figure 4.1: Nanosyntactic model of grammar

how such a 'translation' of the syntactic structure onto PF (and CF) looks like, I will be working with a fragment of an Iron Ossetic paradigm, including NOM, ACC, GEN, LOC, INS and DAT. In order to bring down the complexity even more (for the sake of exposition), I will be initially looking at the singular in Table 4.1.

Table 4.1: Iron declension, fragment

	head, SG.
NOM	sær-Ø
ACC	sær-Ø
GEN	sær-y
LOC (INE)	sær-y
DAT	sær-æn
INS (ABL)	sær-æj

On the basis of the discussion in the previous chapter, I am going to work with the proposal that the structure of these cases is as in (1). In the model of spellout introduced in Figure 4.1, structures such as (1) are pronounced by lexical entries in a way that the paradigm in Table 4.1 is derived. Lexical entries thus play a crucial role in linking the structure to the forms, and I would like to start from general issues pertaining to the notion of a lexical entry in the framework I am using.

(1)

```
              DAT
             /    \
           F6      INS
                  /    \
                F5      LOC
                       /    \
                     F4      GEN
                            /    \
                          F3      ACC
                                 /    \
                               F2      NOM
                                      /    \
                                    F1      xNP
                                            /\
                                           /  \
                                          noun
```

Following Starke (2014), I understand lexical entries as nothing else but *links* between well-formed syntactic representations, well formed phonological representations, and/or conceptual representations. One of the motivations for adopting this view is to have a 'principled' theory of the lexicon. What 'principled' means is not that lexical items are no longer arbitrary associations between syntax, phonology and/or conceptual meaning; they still are. Rather, 'principled' is used in the sense that the *format* of the lexical item is restricted. Since well-formed syntactic structures are constrained by principles, and lexical items link such representations to their pronunciation (a phonological representation), it follows that the representations in a lexical entry are constrained by universal principles (the same ones that regulate what syntactic trees look like).

The specific implications of this claim are strengthened by the way Nanosyntax treats complex feature structures. In particular, the core assumption is that the only way how a complex feature structure can arise is for it to be assembled by Merge. Complex feature structures are never the input to syntax, they are always its product. Syntactic trees are therefore not assembled from some pre-existing 'feature bundles' or any similar complex building blocks (lexical items). The idea is that syntax starts from single, atomic, indivisible grammatical features, ideally the same for all languages (cf. Cinque & Rizzi 2008).

So suppose that syntax builds a structure corresponding to the locative case, a sub-structure of (1), containing the features F1-F4. Given what we just said, a lexical entry such as (2) is *not* a well formed lexical entry for the locative *y*:

(2) $/y/ \Longleftrightarrow$ [F1, F2, F3, F4]

The reason is that the feature specification on the right-hand side is equivalent to a tree like the one in (3):

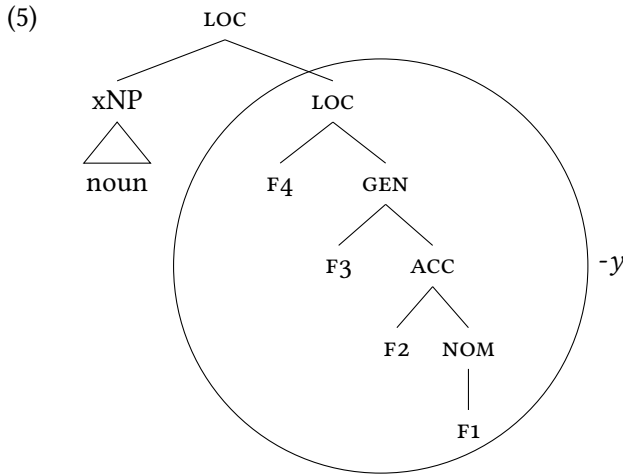(3) $/y/ \Longleftrightarrow$ LOCATIVE
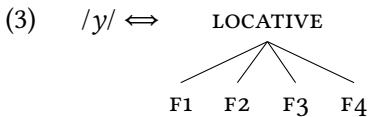
In (3), it is obvious that the right-hand side of the entry does not correspond to a well-formed syntactic structure (it violates binary branching), and hence, (3) is not a possible lexical entry (just like any entry with the same abstract properties). As said, this is not because we would stipulate some rules as to how lexical feature structures come to exist; rather, this follows from the general idea that lexical entries do nothing but link well-formed representations belonging to one module (e.g., syntax) to the representations in other modules (e.g., PF). Once this idea is adopted, it follows that lexical entries cannot look as in (3), because the feature-structure in (3) is not a well-formed syntactic tree.

So instead of having lexical entries like (3), the lexical entry for the locative will have to look like (4).
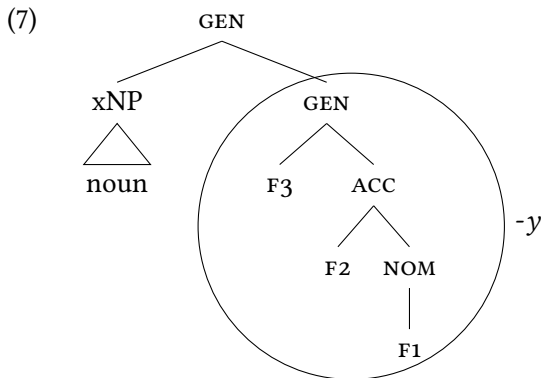
(4) $/y/ \Longleftrightarrow$ LOC
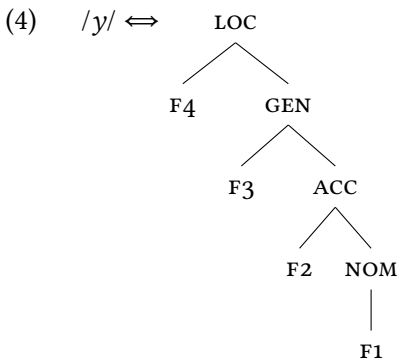
Here, the right hand part of the entry corresponds precisely to a constituent that syntax can create, see the derivation in (5) (the tree is copied here from Chapter 3, numbered point (26)). So when the syntactic derivation yields a structure like (5), the lexicon will be able to map the encircled constituent onto the pronunciation -*y*, because this pronunciation is linked to the representation that syntax has provided (it is the lexical entry (4) who is responsible for the linking).

(5)

```
            LOC
          /      \
       xNP        LOC
        △       /     \
      noun    F4      GEN
                     /    \
                   F3     ACC
                         /    \
                       F2     NOM
                               |
                               F1
```
-*y*

Now an important part of the insertion procedure is a condition on matching known as the Superset Principle:

(6) *The Superset Principle* (Starke 2009):
     A lexically stored tree matches a syntactic node iff the lexically stored tree contains the syntactic node.

A lexically stored tree in the definition (6) refers to a tree that is stored inside a lexical entry. The tree in (4) is a lexically stored tree. Syntactic structures like the ones in (5) are syntactic trees. What the Superset Principle states is that matching between a lexical tree and a syntactic tree does not require full identity, but 'only' containment. For instance, the lexical entry for -*y* in (4) matches the structure of the genitive case in (7), because the encircled genitive constituent is contained inside the lexically stored tree in (4).

(7)

```
            GEN
          /      \
       xNP        GEN
        △       /     \
      noun    F3      ACC
                     /    \
                   F2     NOM
                           |
                           F1
```
-*y*

By the same token, the lexical entry of *-y* matches also the syntactic structure of the accusative, which is shown in (8). The encircled constituent is contained inside the lexical tree in *y*'s entry, repeated in (9).

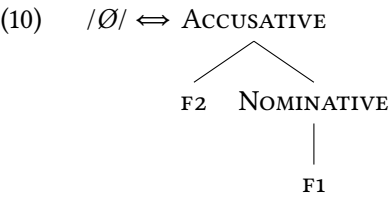(8)   (9) $/y/ \Longleftrightarrow$
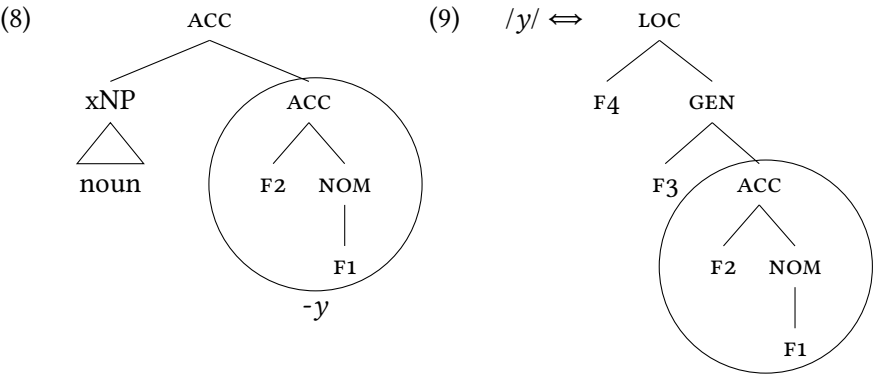
However, recall that in the paradigm we intend to derive, there is actually no *-y* in the accusative, see Table 4.2 (repeated from Table 4.1).

Table 4.2: Iron declension, fragment

	head, sg.
NOM	sær-Ø
ACC	sær-Ø
GEN	sær-y
LOC (INE)	sær-y
INS (ABL)	sær-æj
DAT	sær-æn

Therefore, what we shall ned is an additional lexical entry like the one in (10).

(10) $/\emptyset/ \Longleftrightarrow$ ACCUSATIVE

Based on the Superset Principle (recall (6)), the lexical item (10) also matches the syntactic structure of the accusative in (8), because it contains it. In effect,

we have two candidates for the spellout of (8), and competition arises. As in many frameworks, the winner of the competition is decided on the basis of the Elsewhere Condition (Kiparsky 1973). I state it as in (11) (from Caha 2020).

(11)   *The Elsewhere Condition:*
        When two entries can spell out a given node, the more specific entry wins.
        Under the Superset Principle governed insertion, the more specific entry
        is the one which has fewer unused features.

In our case, the lexical entry with fewer unused features is the Ø-marker, and so the accusative is spelled out as Ø. This is the correct result.

In the nominative case, with the structure as in (12), the same competition arises, and the result is again the same: the Ø marker wins.

(12)

```
          NOMINATIVE
         /        \
      xNP      ( NOMINATIVE )
      /\       (     |      )
   noun       (     F1     )

            -y/Ø
```
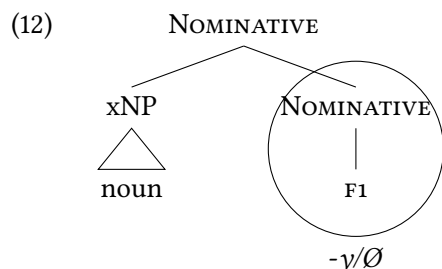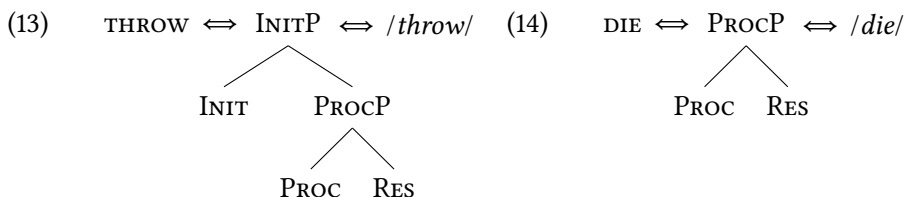
Note that the *ABA property of paradigms follows neatly in this model. As we have seen, the lexical entry for *-y* in (4) inserts this marker in the locative and also in any case contained in it, until a better match is found for some smaller case. However, once a better match is found (Ø in our case), *-y* will never resurfaces for any case smaller than the one matched by Ø, since for all of these cases, Ø will continue to be a better match.

4.2 Roots

While the main focus of this book is on functional morphology, I will make here a couple of remarks about how root morphemes are treated in Nanosyntax. The basic idea goes back to Ramchand's (2008) approach, which has two features that are worth pointing out. First of all, Ramchand (2008) decomposes what used to be the lexical V head (replaced by the $\sqrt{\ }$ node in some approaches) into a series of functional heads. In her specific implementation of this idea, she is replacing the former lexical V by three heads called Init (for initiation), Proc (for process) and Res (for result). As a consequence, functional heads on Ramchand's approach

reach to the very bottom of the syntactic tree. There is no special lexical head (or a $\sqrt{}$ terminal) at the bottom.
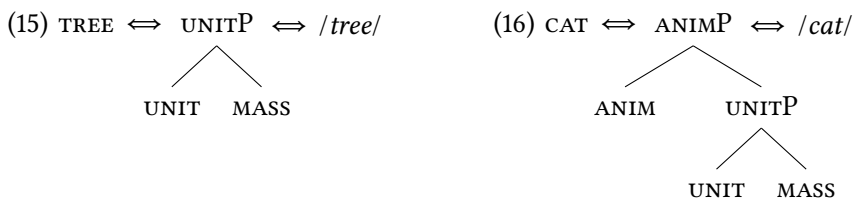
The second relevant aspect of Ranchand's approach is that individual verbs (i.e., verbal roots) may spell out different meaning components of the structure, yielding different verb classes as a consequence. For instance, a verb like *throw* is specified for all three components, i.e., Init, Proc and Res, see (13). A verb like *die* would lack the Init component, see (14).
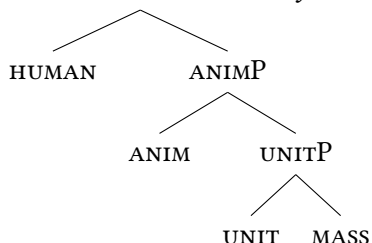
(13) THROW ⟺ INITP ⟺ /*throw*/   (14) DIE ⟺ PROCP ⟺ /*die*/

         INIT   PROCP   PROC   RES

              PROC   RES

Each verb is associated to encyclopaedic content, abbreviated by small caps. For the verb 'throw,' the encyclopaedic content would specifiy that the process involves movement through air (flying) as opposed to movement on the ground (as in the case of rolling), that the initiation of the event is performed by hand (as opposed to kicking the ball), etc. All of this is simply abbreviated in the concept related to the verb.

In the current study, I am assuming an analogous approach to nominal roots, though nothing much hinges on this. In my decomposition, I take inspiration from approaches such as Borer (2005), who claim that all nouns start from a MASS of a certain kind (specified by the encyclopaedic content), that is chunked up into UNITS (if the noun happens to be countable). For instance, a countable noun like *tree* (contrasting with *wood*) would have an entry like (15), where both the type of MASS (wood) and the type of UNIT (a naturally occurring one) would be specified as part of the encyclopaedia. I simply abbreviate this as TREE in (15).

Animate nouns like *cat* could easily have a structure such as in (16), and human-denoting nouns as in (17).

(15) TREE ⟺ UNITP ⟺ /*tree*/   (16) CAT ⟺ ANIMP ⟺ /*cat*/

         UNIT   MASS   ANIM   UNITP

                                                UNIT   MASS

(17) BOY ⟺ HUMANP ⟺ /*boy*/

```
            HUMANP
           /      \
      HUMAN      ANIMP
                /     \
            ANIM     UNITP
                    /     \
                 UNIT    MASS
```
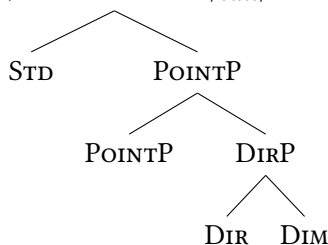
However, as nothing much hinges on this, I shall simply abbreviate roots as 'xNP' in my tree diagrams, and assume that inside the 'xNP' triangle a variety of roots may be inserted.

The recent Nanosyntax literature on roots adds one more interesting twist to this, which relates to various AUGMENTS that roots may come along with. As augments are going to be relevant for us, I shall introduce here the basic ideas from Vanden Wyngaerd et al. (2019), who apply Ramchand-style approach to adjectives. In their proposal, adjectives decompose minimally into a dimension (*height, weight*) and a direction (positive for, e.g., *tall*, negative for *short*). These each correspond to a functional head (DIM, DIR respectively) and correspond to the two lowest projections.

These two projections jointly specify a particular scale that various adjectival degrees operate on. The basis of the individual degrees is that they always introduce some POINT on the scale. This point may be linguistically specified (*five meters long*), or, as in the positive degree adjective, the relevant point happens to be the STANDARD of comparison. The structure of the positive degree is thus as in (18).

(18) /HEIGHT/ ⟺ STDP ⟺ /*tall*/

```
             STDP
            /    \
         STD    POINTP
               /      \
          POINTP      DIRP
                     /    \
                  DIR    DIM
```

The new aspect of Vanden Wyngaerd et al. (2019) is the observation that in Czech, such structures are spelled out by a variable number of morphemes. Sometimes, the positive degree is expressed fully by the root (as in (19-a)). In other cases,

however, the root must be accompanied with an extra morpheme, called augment.
In (19-b), *ok* is an augment.

(19) a. star-ý, hrub-ý
          old-AGR, rough-AGR
      b. šir-ok-ý,   hlub-ok-ý
          wide-AUG-AGR, deep-AUG-AGR

The fact that *-ok* is an independent morpheme in (19-b) is confirmed by the fact
that it is missing in the comparative, as the data in (20) show. As we can see
in (20-a), the comparative in Czech is expressed by attaching *-š* to the base. In
(20-a), this base happens to be identical to the positive degree base, recall (19-a).
In (20-b), we see that this comparative marker attaches to the bare root of the
adjectives in (19-b), i.e., without the augment.

(20) a. star-š-í,   hrub-š-í
          old-CMPR-AGR, rough-CMPR-AGR
      b. šir-š-í,   hlub-š-í
   wide-CMPR-AGR, deep-CMPR-AGR

Vanden Wyngaerd et al. (2019) interpret this in a way that the functional se-
quence for both types of adjectives in the positive degree is identical (and looks
as the tree in (18)). The only difference between the two classes is their lexical
specification. The roots in (19-a) are specified for all the projections (see (21))
and need no additional morphemes to spell out the full structure. However, the
roots in (19-b) are (arbitrarily) specified in the lexicon for only a subset of the full
structure, see (22).

(21) AGE ⟺ STDP ⟺ /*star*/   (22) WIDTH ⟺ POINTP ⟺ /*šir*/
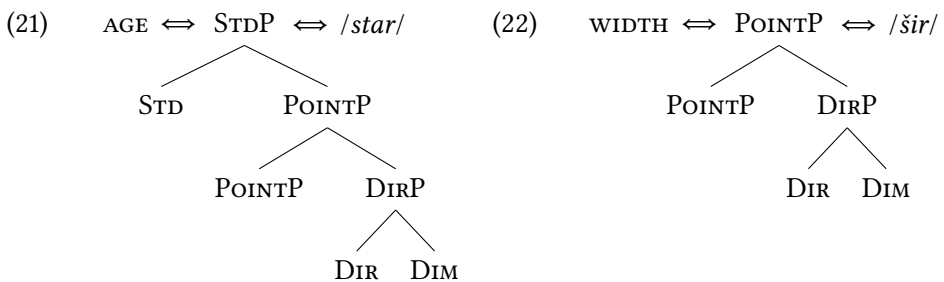
Because of this, such 'small' roots need to combine with an augment to spell out
the remaining projections. The augment is specified as in (23). Given its lexical
entry, we see that the augment expresses the presence of the implicit standard

of comparison (*wide* = 'wider than some contextual standard). As a result, the suffix is missing in the comparative, because the CMPR marker attaching on top of the POINTP. See Vanden Wyngaerd et al. 2019 for more details.

(23) STDP ⟺ /*ok*/
      |
      STD

The main point to be remembered is that the same features are in one case all spelled out by the root only (see (24)), while in another case (when the root is small), an identical set of features is spelled out by two morphemes, see (25). This idea is going to be important later on when we shall look at the numerical augment *-e(m)* in Digor, and also at arbitrary inflectional classes of nouns (declension classes in Russian).

(24)

(25)

As can be seen from these diagrams, one of the rules of the game is that all features must be pronounced. This is what forces the augment *ok* to appear under the STD node (cf. Fábregas 2007).

Note that on this approach to roots, roots are like functional morphemes in that they are inserted late. As a consequence, syntax operates only with abstract features and the roots are only differentiated at lexical insertion, where an entry like (22) links the relevant syntax to a particular concept at CF and to a corresponding phonology at PF. It follows from this architecture that syntax (which precedes lexical insertion) cannot access the proverbial distinction between a 'cat' and a 'dog:' as far as syntax is concerned, these contain identical features and will, therefore, exhibit the same syntax. They are distinguished only after lexical insertion takes place (see Caha et al. 2019a).

As a final remark, let me point out that the choice of roots is not restricted by the Elsewhere Condition. Lexical items are inserted based primarily on the concept they are associated to ('what we want to talk about'), and the Elsewhere Condition only comes into play when a concept does not distinguish between two lexical entries. For example, in the previous section, we have used the Elsewhere Condition to distinguish between the locative and the accusative case, neither of which was associated to a concept. I will continue to use the Elsewhere Condition so in these cases, but there will be no 'Elsewhere' reasoning involved for the difference between 'old' or 'long,' even if one should turn out to have fewer superfluous features as a result of arbitrary lexical storage.

With the brief discussion of root insertion in place (to be returned to later), I will, for now, assume a lexical entry as in (26) for the lexical item 'head' from our example paradigm 4.2.

(26)   /HEAD/ ⟺ UNITP ⟺ /*sær*/

```
            UNIT   MASS
```
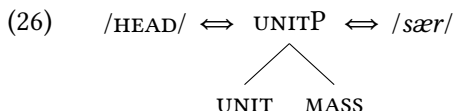
4.3 Cyclic spellout and spellout movements

In Nanosyntax, spellout is cyclic. This means that structure building (merging a new feature) is always followed by spellout. The result is that any newly added feature must always be spelled out immediately upon addition.

To see how this works, suppose that we start our derivation by merging the features MASS and UNIT, producing the tree in (27).

(27)   UNITP

```
        UNIT   MASS
```
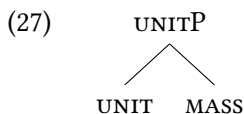
When the tree is built, it must be spelled out before the derivation can continue by merging a new feature. The lexicon is therefore searched for a matching item. In our case, we have the lexical item for 'head' in (26). This lexical item contains the relevant structure and may therefore spell it out, which I am going to mark by encircling the relevant constituent, as in (28).

(28)

UNITP

UNIT   MASS

sær
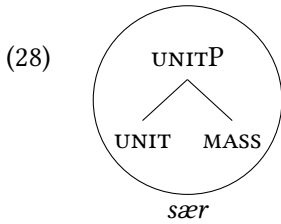
The procedure we are following can be, following Starke (2018), formalised in the following spellout algorithm (to be enriched). The spellout algorithm says that every time we build an FP, we must immediately spell it out.

(29)   Merge F and
        a.   Spell out FP

When spellout is successful, Merge F may continue. In the next step, we put the nominative feature on top of the structure that we had just derived, forming (30).

(30)   NOMINATIVE

F1   UNITP

UNIT   MASS

sær
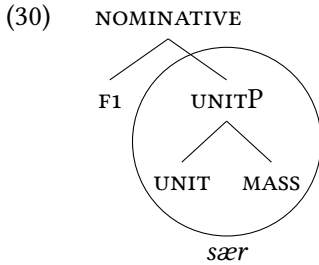
This structure must now be spelled out again. However, the lexical item for *sær* 'head' does not match the structure in (30), because it does not contain it. Recall that we also have the lexical entry for the NOM/ACC case (see (10)), repeated below in (31) for convenience.

(31)   /Ø/ ⟺ ACCUSATIVE

F2   NOMINATIVE

F1
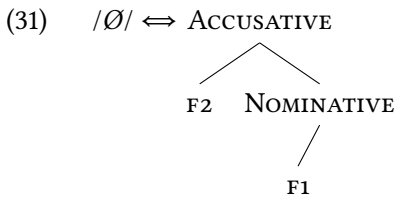
However, this lexical entry does not contain the top node of (30) either. (It contains only one of the daughters of the NOMIANTIVE node, namely F1, but not the other daughter.) As a result, the structure cannot be spelled out. When a structure

can't be spelled out, it is rejected at the interface, and Merge F cannot continue. The derivation is stuck.

Starke's (2018) idea is that when this happens, syntax is going to perform movement operations that are going to change the geometry of the tree, giving spellout a second chance to succeed (cf. Caha et al. 2019b, Vanden Wyngaerd et al. 2019, Wiland 2019, Holaj 2018 for applications). There are two main types of rescue movements (Spec movement and complement movement), applying blindly in a pre-defined order, given in (32).

(32) Merge F and

  a. Spell out FP
  b. If (a) fails, attempt movement of the Spec of the complement of F, and retry (a)
  c. If (b) fails, move the complement of F, and retry (a)

Applying the algorithm to our situation yields the following sequence of steps. When spellout gets stuck in (30), it goes to the clause (32-b) of the spellout algorithm, and tries to move the Spec of the complement of F. The complement of F is the UNITP, which has no movable Spec, and so this option fails. We therefore proceeds to the step (32-c) of the algorithm, which says that the whole complement of F is to be moved. I show the movement in (33).

(33)
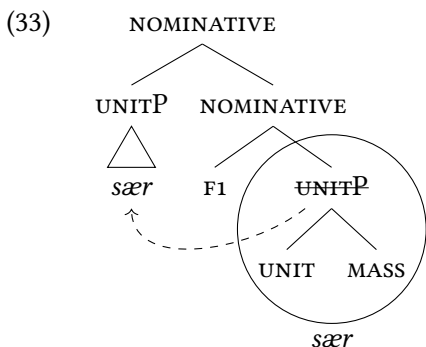
Before we see how this is going to help, a couple of words about spellout movement are in order. It is generally agreed that all movements must be motivated. In the case of a standard feature-driven movement, the movement is motivated by the fact that the moved phrase assumes a new interpretive position (wh, focus, etc.). Feature-driven movements therefore lead to structures with two interpre-

tive positions, a fact that is encoded in the theory by traces/chains.[1]

Spellout movement is different in that it is 'meaningless' (not driven by interpretation). Yet this does not mean that it is unmotivated: its motivation is to provide the right constituent structure for lexicalisation to succeed. Now in order to reflect the fact that spellout movement does not establish any new interpretation, I will assume (following Starke's work) that such movements do not give rise to chains. Since there is no reason for postulating chains, and since the phrase is obviously displaced, I am going to follow Starke in assuming that spellout movements do not leave a trace.

This convention is convenient also for the reason that it provides a somewhat clearer representation for determining a potential match between the structure and a lexical item. As a consequence of dropping traces, we can simplify the structure (33) into the tree (34). Once we do that, we can easily see that the lower NOMINATIVE node perfectly matches a subconstituent of the lexical entry for the zero ending in (31). Ø is therefore inserted as the spellout of NOMINATIVE, which is depicted in (35).[2]

(34)

(35)
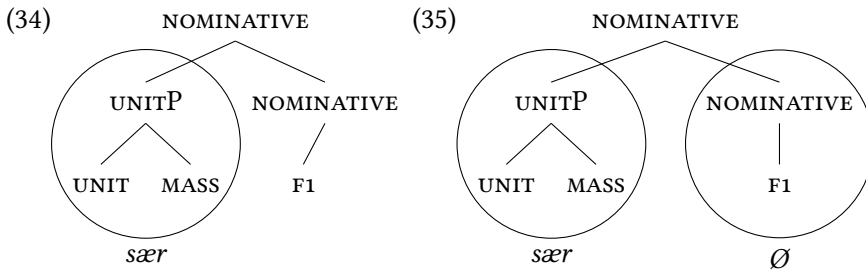
Before I continue with the derivation by merging a new feature, a remark on pronunciation is in order. Specifically, successful spellout (as the phrase is used in the spellout algorithm) does not lead to an immediate pronunciation. Rather, it is more accurate to think of spellout as involving only 'matching.' The spellout procedure as if only makes sure that if the derivation stopped, there would be a matching item for all features. However, it does not immediately pronounce

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[1]As Koeneman & Neeleman (2001) succinctly put it: "It is uncontroversial that every movement must have a trigger. This requirement entails that the head of a movement chain {α, t} must be licensed by at least one function, F, which cannot be satisfied by the tail of the chain. […] If this is the defining property of triggers, one would expect a further requirement to hold as well: Something must motivate the presence of the trace. Like the head, the tail of a movement chain must be licensed by at least one function, F', which cannot be satisfied by its head."

[2]Had there been traces, the matching procedure would have to ignore them. Alternatively, traces would have to be specified inside lexical entries.

all the features, and it waits if more features are coming. Eventually, if no more features arrive, the pronunciation of the nominative is going to be *sær*, but if more features come and we derive, say, the locative, the pronunciation may change depending on what happens later on.

Once spellout succeeds, Merge F can continue. It takes the structure in (35) as an input, and merges the accusative feature on top. The structure so created is given in (36). This structure cannot be spelled out by the root or by the accusative suffix; there is no lexical entry that contains the top node in its entirety. The structure is therefore rejected at the interface, and Merge F cannot continue. Syntax then performs rescue movements. The first one to be tried is the movement of the Spec of the complement, recall (32-b). This time, there is a movable Spec, and so it is moved as shown in (37).
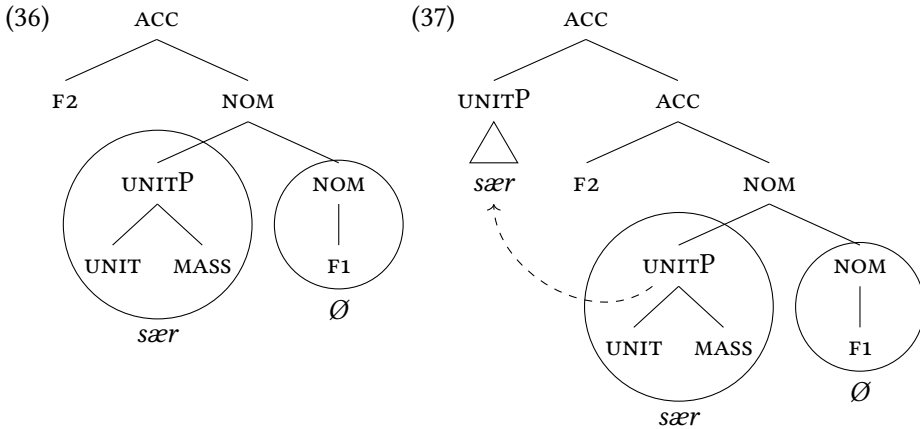
Given that traces of spellout movement are ignored, the tree in (37) is simplified to the one in (38). Here we can see that the Ø lexical item in (31) matches the lower accusative node that arises as a result of the spellout movement.
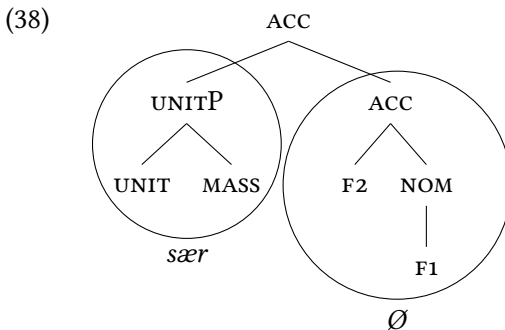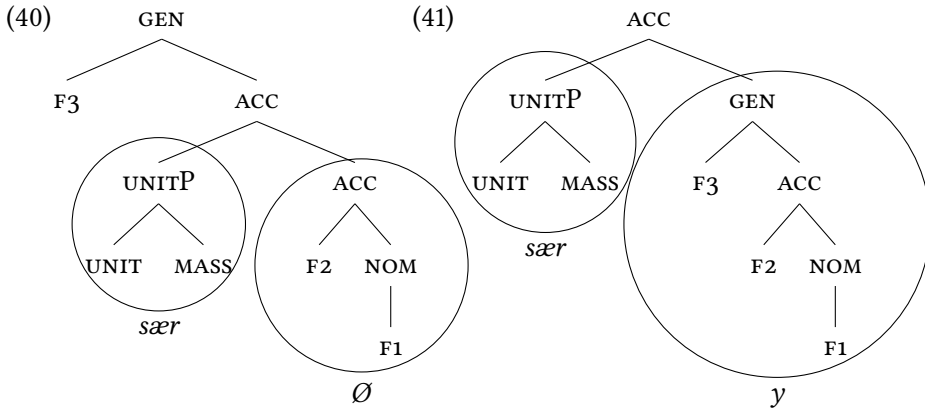
The result of phrasal spellout and cyclicity is that match at the nominative node is 'replaced' by a match at a higher node. This is a corollary of the system that is sometimes referred to as Cyclic Override.
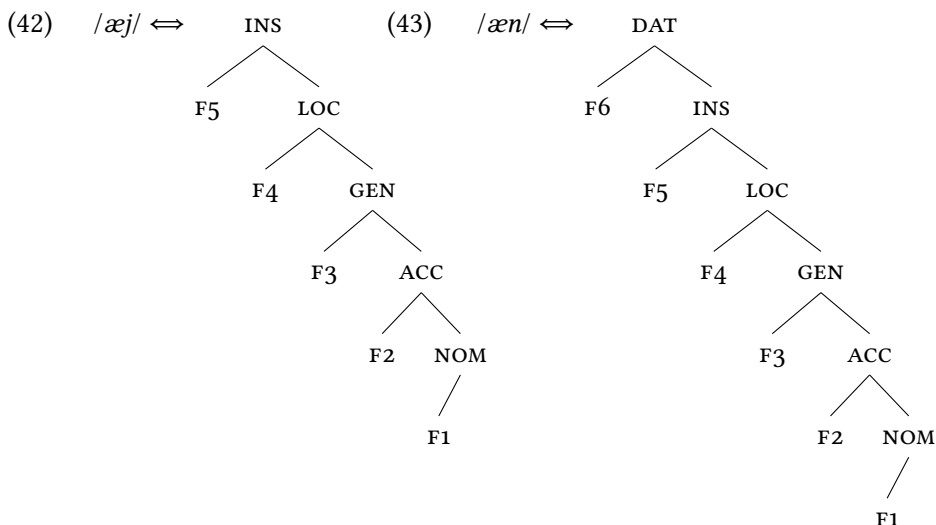
(39)   *Cyclic Override*
        Lexicalisation at a node XP overrides any previous match at a phrase contained in XP.

Returning to (38), when spellout succeeds, Merge F can continue. When we Merge the genitive feature to (38), we get (40). There is no match for this structure, and spellout movements come to play. We first try moving the Spec, yielding (41). Here the accusative Ø is no longer a candidate, but locative -*y* applies comfortably, as we have already seen in (7). This leads to a cyclic override of Ø by -*y*, and the latter will eventually surface unless overridden again.

(40) GEN / F3 / ACC; UNITP (UNIT MASS *sær*) / ACC (F2 NOM — F1 Ø)

(41) ACC / UNITP (UNIT MASS *sær*) / GEN (F3 ACC (F2 NOM — F1 *y*))

I trust the readers can now continue the derivations on their own. The lexical entries for the instrumental -*æj* and the dative -*æn* are given in (42) and (43) respectively, as they will be relevant later on. The basic idea behind the lexical entries is that they spell out all the case features from the nominative (F1) all the way to the instrumental F5 and the dative F6 respectively. Such lexical entries will force a step-wise cyclic evacuation of the noun from below the nominative all the way above the highest case feature, overriding smaller case markers (-*æj* will override the locative -*y* and the dative -*æn* will override -*æj*).

(42) /æj/ ⟺

```
            INS
          /     \
        F5      LOC
              /     \
            F4      GEN
                  /     \
                F3      ACC
                      /     \
                    F2      NOM
                              \
                              F1
```

(43) /æn/ ⟺

```
            DAT
          /     \
        F6      INS
              /     \
            F5      LOC
                  /     \
                F4      GEN
                      /     \
                    F3      ACC
                          /     \
                        F2      NOM
                                  \
                                  F1
```

Before we leave this section, a more general remark on spellout movement follows. One way to portray them would be as an addition to the overall syntactic theory. In this view, they represent a complication of the system, needed basically only for phrasal lexicalisation to proceed correctly. However, I think that this is the wrong way of looking at things.

To see that, consider first a model such as Cinque (2005). In that model, there is a universal hierarchy of functional projections, which is mapped onto linear order by Kayne's (1994) Linear Correspondance Axiom. In this model, functional heads always end up to the left of the noun unless movement interferes. So to get any other order than the scopal left-to-right order, movements are necessary. The set of movements required to achieve the full range of attested orders is a superset of the types of movements that the current theory needs. Hence, the conclusion to be drawn here is that the types of movement triggered by the spellout algorithm are needed regardless of whether we have phrasal spellout or not (that is, as long as we have a model like that of Cinque 2005). The suggestion therefore is that rather than enriching the typology of movement types, the current proposal provides a rationale for a subset of the movements that we already have.

To have a concrete example to draw on, recall, for instance, that in Chapter 2, tree (11), I have used movement to get a DemP (containing the demonstrative, the adjective and the noun) to the left of the case marker (which is last in the phrase). This derivation was needed before phrasal spellout even became an issue, and so phrasal spellout cannot possibly be the only reason why we have

such movements: we need them independently. Therefore, what phrasal spellout does is not that it enriches the typology of movements; rather, it provides a new rationale for such movements. Specifically, the movement happens because we need to spellout the remnant phrasal node.

Having a new motivation for these movements is a good thing. To see why, consider the fact that in Cinque (2005), such movements are likened to regular feature driven movements. This has attracted criticism, probably most clearly expressed in Abels & Neeleman (2012). The authors note (p. 51): "the movements required to reconcile [Cinque's universal left-right order] with the attested word orders stand in the way of a restrictive theory of movement. The issue is not one of the number of movements required; rather, it resides in the types of movement that must be allowed."

For instance, Abels & Neeleman (2012: 52) point out that feature driven movements never move the complement of a functional head to its Spec. They illustrate that by the impossibility to move an IP—via the Spec of the immediately higher CP—to a topic position:

(44)   *Anything would happen, nobody thought that.

But this is exactly the type of movement that I have adopted to get the DP across the case marker in Chapter 2, numbered point (11). If Abels and Neeleman are right, and feature driven movement never does things like this, it follows that the movement of the DP across K (if it exists) cannot be feature driven. So the fact that we have a new motivation for the movement (namely phrasal lexicalisation) is by no means 'a complication,' or an unwanted baggage that comes with phrasal spellout: it is a solution to an independently existing issue in linguistic theory.[3]

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[3]Naturally, it is not the only type of a solution: Abels & Neeleman (2012) eliminate the need for such movements by abandoning Kayne's LCA, and by allowing for a symmetric base-generation with heads both to the left and to the right of their complements. This is of course legitimate, but in the context of a non-terminal lexicalisation theory, this does not really help to create the constituent structure one needs for phrasal lexicalisation. For instance, if we simply ordered case heads to the right, we would end up with a structure like (i):

(i)

ACC

NOM   F2

xNP   F1

...
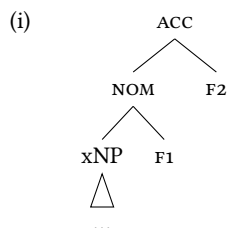
4.4 Spelling out the Iron numerical phrase

Now that we know how individual case structures are generated using the spell-out algorithm (32), let me apply it to the numerical construction as a whole. I will go through the derivation step by step and show that this algorithm yields one interesting consequence for the c-command requirement on ellipsis.

We start by deriving the genitive, which combines with the [CARD NUMBER] constituent. I repeat the genitive in (45), just substituting the noun *sær* 'head' with the noun *bon* 'day.'

(45)
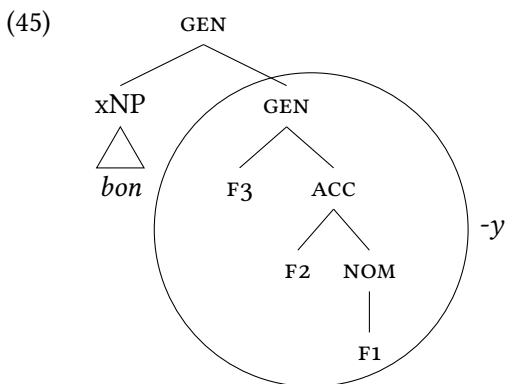
The noun in the genitive is selected for by the cardinal numeral. As I have highlighted earlier (recall here the discussion in Ch. 2 section 2.9 for a discussion), the reason why numerals require the genitive is because they contain a nominal element inside them (Kayne 2005; Zweig 2006; Ionin & Matushansky 2006). I will use the lexical entry for numerals as shown in (46-a). This lexical entry (as I am going to show in chapter 6) triggers the opening of a new derivational workspace,


In this structure, the two heads forming the ACC do not form a constituent, as they do in (38). As a consequence, some mechanism of grouping the relevant terminals has to be introduced in addition to constituents. One proposal along these lines is the so-called spaning (see, e.g., Abels & Muriungi 2008, Taraldsen 2010, Svenonius 2012, Blix 2019). Discussing all the ramifications would take me too far away from my course; I simply adopt phrasal spellout here.

My motivation for this move is the same as with all other grammatical processes. For instance, when we see that multiple terminals move jointly, we think of this as movement of a constituent that contains those terminals. When several terminals are elided simultaneously, we think of this as an ellipsis of a phrasal node that contains these terminals. So here I just extend the same logic to a new case: when several terminals are pronounced together, I do not try to invent a new grouping mechanism for this one specific case. Rather, I rely on the type of grouping inherent in phrase structure grammars, and say that when multiple terminals are lexicalised together, this is because lexicalisation targets a constituent that contains these terminals.
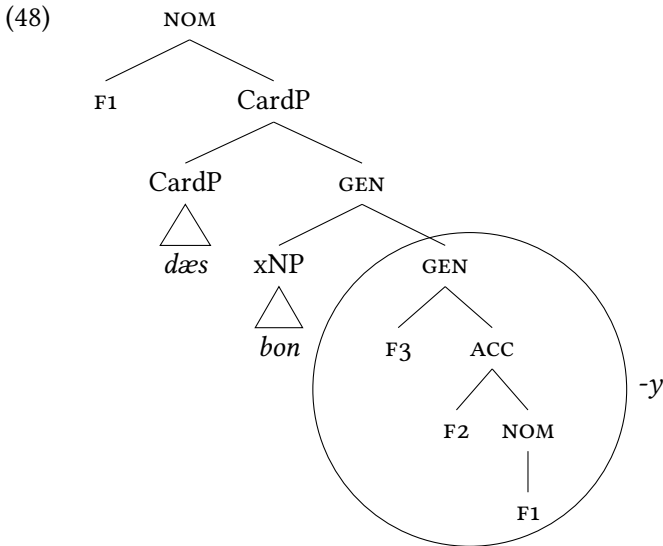
where the cardinal is constructed, as shown in (46-b). I do not want to discuss this in any detail here, as the issue of how the two derivational workspaces are managed will pop out more sharply when more facts are in place. My main focus is on something else here, namely on why it is important to have cyclic movement.

(46) a. CARD ⟺ /*dæs*/

CARD

CARD   NP

NUMBER

b.

CARD

CARD   NP

NUMBER

dæs
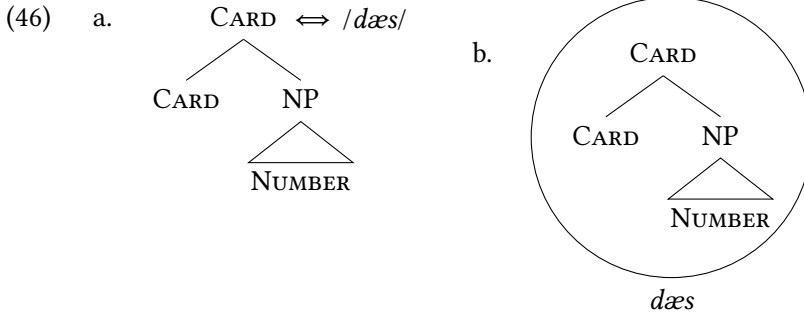
When the cardinal numeral combines with the noun in the genitive, the structure in (47) arises. The numeral behaves as a formal head of the construction, projecting its label to the root node. Its complement is marked by the genitive case, as is customary for nominal dependents (but recall the discussion in 2.9 again).

(47) CARDP

CARDP   GEN

dæs   xNP   GEN
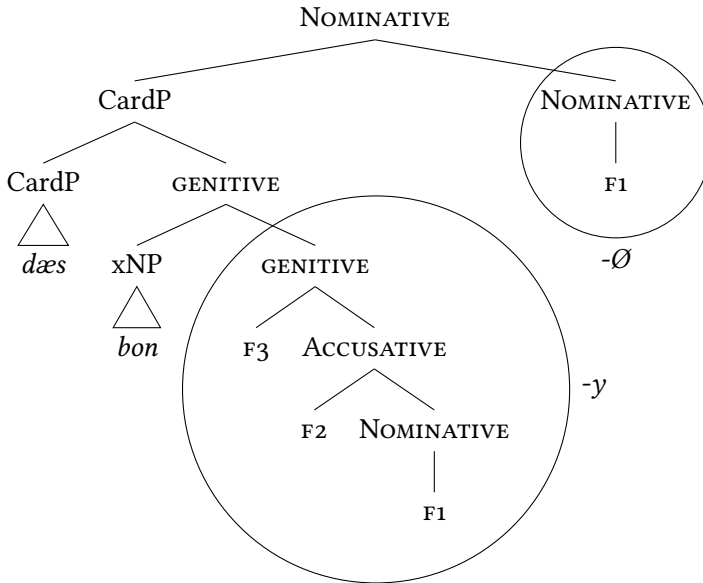
bon   F3   ACC

F2   NOM

F1

-*y*
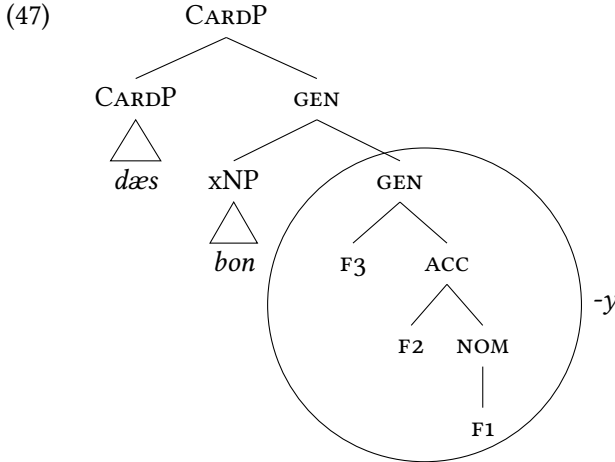
Once the maximal CARDP is created (corresponding to the root of the tree in (47)), it is used in a particular grammatical and/or semantic function. The intended function (the place in the tree where we want to merge it) determines how many case features we must add on top of the full CARDP. Below, I show what the phrase looks like when it merges with the feature F1 that turns it into a nominative:

(48)

```
                    NOM
            _____|_____
           |                 |
          F1              CardP
                     _____|_____
                    |             |
                 CardP          GEN
                   /\       _____|_____
                  /  \     |           |
                 dæs xNP  GEN        (circle)
                     /\         GEN
                    /  \      __|__
                  bon    |    |     |
                        F3  ACC
                          __|__
                         |     |
                        F2   NOM
                              |
                             F1      -y
```

We already know that the newly created phrasal node must be spelled out, forcing (in case of no match) spellout driven movements. Once the complement of the feature F1 moves out, see (49), successful spellout is achieved, and the NOM constituent on the very right is spelled out by the regular NOM marker, which happens to be null in Ossetic. Note that in (49), the xNP that moves from under the NOM feature is complex, containing the numeral *dæs* 'ten' and its genitive complement (*bon-y* 'day-GEN').

(49)

NOMINATIVE

CardP

CardP

dæs

GENITIVE

xNP

bon

GENITIVE

F3   ACCUSATIVE

F2   NOMINATIVE

F1

-y

NOMINATIVE

F1

-Ø

When the whole numerical phrase is to be marked by the locative case, the same operations must be (rather mechanically) repeated for each case feature added. Specifically, the theory says that we now need to take the nominative structure (49) as an input for Merge F, and add the accusative feature F2. If this structure fails to spellout, spellout driven movement will once again displace the CardP ('ten days') to the left. As more features are added on top one by one, the CardP 'ten days' moves in a successive cyclic fashion from below the case features. The following structure schematically illustrates the successive cyclic evacuation of the CardP out of the constituent that contains all the locative features:

(50)
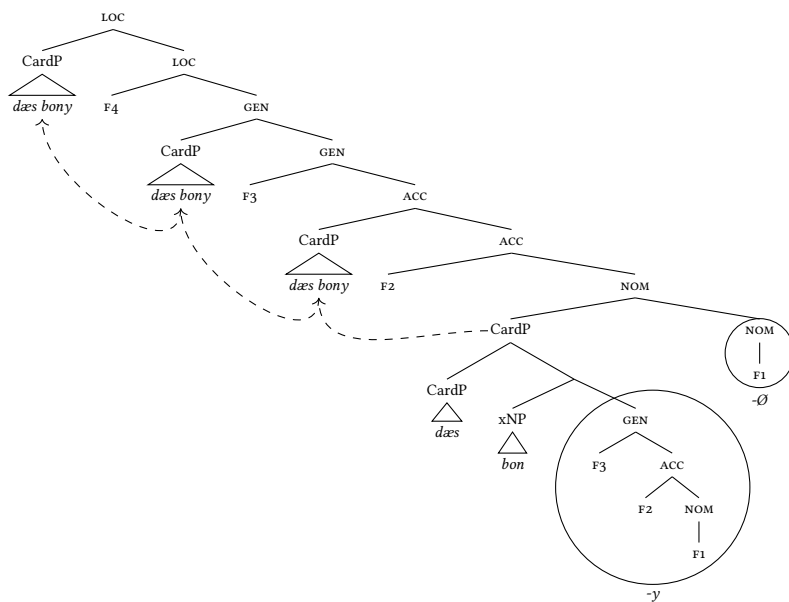
Importantly, as the phrase *dæs bony* 'ten days' is moving out of the locative, there is a point in that derivation when it extracts out of the genitive, and the structure at that point looks as in (51).

(51)
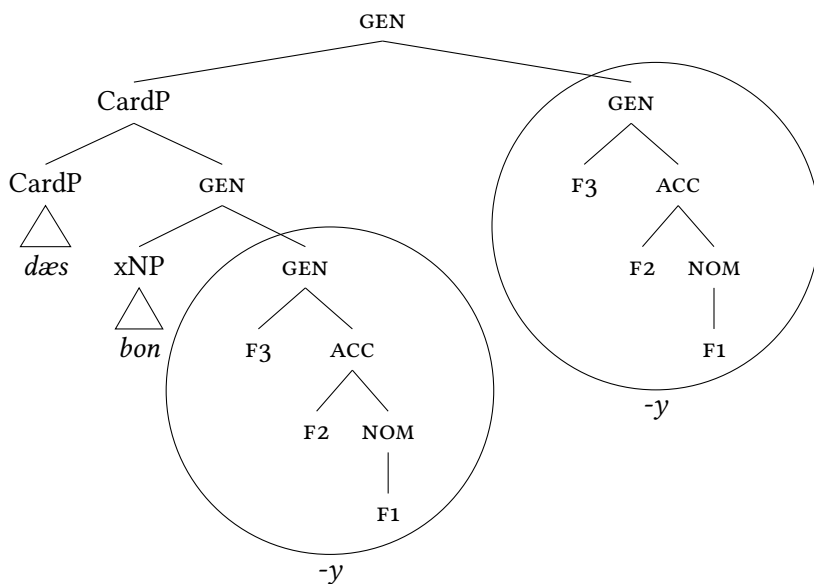
What we see here is that the genitive (spelled out as *-y*) belonging to the noun *bon* 'day' is followed by another genitive (again spelled out as *-y*), belonging to the whole phrase *dæs bony* 'ten days.' In this configuration, ellipsis applies and eliminates the 'inner' genitive belonging to the noun *bon* 'day.' Such an ellipsis applies both under identity and under c-command: the relevant constituents are shaded in (52). The result is that the internal genitive is not pronounced, because it is the internal genitive that is c-commanded by the antecedent. (The ellipsis of the outer case is impossible.) Non-pronunciation is marked by the strikethrough over the inner genitive marker *-y̶*:

(52)
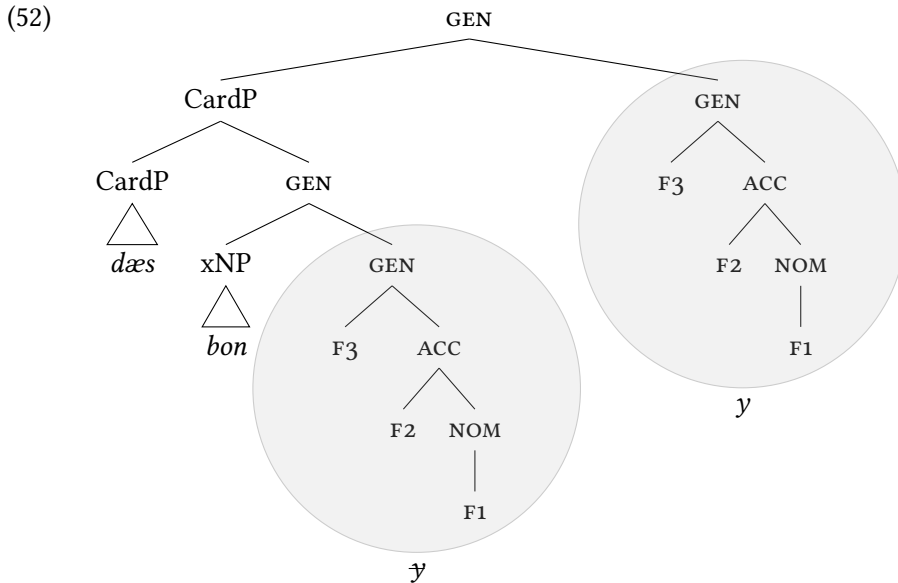
The way I thinking about the ellipsis process is that at this point in the derivation, the lower constituent is simply de-linked from its PF representation, but nevertheless remains present in syntax.

The derivation then continues by adding the locative feature, and once again moving the whole phrase *dæs bony̶* 'ten days' out from under the locative feature. That leads to the insertion of the locative marker *-y* as the outer case marker, overriding (vacuously) the genitive *-y*. The locative case spells out the encircled locative constituent.

(53)
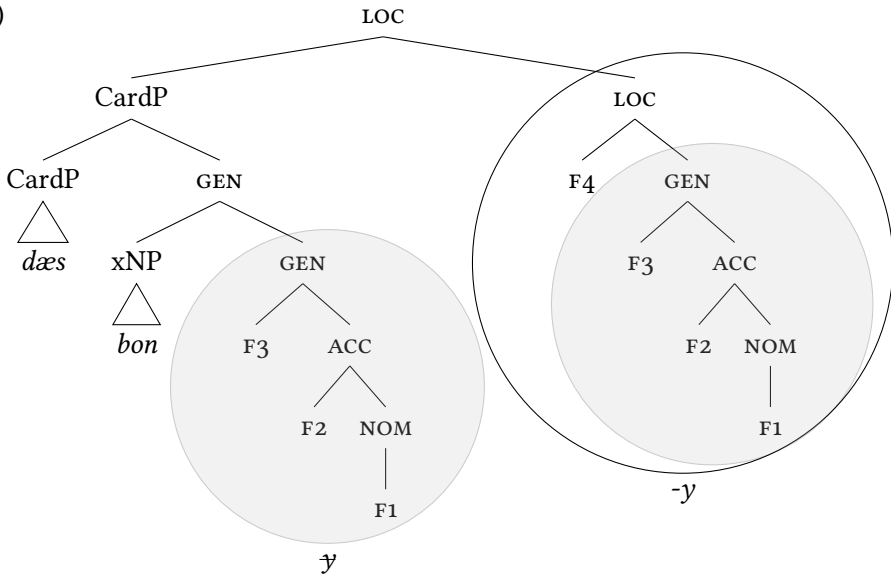
The shades mark the two genitive constituents, where the outer one (now embedded inside the locative) had triggered the ellipsis of the inner marker. Notice that in this stage, the elided genitive case is no longer c-commanded by the ellipsis licensor. However, this is immaterial: the genitive constituent has been de-linked from a PF representation during the previous cycle, and it will never be re-linked. Therefore, the correct form 'three days-LOC' is derived. This is one of the important added benefits of the cyclic movement idea in the case at hand.

4.5 Backtracking

This section introduces a crucial feature of the spellout machinery, which is backtracking. Starke defines backtracking as follows (I am going to modify the definition slightly later on):

(54)   *Backtracking* (Starke 2018)
         When spellout fails, go back to the previous cycle, and try the next option
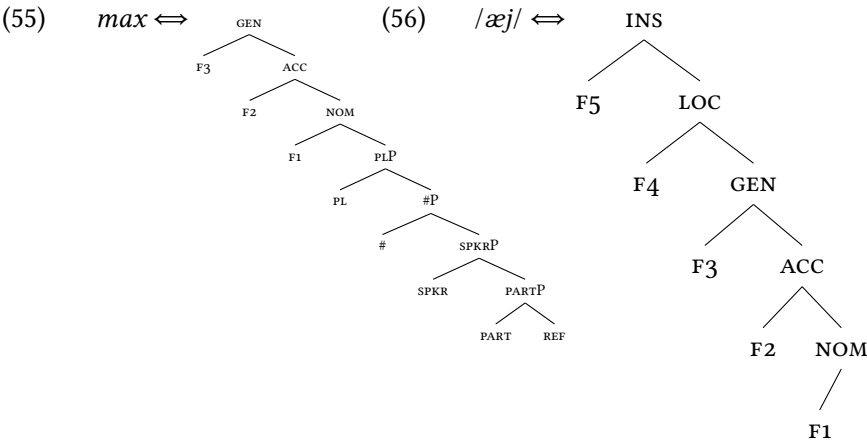   for that cycle.

Let me explain the process on a simple example. The particular paradigm I will now be deriving is the one belonging to the 1.PL pronoun, given in 4.3. The pronoun apparently has no locative form, which is something that I will not try to account for here.

Table 4.3: Iron pronoun, fragment

|	1.PL
NOM	max
ACC	max
GEN	max
LOC (INE)	—
INS (ABL)	max-æj
DAT	max-æn

What we see in this paradigm is that the 1.PL pronoun has the same shape *max* from the nominative all the way to the genitive. The absence of an ending in the genitive cannot be due to the regular zero ending that we have for nouns in NOM/ACC, which is unavailable for the genitive (it lacks the feature F3). I will therefore propose that the 1.PL pronoun is actually able to spell out all the case features on its own, and that its lexical entry is therefore as shown in (55).

Here at the bottom of the tree we find person features; the specific decomposition I am assuming is modeled on the basis of Vanden Wyngaerd (2018). REF stands for 'referential expression,' corresponding (by default) to 3rd person. If the PART feature is added (= participant of the discourse), this can be either 1st or 2nd person, but the node is interpreted as 2nd person by default. If we want to talk about 1st person, we have to add a dedicated SPKR feature. On top of the person features, I add two number features (# for number, PL for plural). On top, there are the case features. Next to the entry for the pronoun, I repeat the entry for the instrumental suffix from (42), as this will become relevant.

(55)   *max* ⟺

```
            GEN
           /   \
         F3     ACC
              /    \
            F2      NOM
                   /   \
                 F1    PLP
                      /   \
                    PL     #P
                          /   \
                         #    SPKRP
                             /     \
                          SPKR    PARTP
                                 /    \
                              PART    REF
```

(56)   /æj/ ⟺

```
          INS
         /   \
       F5     LOC
             /   \
           F4     GEN
                 /   \
               F3     ACC
                     /   \
                   F2     NOM
                            \
                            F1
```

So suppose we have the entries (55) and (56), and we want to derive the instrumental shape of the pronoun. The way we have set up our derivations, we will keep merging features and spelling out using *max* all the way to GEN; this correctly derives the shape of the pronoun in NOM, ACC and GEN. The question is what happens when we want to derive the instrumental, and add the feature F4 on top of the genitive, yielding the configuration in (57).[4]
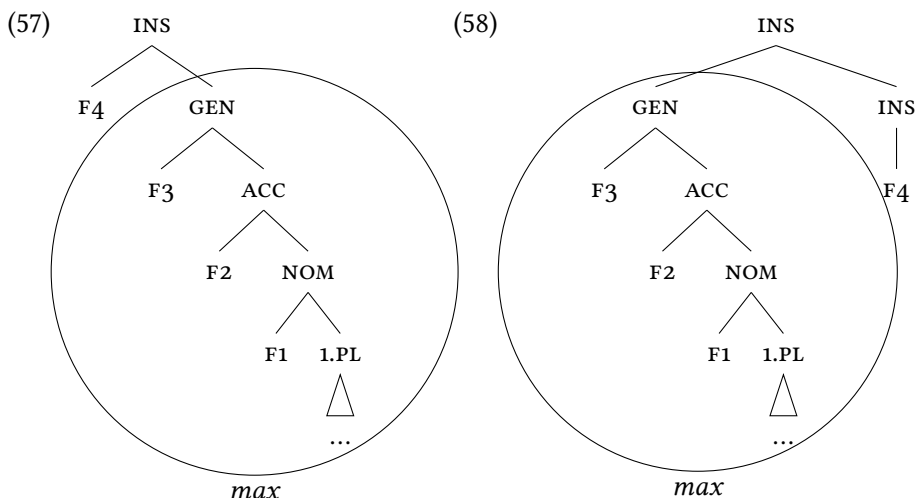
What our definitions lead to is that we try to spell out (57) in one piece (fail), then try Spec movement (fail, as there is no movable Spec), and then finally try complement movement—yielding (58)—fail again. The problem here is that the projection on the right branch, labelled INS, is not a sub-constituent of the lexical entry of the instrumental as given in (56).

In such cases, we say that spellout fails. The derivation will therefore crash unless saved in some other way. This is where backtracking, repeated in (59), steps in.

(59)   *Backtracking* (Starke 2018)
   When spellout fails, go back to the previous cycle, and try the next option
         for that cycle.

Below, I will be applying this definition quite mechanically, so let me first say 'in human terms' what its purpose is going to be. In particular, backtracking will

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[4]For simplicity, I am skipping the locative case, as this case is not available for pronouns in general. I do not know why this is so.

achieve that the lexical item for *max* (the 1st person pronoun) will 'shrink' down below nominative, and it will only spellout the 1st person plural constituent; recall that this is possible du to the Superset Principle (6). Once this happens (due to backtracking), the 1st plural will evacuate from below the nominative case feature, which corresponds to the bottom of the instrumental lexical entry in (56). After a series of successive cyclic movements, the form *max-æj* will be derived.

Let me now turn to the mechanics, applying the definition (59) to the derivation we have in (58); which is the place where we got stuck. When the backtracking definition is applied to this scenario, the phrase 'current' cycle in the definition of backtracking refers to the 'instrumental' cycle. What we should then do is go to the previous cycle, which, in our case, is the 'genitive' cycle. It corresponds to the circle inside (57). On the genitive cycle, spellout had succeeded without any movement. But that led ultimately nowhere, so a different option has to be tried (this is what backtracking is about). So we try other options for spellout; however, the genitive constituent has no movable Spec, so complement movement applies, yielding (60)—but that fails again.


(60), (61), (62)
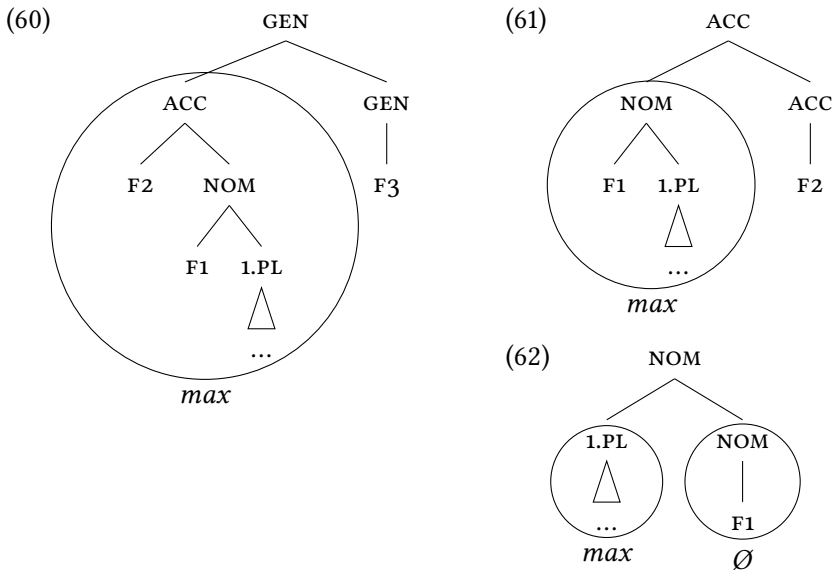
This means that spellout fails also after one step of backtracking, forcing another step: the current stage of the derivation in (60) is the one where spellout has failed, so backtracking brings us back to the 'accusative' cycle: circled in (60).

Trying other options at the accusative cycle won't spell out, see (61), so backtracking must apply again. We go to the nominative cycle, which, at first, we

spelled out using *max* and the no-movement option: see the Spec in (61). However, backtracking tells us to try a different option, and since there is no movable Spec, (62) is produced by complement movement. Here, finally, the NOM feature spells out using the regular NOM zero. This is what we needed, since a new derivational path has been opened that can now continue in a different direction compared to our first try—which ultimately led nowhere.

From there on, the derivation continues in cyclic steps—very much in the way as shown in (50)—ultimately reaching the instrumental, where backtracking was required at first. However, this time the instrumental spells out successfully, because backtracking has shrunk the pronoun *max*, and the bottom of the INS constituent now corresponds to the nominative feature, so there is a perfect match with the entry for *-æj*, recall (56).

(63)
(64)
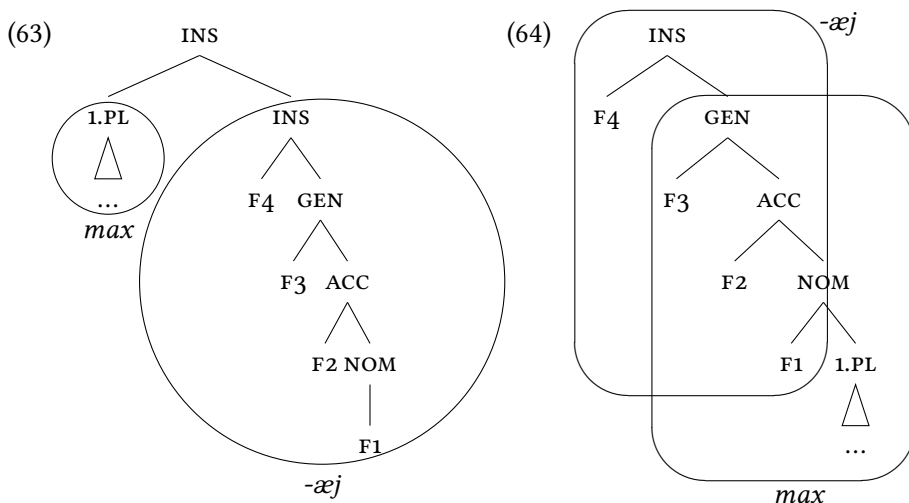
So to sum up, backtracking arises in situations where the specification of lexical entries overlaps, see (64), where the specifications of the entries are placed in rectangulars. In such cases, the lower element has to shrink (which is allowed by the Superset Principle) below the 'foot' of the higher entry, to allow for the 'foot' of the higher lexical entry to be matched. The higher lexical entry cannot shrink at the bottom (and spell out just the high feature), because of the way constituent matching works; the lexical entry for the instrumental *-æj* cannot match just F4 and its projection INS, because these are not a sub-constituent of the lexical tree.

4.6 Pointers

In a couple of the derivations to come, I will rely on pointers. Pointer is an index inside one lexical entry pointing to a different lexical entry. The initial reason why Starke introduced them was because of idioms like *kick the bucket*. Starke's idea was that we can store the idiomatic meaning as a phrasal lexical entry that looks as in (65).

(65)   /−/ ⟺ VP ⟺ DIE

        23 (*kick*)   DP

   24 (*the*)   25 (*bucket*)
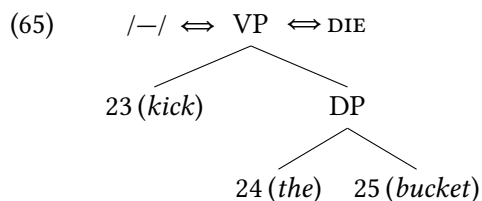
The idea here is that if syntax builds (in a cyclic, bottom-up fashion) a constituent where the three branches are spelled out by the lexical entries for *kick, the* and *bucket*, then the insertion procedure overwrites the conceptual information contained inside the constituent, and inserts DIE instead.

The lexical items on the terminal nodes of the lexical entry (65) (i.e., *kick, the, bucket*) are indexed by numbers. This convention is here to remind us that each lexical item is a triplet < phonology, syntax, concept >, and not just phonology. The numbers are arbitrarily assigned to such triplets and then used in the lexical entry of the idiom. So the lexical entry (65) really has numerical indexes at the terminals, but to keep track of what lexical item the arbitrary indexes refer to, I have placed inside brackets the relevant lexical entries in italics. However, it is important to keep in mind that pointers do not refer to the phonology (or meaning) of the entry pointed to, they refer to the whole triplet (and more specifically to the fact that this entry applies at the relevant node). The numerical indexes will be kept in lexical entries as a device to remind us that reference is being made to the lexical entry (and not just to the phonology of *kick*).

The phonology of the idiomatic lexical item is null; this does not mean that some kind of a zero morpheme overrides the phonology of *kick, the* and *bucket*; rather, this instruction is interpreted as 'do nothing to the phonology.' This derives the effect that lexical items inside idioms have the same phonology (up to irregularity) as the original lexical items.

This view on zero phonology has interesting consequences for traditional zero lexical items. Some of them may actually insert 'zero phonology' (e.g., empty CV), which overrides overt phonology. Other zero lexical items may simply be

of the 'do-nothing' sort, not overriding anything, but simply keeping what we had before. I will be using this distinction in what is to come. For instance, we can treat the zero accusative ending of Ossetic (recall (31)) as 'do-nothing' type of zero, though in this case, inserting an 'overriding' type of zero is an option too. In some cases, a difference will appear.

(66) $/-/ \Longleftrightarrow$ ACCUSATIVE

        F2   NOMINATIVE

               F1
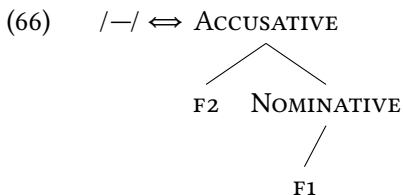
Pointers can be used to handle suppletive lexical items. For instance, Starke has, in his early unpublished lectures, proposed that the lexical entry for *mice* could easily look as in (67). Here the idea is that if syntax and spellout build the regular plural *mous-es*, the output of the derivation is, at a higher level, overridden by the phonology *mice*. This lexical entry is thus in a way a representative of a phonological idiom, because it inserts an irregular phonology for a regular combination of lexical items, keeping the concept intact (the entry says 'do nothing to the meaning').

(67) $/mice/ \Longleftrightarrow$ PLP $\Longleftrightarrow$ −

      27 (*mouse*)   28 (*es*)
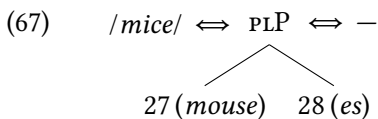
An alternative, explored in Caha et al. (2019b,a) is that the entry could potentially look also as in (68), where inside the lexical entry, we mix grammatical features (PL) and a pointer. The idea behind the entry is that when we are spelling out the PLP, we can directly insert *mice* (as long as one daughter is the PL feature, and the other daughter has been spelled out by 27 = *mouse*). This saves us moving *mouse* over *es* before *mice* is inserted.

(68) $/mice/ \Longleftrightarrow$ PLP $\Longleftrightarrow$ −

     PL 27 (*mouse*)
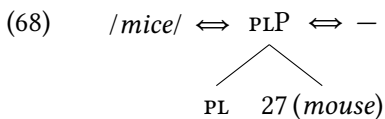
Let me now turn to one particular paradigm in the Ossetic declension that I think well illustrates the usefulness of pointers. The relevant place is the declension of the 1st/2nd person pronouns in the singular. I present them side by side with the
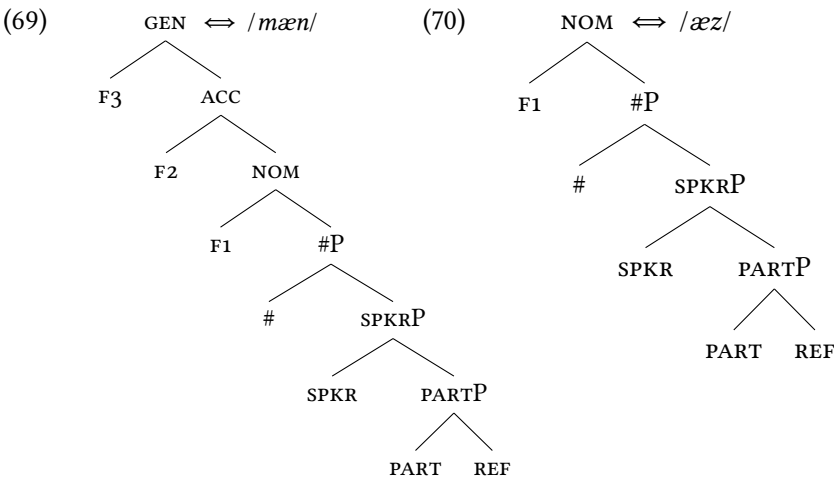
plural pronouns in Table 4.4. The two plural pronouns have NOM—ACC—GEN syncretism, and in the rest of the cases, they have the regular case endings attached on top of the pronominal base. In the previous section, I have shown that within Nanosyntax, this requires backtracking.

Table 4.4: Iron pronoun, fragment

|	1.PL	2.PL	1.SG	2.SG
NOM	max	symax	æz	dy
ACC	max	symax	mæn	dæw
GEN	max	symax	mæn	dæw
INS (ABL)	max-æj	symax-æj	mæn-æj	dæw-æj
DAT	max-æn	symax-æn	mæn-æn	dæw-æn

Now the singular pronouns have a very similar system, with the difference that they have a different (suppletive) form for the nominative. One way to think about this paradigm (a way which will ultimately prove to be the wrong one) would be that the genitive 1.SG *mæn* is parallel to the entry for 1PL *max*. This would lead us to propose the entry in (69) (recall the entry for *max* in (55)). The only difference is the absence of PL in the singular *mæn*.

The nominative *æz* would then have the entry in (70). This entry has the same person/number features as *mæn*, but differs in that it lacks the GEN and ACC features.

(69) GEN ⟺ /*mæn*/

- F3
- ACC
  - F2
  - NOM
    - F1
    - #P
      - #
      - SPKRP
        - SPKR
        - PARTP
          - PART
          - REF

(70) NOM ⟺ /*æz*/

- F1
- #P
  - #
  - SPKRP
    - SPKR
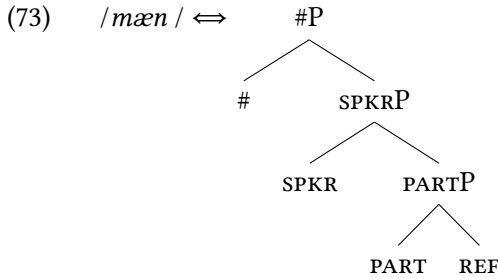   - PARTP
      - PART
      - REF

The two entries will provide the correct form for NOM: here we keep spelling out the features without any movement. Both *æz* and *mæn* are a match for the nominative, but *æz* wins due to the Elsewhere. Once we reach ACC, *æz* is no longer a match, and so *mæn* overtakes and spells out without any movement until the genitive. Then the problems begin.

So recall that for the instrumental, the 1.PL *max* had to shrink (due to backtracking), because the instrumental ending *æj* expresses all the features from NOM up. Its foot is therefore the nominative feature F1 and *max* had to shrink below this foot. This is repeated in (71). Now we expect that an analogous shrinking below the foot of the ending *æj* will take place in the 1.SG. This is shown in (72). However, given the lexical entries in (69) and (70), we expect *æz* to win, deriving *æz-æj*, contrary to fact. The correct form is *mæn-æj*.

(71)   (72)
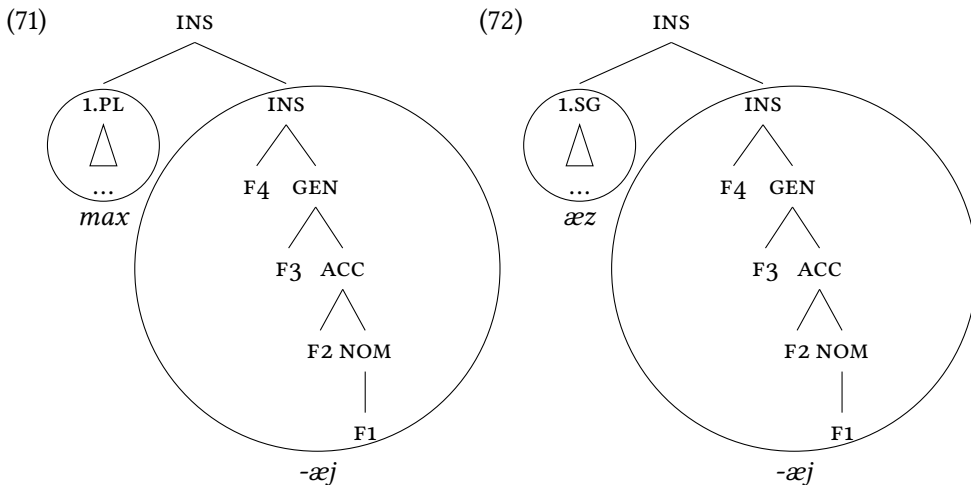
So we need an alternative. Given the facts, the starting point of the correct analysis must be that *mæn* wins over *æz* in (72). In order for that to be so, its entry must be as in (73). This analysis basically says that *mæn* is the 'caseless' form of the 1.SG pronoun.

(73)   /*mæn* / ⟺   #P

```
                #P
               /  \
              #   SPKRP
                  /   \
               SPKR   PARTP
                      /   \
                   PART   REF
```

Once the entry is like this, we explain the instrumental and the dative, because in a structure like (72), *mæn* wins over *æz* due to the fact that it has fewer superfluous features, in fact, *mæn* is a perfect match here. *Æz* has, in addition, the nominative feature F1, and this is what makes it loose.

We also still get the nominative right, because when the nominative F1 feature is added on top of the structure (73), the form *æz* (whose entry is still as in (70)) spells out such a structure without any movement, and it is the only candidate for the job.

This division of labour between *mæn* (caseless shape) and *æz* (spells out NOM in addition) further correctly predicts the distribution of the two shapes in suspended affixation. In particular, since the case features are all located in the suffix after the coordination, we expect the 'caseless' *mæn* to surface in the first conjunct, which is correct. I show this in (74).

(74)   Ossetic (Belyaev 2014: 39)
         a.   mæn æmæ Zauyr-æn
               1.SG and Zaur-DAT
         b.   *æz æmæ Zauyr-æn
               1.SG and   Zaur-DAT
               'me and Zaur'

The question then becomes how the ACC and GEN shapes arise. The stage of the derivation when we add the accusative feature on top of the nominative *æz* is shown in (75).

(75)

æz
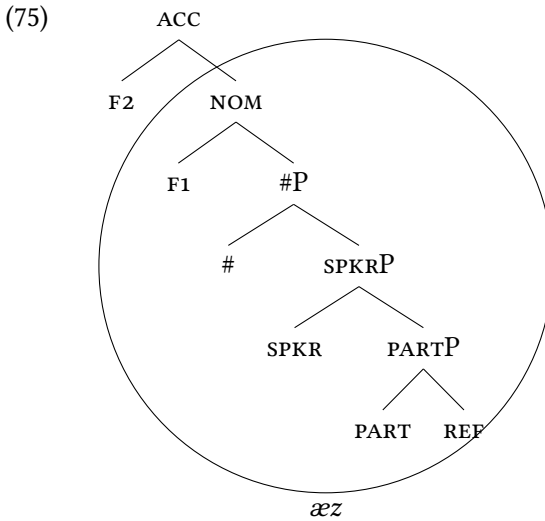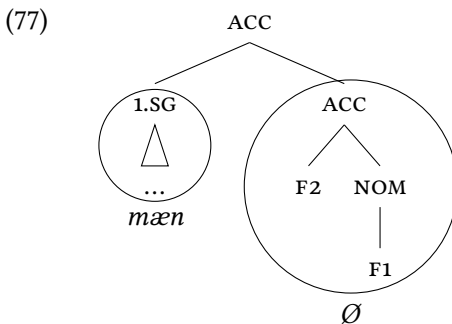
Interestingly, to get the correct accusative, we need to say nothing beyond repeating its regular entry in (76).

(76)   /—/ ⟺ Accusative
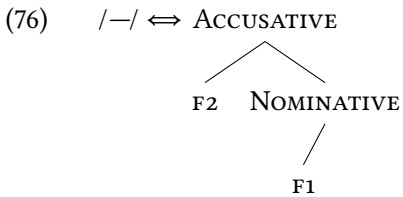
This entry will lead to backtracking below its foot – i.e., to #P – which then cyclically extracts over F1 and F2, yielding (77):

(77)

What about the genitive? Here something special needs to be said. The reason

is that under the current analysis, the structure of the pronominal paradigm is expected to be essentially parallel to the nominal one: putting aside the special nominative form *æz*, what we expect in the rest of the paradigm is to have a 'caseless' base *mæn*, which should inflect like a 'caseless' noun like *sær* 'head.' The table 4.5 shows that this is almost always the case: outside of the nominative (which is due to the special 'nominative' form *æz*), there is almost a perfect match between the nominal and pronominal endings, with the exception of the genitive. What we would expect in the genitive (under the analysis where *mæn* is a caseless base) is the form *mæn-y*.

Table 4.5: Iron pronoun vs. noun (Belyaev 2014, Abaev 1964)

	1.SG	2.SG
NOM	æz	sær-Ø
ACC	mæn-Ø	sær-Ø
GEN	mæn (???)	sær-y
INS (ABL)	mæn-æj	sær-æj
DAT	mæn-æn	sær-æn
ALL	mæn-mæ	sær-mæ
ADE	mæn-yl	sær-yl
EQU	mæn-au	sær-au
COM	mæn-imæ	sær-imæ

In terms of the actual derivation, this prediction arises as follows. Consider the stage of the derivation where we merge the genitive feature on top of the accusative (see (78)) and the entry for *-y*, repeated in (79).
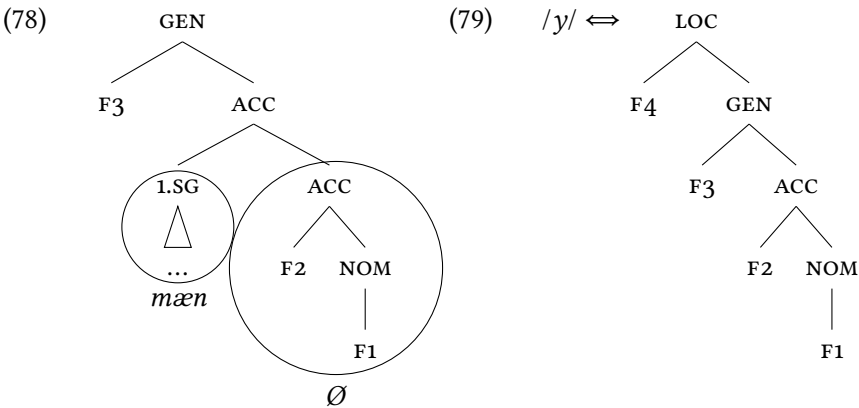
Given that we have no single lexical entry for (78), we would expect that *mæn* undergoes Spec-movement from below the genitive feature, see (80). This yields the tree (81), which should be spelled out as *mæn-y*.

(80)

GEN
├── 1.SG
│   └── △ *mæn*
└── GEN
    ├── F3
    └── ACC
        ├── 1.SG
        │   └── △ *mæn*
        └── ACC
            ├── F2
            └── NOM
                └── F1
                Ø

(81)

GEN
├── 1.SG
│   └── △ *mæn*
└── GEN
    ├── F3
    └── ACC
        ├── F2
        └── NOM
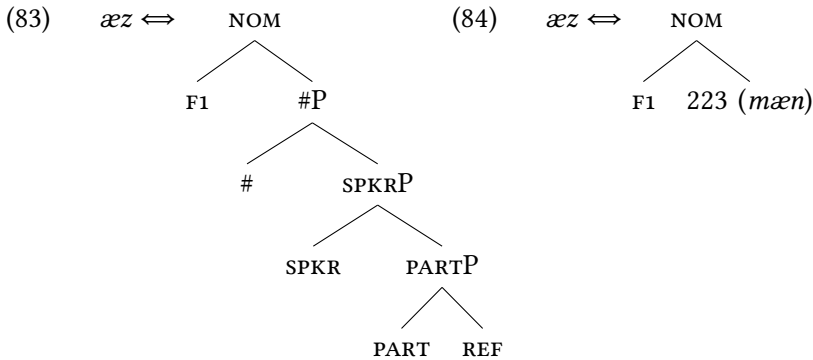   └── F1

-y
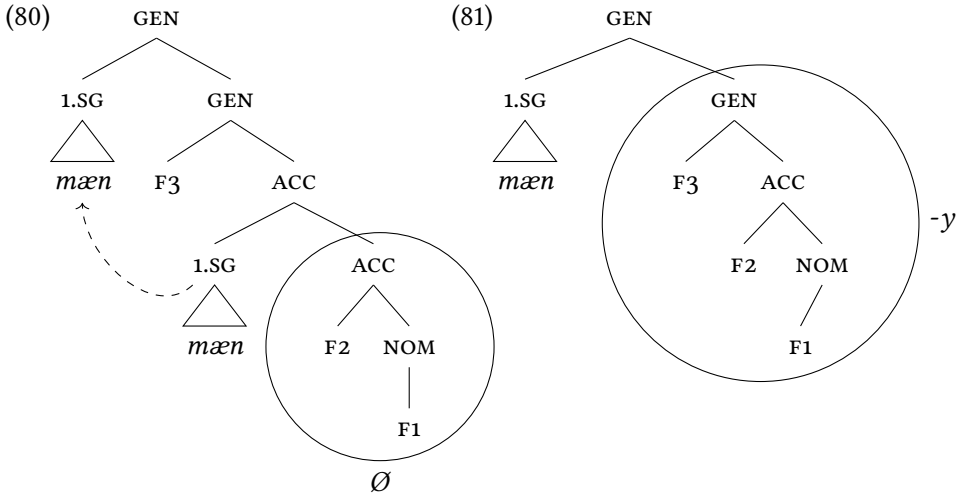
This derivation takes place in the case of nouns, but not in the case of 1.SG and 2.SG pronouns. In other words, if the Spec in (81) contained a different lexical item, the derivation would be fine. But when it contains *mæn*, it leads to a wrong result. Why is this so? Why is the expected derivation blocked in just two cases? The reason is, I propose, that for these two exceptional cases, there is actually a special lexical entry that applies at the top node of the structure (78), where we merge the genitive feature to the accusative case. If such an entry exists, it will spell out the genitive structure without any movement, thereby preventing the unwanted derivation in (80).

Now obviously, this must be a special type of a lexical entry, because it blocks this derivation only for 1.SG and 2.SG (and in no other case). How can we make sure that this entry applies only in these two instances? The answer is – via pointers. This is exactly the type of a device that can – through directly referencing the 1.SG (or 2.SG) pronoun – be restricted to apply in just this special case. The lexical entry for the 1.SG is shown in (82). (An analogous entry will be needed for 2.SG.)

(82)   /—/ ⟺ GEN ⟺ —

               F3   ACC

                          223 *mæn*   224 Ø
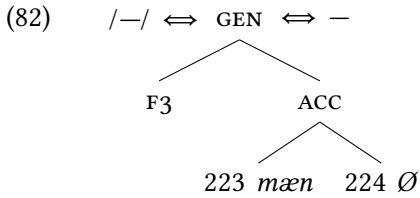
What this entry basically says is: when the genitive feature F3 is added to the accusative of *maen*, just 'do nothing.' This achieves the correct form of the genitive, which really is the only irregular form in the 1.SG paradigm once we have the caseless entry for *mæn*. Recall that pointers are exactly the type of device that handles 'irregular' forms of individual lexical items. Since they are specific to individual lexical items, an analogous lexical entry will be needed for 2.SG.

Finally, I want to note that the introduction of pointers leads to some degree of 'indeterminacy' in the system. For instance, the special nominative shape of the 1.SG pronoun could now be coded in two roughly equivalent ways. The first one has been given in (70) and I repeat it in (83). The second possible encoding (after pointers have been introduced) is in (84).

(83)   *æz* ⟺   NOM   (84)   *æz* ⟺   NOM

                F1   #P   F1   223 (*mæn*)

                  #   SPKRP

                     SPKR   PARTP

                          PART   REF

The former entry says that the NOM of 1.SG is *æz*. The latter says that the NOM of *mæn* is *æz*. Caha et al. (2019b) propose a system where the indeterminacy is removed, and (84) is the only possible format. This has to do with their view on roots, override and the absence of Elsewhere in their system. For the current discussion, this is too advanced, so I prefer to keep the ambiguity.

4.7 Conclusion

By means of conclusion, let me recapitulate briefly the main outline of the spell-out theory.

The first component of any such theory is a matching procedure. This procedure defines when a match between a lexical entry and a structure obtains. In Nanosnytax, matching is governed by the Superset Principle, repeated from (6).

(85)   *The Superset Principle* (Starke 2009):
        A lexically stored tree matches a syntactic node iff the lexically stored tree contains the syntactic node.

Further, I have introduced the idea of cyclic spellout governed by the following spellout algorithm, repeated from (32):

(86)   Merge F and
        a.   Spell out FP
        b.   If (a) fails, attempt movement of the Spec of the complement of F, and retry (a)
        c.   If (b) fails, move the complement of F, and retry (a)

When the spellout algorithm leads the derivation into a dead end, the derivation may go back to previous cycles and trying different options:

(87)   *Backtracking* (Starke 2018)
        When spellout fails, go back to the previous cycle, and try the next option for that cycle.

With the basics in place, we are ready to explore the empirical domain of augments in the following Ch. 5. Following up on that, I shall enrich the theory further in Ch. 6.

5 The augment

The current chapter explores the empirical domain of 'augments' in Ossetic and beyond. I begin by providing an idea of how to deal with these structures in the spellout model adopted. I will then discuss analogous augments in Ossetic pronouns as well as in other languages. We will see that under particular assumptions about allomorphy, augments raise serious challenges to the overall theory of cumulative decomposition proposed here. I will, however, argue that the spellout machinery proposed in the previous chapter – with backtracking as an essential part – allows us to implement the apparently problematic facts without giving up on the idea that case decomposes in a cumulative fashion.

5.1 The augment *-e(m)* in Digor

Let me start the chapter by coming back to the declension of the numerals in Ossetic. Recall that the numeral declension is relatively unremarkable in one variety of Ossetic (Iron), see the table 5.1. Here the numerals inflect in exactly the same way as nouns.

Table 5.1: Iron (Abaev 1964)

	ten	head, SG.
NOM	dæs-Ø	sær-Ø
ACC	dæs-Ø	sær-Ø
GEN	dæs-y	sær-y
LOC (INE)	dæs-y	sær-y
DAT	dæs-æn	sær-æn
INS (ABL)	dæs-æj	sær-æj
ADE	dæs-yl	sær-yl
ALL	dæs-mæ	sær-mæ

However, in the Digor variety, the numerals show an 'augment' *-e(m)* in the

oblique cases (from GEN on), though not in the structural cases (NOM-ACC), see Table 5.2, repeated from Chapter 2, Table 2.8.
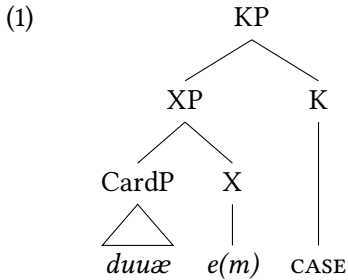
Table 5.2: Digor (Erschler 2018)

	two			horse
NOM	duuæ-		Ø	bæx-Ø
ACC	duuæ-		Ø	bæx-i
GEN	duu-	e	-j	bæx-i
LOC (INE)	duu-	em	-i	bæx-i
DAT	duu-	em	-æn	bæx-æn
INS (ABL)	duu-	em	-æj	bæx-æj
ADE	duu-	e	-bæl	bæx-bæl
ALL	duu-	e	-mæ	bæx-mæ

In this section, I want to show how the Digor shapes are derived and how the difference with Iron can be analysed. The discussion has relevance for the structure of morphological paradigms beyond Ossetic, and crucially, also for the overall theory of case competition.

I will start my way towards an analysis by recalling the general remarks from Chapter 4 on the function of augments in the grammar. The general idea is that augments spell out meaningful functional projections that are commonly part of the functional sequence. They appear only with some roots due to the arbitrary nature of lexical storage: some roots are able to spell out all the relevant projections on their own (and have no augment), other roots can't (and need an augment). This has been ilustrated in (25) (Chapter 4) on the example of gradable adjectives in Czech, with detailed discussion in Vanden Wyngaerd et al. (2019).

Based on this understanding, let me recall here the structure (1), arrived at originally in Ch. 2, numbered point (48), where I have proposed that the *-e(m)* of Digor heads a special projection, X:

(1)

```
                    KP
                  /    \
               XP       K
              /  \      |
          CardP   X     |
            /\    |      |
          duuæ  e(m)   CASE
```

As should be clear by now, the head X is not some meaningless 'morphological-stem' head, but one of the regular interpretive heads inside the numeral's projection. It is just hard to say as yet which head that is exactly, and so it is labelled as X.

In general terms, we know that the composition of cardinals involves a number of components (e.g., scales, classifiers), so there are quite a few meaning components to chose out of. For instance, in a recent article, Bale & Coon (2014) found that some languages exhibit a system where numerals fall into two classes. The first class contains numerals that require a special morpheme called the 'classifier,' denoting what Bale & Coon (2014) call a 'cardinality measure.' This classifier morpheme is boldfaced in (2-a). Its absence leads to ungrammaticality, see (2-b).

(2) Mi'gmaq (Bale & Coon 2014)

    a.   asugom **te's**-ijig ji'nm-ug
            six   CL-AGR man-PL
            'six men'

    b.   *asugom-ijig ji'nm-ug
            six-AGR   man-PL

Other numerals do not need to combine with such a 'cardinality-measure' marker, see (3-a). In fact, when they do, ungrammaticality arises, see (3-b).

(3) Mi'gmaq (Bale & Coon 2014)

    a.   na'n-ijig ji'nm-ug
            five-AGR man-PL
            'five men'

    b.   *na'n **te's**-ijig ji'nm-ug
            five CL-AGR man-PL

The way Bale & Coon (2014) explain this is by proposing that the numeral in (3) "has a cardinality measure (μ#) built into its meaning." In (2), the numeral does

not have such a 'cardinality measure' incorporated, and the cardinality measure must therefore be expressed as an independent marker. This is very similar to the approach taken here, where the functional projection of numerals is assumed to have always the same meaning components, but some numerals are able to spell out most of these (and 'incorporate' the relevant semantics), while other numerals need to have augments to express the same set of meaning components.
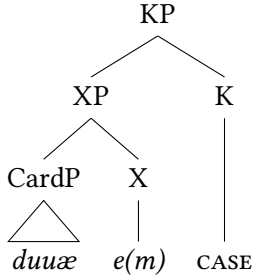
Given these considerations, I will base my analysis on the idea that the head X (spelled out by the augment in Digor) carries a meaning that will be present in all cases – both structural and oblique – and in both varieties – Digor and Iron. I will later tentatively suggest what this meaning may be, but leave it open for now. Taking this as given, two questions arise. The first one: how to analyse the structural cases in Digor (where no *-e(m)* is present). The second one: how to analyse numerals in Iron (no *-e(m)* whatsoever).

Starting from the latter question, two possibilities arise. The first one is to say that *-e(m)* is missing because X is spelled out as zero in Iron, see (4). I will call this the 'zero-X' analysis. The second possibility is that X is spelled out as a part of the numeral, see (5). I will call it the 'big-numeral' analysis. In either case, X will be silent in Iron.

(4) Iron: zero X
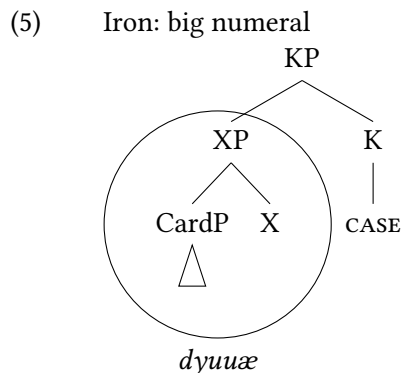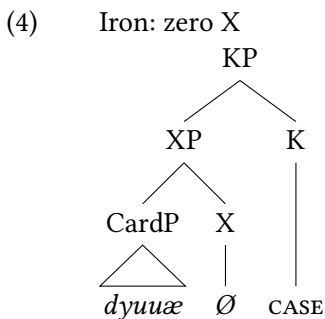
(5) Iron: big numeral

No matter how this is settled, the conclusion must be that in order for Digor to have *-e(m)*, the numeral absolutely cannot spell out X, otherwise we would never see *-e(m)* (just like we don't see it in Iron under the big-numeral analysis). So this is our firm starting point: Digor numerals are small and cannot spell out X, which is as depicted in (6). If they could, we would never see *-e(m)*.
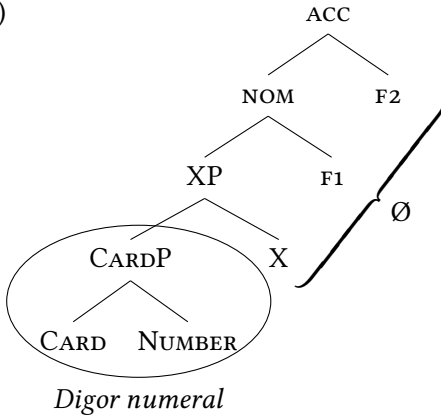
(6)   Digor

```
                    KP
                   /  \
                 XP    K
                /  \    |
            CardP   X    |
             /\     |    |
           duuæ   e(m)  CASE
```
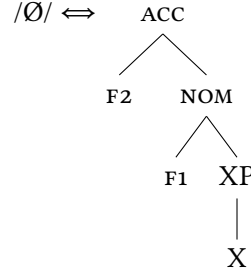
With this in mind, consider the fact that there is no *-e(m)* in the structural cases in Digor. How can this be, given that X cannot be spelled out by the numeral? The only remaining option is that X is spelled out along with case. This idea is depicted informally in (7), where the bracket indicates that there is a zero NOM/ACC marker that spells out X along with K. The accusative reading requires the full structure in (7), the nominative reading is allowed by the fact that the lexical item can 'shrink.'

The lexical item for the NOM/ACC zero marker (which also spells out X) is in (8). As we shall see, it is important that this zero marker is an 'overriding' type of zero (which is indicated by Ø as opposed to —). I also add the marker for the augment *-e(m)*, which (as we have been assuming all along) spells out XP.

(7)

```
                      ACC
                     /    \
                  NOM      F2
                 /   \       \
               XP     F1      \
              /  \      \      Ø
         ( CARDP   X )
          /    \
       CARD   NUMBER
        Digor numeral
```

(8)   /Ø/ ⟺   ACC
                 /   \
               F2   NOM
                     /   \
                   F1   XP
                           |
                           X

(9)   /-e(m)/ ⟺ XP
                    |
                    X
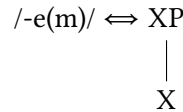
With the lexical items in place, let us see how the derivation works. The lexical entry (9) comes into play upon the merger of X on top of CARDP. Given that the Digor numerals cannot spell out X, the CARDP has to move to the left of X, and the remnant XP is lexicalised by the *-e(m)* marker. The Ø of (8) is also a candidate,

but it loses, because it has more unused features; see (10).

(10)

Digor numeral

(11)
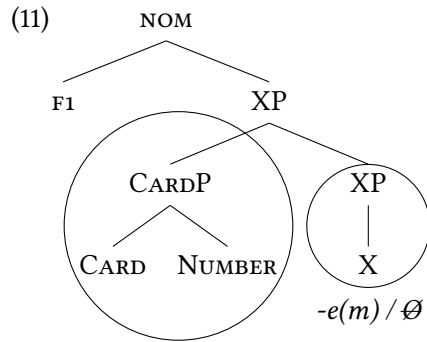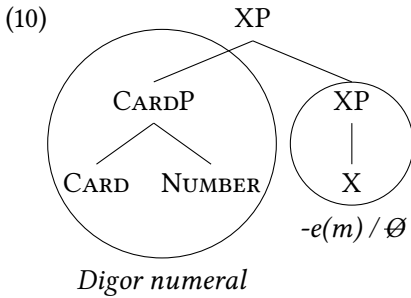
Upon the addition of case features, see (11), the CARDP must move on by Spec movement, yielding the nominative in (12). Note that once case features are merged, *-e(m)* is no longer a candidate, and the zero marker (beaten in (10)) overrides it. The accusative is in (13).

(12)

Digor numeral

(13)

Digor numeral
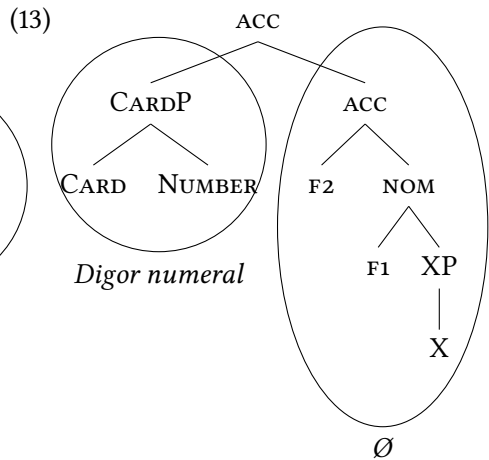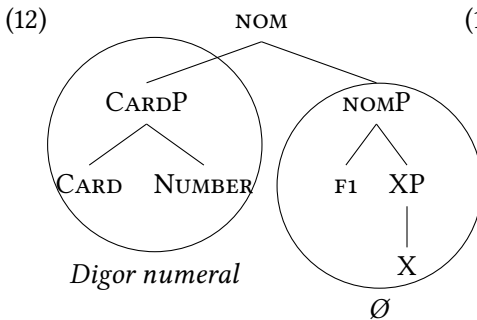
However, when the genitive feature is merged on top of accusative (yielding (14)), the derivation blocks.

(14)

```
                    GEN
            ┌────────┴────────┐
           F3               ACC
                   ┌─────────┴──────────┐
               ( CARDP )            ( ACC )
                 ┌─┴─┐              ┌──┴──┐
              CARD  NUMBER         F2   NOM
                                       ┌─┴─┐
              Digor numeral           F1   XP
                                           │
                                           X

                                           Ø
```
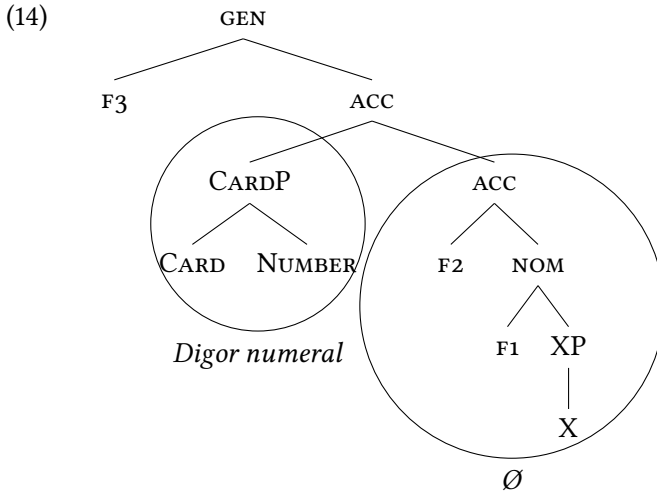
The reason is that the structure (14) does not spell out as a whole, and spellout movements do not help either. Spec movement produces (15), but there is no lexical item that bottoms out at X and includes the genitive feature F3. Similarly, there is no entry with F3 as its lowest feature, and so complement movement fails as well (see (16)).

(15)

```
                    GEN
           ┌─────────┴────────┐
        ( CARDP )            GEN
          ┌─┴─┐           ┌───┴───┐
       CARD  NUMBER      F3     ACC
                               ┌──┴──┐
       Digor numeral          F2   NOM
                                   ┌─┴─┐
                                  F1   XP
                                       │
                                       X
```
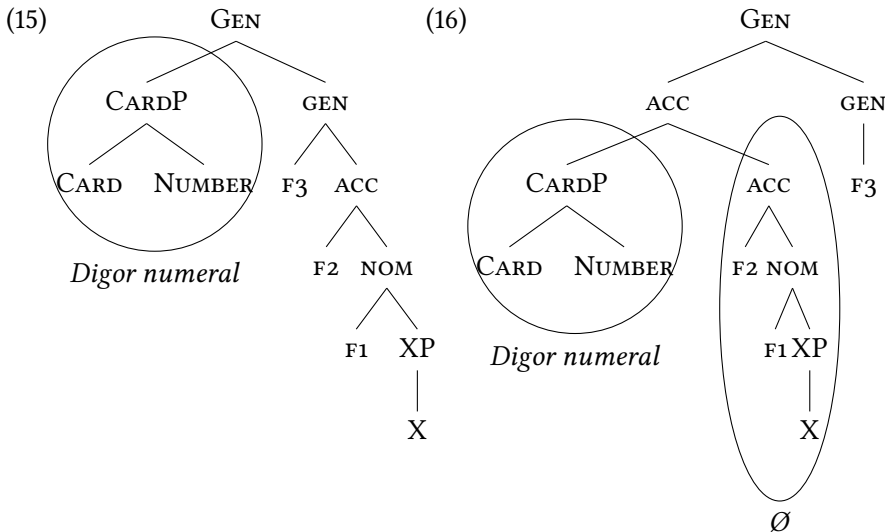
(16)

```
                    GEN
           ┌─────────┴────────┐
          ACC               GEN
       ┌───┴────┐            │
   ( CARDP )  ( ACC )       F3
     ┌─┴─┐    ┌──┴──┐
  CARD NUMBER F2  NOM
               ┌──┴──┐
  Digor numeral F1  XP
                    │
                    X

                    Ø
```

Backtracking has to be set in motion, and go all the way back until it finds a new derivational option. This will happen at the level of NomP. At the first pass

through the cycle, we did Spec movement, see (17), repeated from (12). But since this led nowhere, we move the full complement of F1 (corresponding to the XP), yielding (18).

(17)

Digor numeral

(18)

Digor numeral
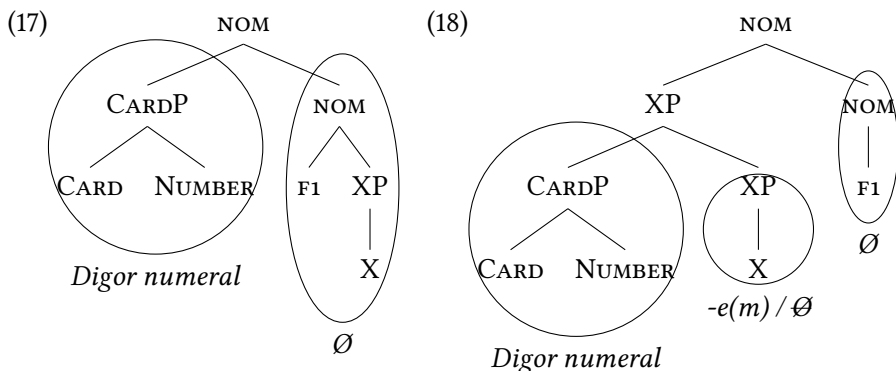
The structure (18) spells out fine, recall we have the NOM/ACC (do-nothing type of) zero in (19) (a different type of zero from the one that spells out X). In the structure (18), the augment -*e(m)* resurfaces, because for XP, it is a better match than the override zero; recall the discussion surrounding the structure (11).

Once the new derivational path is opened by backtracking, The XP (spelled out as *numeral-e(m)* sequence) will keep cyclically moving from below the case features due to the existence of a series of oblique case markers that all bottom out at F1: recall we have the locative *y*, recall (4)), the dative -*æn* (43), the instrumental -*æj* (42). In Digor, we have (in addition to all of this) a dedicated entry for the genitive, which I introduce in (20).

(19) $/-/ \Longleftrightarrow$ ACC

F2 NOM
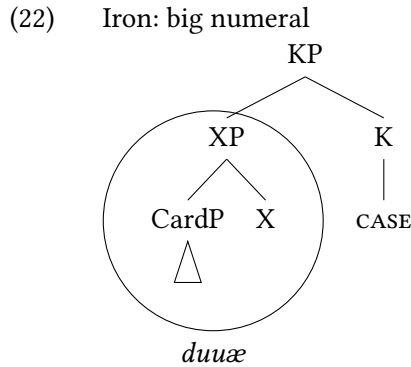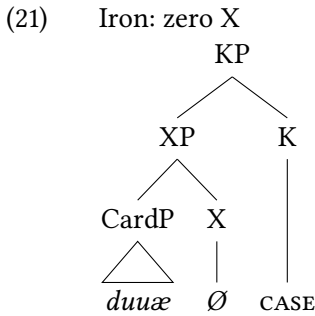
F1

(20) $/j/ \Longleftrightarrow$ GEN

F3 ACC

F2 NOM

F1
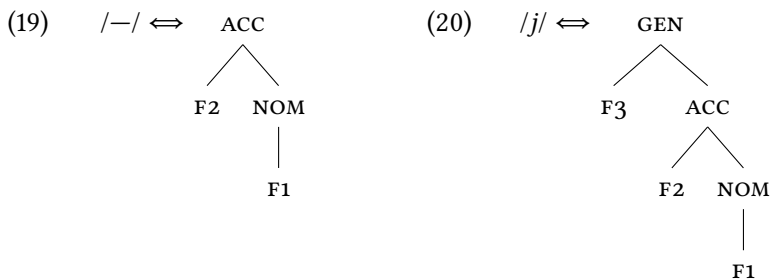
Given this conclusion, we end up with a paradigm where in the structural cases, the marker Ø attaches to the root of the numeral, pronouncing the augment slot and the case features. In the oblique cases, due to backtracking, the augment -

e(m) is restored under X and the sequence NUMERAL-*e(m)* is subject to further affixation by the oblique markers.

5.2 The lack of the augment in Iron

Let me now briefly come back to the two possible approaches to the absence of an augment in Iron. We have called them the zero-X analysis and the big-numeral analysis. I repeat them below (originally (4) and (5)).

(21) Iron: zero X

```
            KP
          /    \
        XP      K
       /  \     |
   CardP   X    |
    /\     |    |
  duuæ     Ø   CASE
```

(22) Iron: big numeral

```
            KP
          /    \
    (  XP   )   K
    ( /  \  )   |
    (CardP X)  CASE
    (  /\    )
    ( duuæ  )
```

The first analysis, where X(P) is spelled out as zero, leads to the expectation that if Digor had more contexts where the augment *-e(m)* shows up, Iron should not show *-e(m)* in these contexts, but have the augment Ø instead. The reason is simply that Ø is the Iron counterpart of the Digor *-e(m)*, so where Digor has *-e(m)*, Iron should have Ø. The big numeral analysis does not make this prediction. It says that Iron numerals can spell out the projection of X. However, this does not exclude a scenario where *-e(m)* pronounces X even in Iron, which could arise when some item (other than the numerals) fails to spell out X.

So the goal now is to see if there are additional contexts where Digor has *-e(m)*, and then see what happens in Iron. Ultimately, the discussion is going to be somewhat inconclusive, but since it is relevant for what shall follow, I need to take the time to present it at this point.

Let me start the discussion of additional suspected instances of the augment *-e(m)* in Digor by presenting the declensional paradigm of its demonstratives ('this' and 'that') side by side with the numeral, see 5.3. The distal demonstrative also functions as a 3.SG pronoun.

Table 5.3: Demonstratives in Digor (Belyaev 2014, Erschler 2018)

	two			this		that (3.sg)	
NOM	duuæ-	Ø		a		je	
ACC	duuæ-	Ø		a-	j	uo-	j
GEN	duu-	e	-j	a-	j	uo-	j
LOC (INE)	duu-	em	-i	a-m-i		uo-m-i	
DAT	duu-	em	-æn	a-m-æn		uo-m-æn	
INS (ABL)	duu-	em	-æj	a-m-æj		uo-m-æj	
ADE	duu-	e	-bæl	a-	bæl	uo-	bæl
ALL	duu-	e	-mæ	a-	mæ	uo-	mæ

What we see here is that when we separate the oblique case endings of the demonstratives in a way that they match those of the numeral (the endings are on the very right of the forms), we get two shapes of the demonstrative to the left of the endings. *A* and *a-m* for the proximal demonstrative, and *uo* and *uo-m* for the distal demonstrative. The two shapes of the base differ by the presence/absence of the segment *-m*, which I shall refer to as the demonstrative augment. Importantly, the demonstrative augment *-m-* appears in exactly the same cells where the numerals have an augment that includes an *m* as well: before vowel final oblique markers. I will now follow a path of reasoning where this overlap is taken to be significant, i.e., a consequence of the fact that the two *-m*'s are in fact the same *-m*. In other words, the idea to be explored is that demonstratives in Digor have at least a part the very same augment that we see in the numeral paradigm.

The reason why I talk about 'a part of the augment' rather than about 'the full augment' has to do with the shape of the numerical augment, which is *-e(m)*, while the augment on the demonstrative is just *-(m)*.

One analytical option is to treat the augments as identical,. i.e., *-e(m)*, and propose that *e* is eliminated in demonstratives for phonological reasons—because it would follow a vowel. Under this analysis, the reason why numerals keep the *-e* would be that the numerals are consonant final (including the base *duu-*, which really ends in *w*).

However, this analysis is not correct. It can be shown that when we place the numerical augment *-e(m)* after a vowel final base, this does not lead to the deletion of *-e*, but we get a glide appears. As a consequence, the demonstrative forms cannot be derived by some kind of an automatic deletion of *-e* after vowels,

because there is no such process in Digor.

The place where we can see this is when the numeral appears applies to a vowel final noun. Recall from Ch. 2 Table 2.6 that when a vowel final noun is followed by a vowel initial ending, this is usually resolved by glide insertion. The data is repeated in Table 5.4 for convenience.

Table 5.4: Consonantal and vocalic stems in Digor (Belyaev 2014: 33)

	'horse'	'rat'
NOM	bæx	uru
ACC	bæx-i	uru-j
GEN	bæx-i	uru-j
LOC (INE)	bæx-i	uru-j
DAT	bæx-æn	uru-jæn
INS (ABL)	bæx-æj	uru-jæj
ADE	bæx-bæl	uru-bæl
ALL	bæx-mæ	uru-mæ

So the question now is what happens when we count such a noun, which requires us to place the augment *-e(m)* after the noun (rather than after the numeral). Two relevant examples to consider are in (23).

(23)   Digor (Oleg Belyaev, p.c.)

    a.   fondz uru-jem-æj
             five   rat-AUG-ABL

    b.   *fondz uru-m-æj
   five   rat-AUG-ABL
             'five rats' (ABL)

The examples in (23) differ in how the morphologically expected sequence of the noun's final vowel + the suffix initial vowel are resolved. In (23-a), we get a glide insertion (so the augment is *jem*). In (23-b), we get vowel deletion (so the augment is just *-m*, as in the demonstrative). However, it turns out that only the option in (23-a) is the correct one.[1]

---

[1]The same contrast has been confirmed to me by a speaker of an Anatolian variety of Digor. In (i-a), we have a vowel final noun *mašina* 'car,' and we see that the augment has the shape *jem*. It is impossible to delete the initial vowel of the augment, as shown in (i-b) (which is what we would have to do to get the demonstrative form). Interestingly, it is possible to delete the final

Therefore, in order to maintain the idea that there is an identical *-m* in the numeral and in the demonstrative, we must decompose *-e(m)* into *-e* and *-(m)*, and claim that *-e* is present only in numerals, while *-(m)* is present both in numerals and in demonstratives. Following this idea, we must split X into two projections, X1 and X2. X1, where available, spells out as *-e*, and X2, where available, hosts *-(m)*. The updated structure of the numeral is shown in (24).
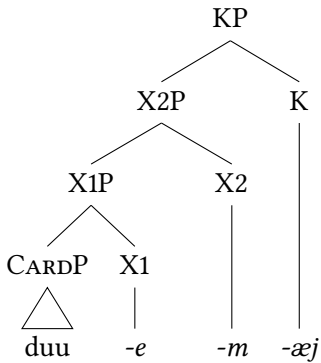
(24)   Digor numerals   (25)   Digor demonstrative
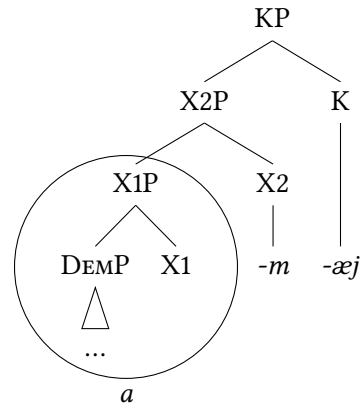
The tree in (25) shows the structure of the Digor demonstrative. Instead of CardP, we we have a DemP at the bottom of the tree. In the structure, I keep the heads X1 and X2. The main difference with the numerical structure is that the demonstrative spells out X1, and leaves only X2 for spellout. As a consequence, the demonstrative lacks the initial vowel of the augment, and shows only its second part, namely the *-m*.[2]

---

vowel of the noun, as in (i-c).

(i)   Digor (Anatolian variety, Emine Şahingöz, p.c.)

    a.   ærtæ mašina-jem-æj
        three cars-AUG-ABL

    b.   *ærtæ mašina-m-æj
        three cars-AUG-ABL

    c.   ærtæ mašin-em-æj
        three cars-AUG-ABL

[2]The account is inspired by Taraldsen's approach to Nguni languages. To see why, consider first a subset of the Zulu demonstratives in the first column of the table (i).

Under the analysis in (25), Digor demonstratives contain a part of the numerical augment. Hence, it makes sense to see what happens with demonstratives in Iron, as this may shed some light on the question whether there is—or isn't—an overt augment in Iron, which in turn is relevant for the analysis of the numerals. The relevant paradigms of Iron demonstratives and numerals are in Table 5.5.

Table 5.5: Demonstratives in Iron (Belyaev 2014, Erschler 2018)

	ten	this		that (3.sg)	
NOM	dæs-Ø	a-	(j)	uy-	j
ACC	dæs-Ø	a-	j	uy-	j
GEN	dæs-y	a-	j	uy-	j
LOC (INE)	dæs-y	a-m-Ø		uy-m-Ø	
INS (ABL)	dæs-æj	a-m-æj		uy-m-æj	
DAT	dæs-æn	a-m-æn		uy-m-æn	
ADE	dæs-yl	a-u	-yl	uy-u	-yl
ALL	dæs-mæ	a-	mæ	uy-	mæ

What we see here is that Iron indeed has the augment *-m-* in exactly the same

(i)

class	DEM	DEM	noun
1	lo	la+**u**	**u**-m-N
3	lo	la+**u**	**u**-m-N
4	le	la+**i**	**i**-mi-N
6	la	la+**a**	**a**-ma-N
9	le	la+**i**	**i**-n-N

Taraldsen (2010: 1529) observes that they can be decomposed into an invariant demonstrative *la*, and an additional vowel, which coalesces (as is usual in Bantu) with *la*. This is shown in the 2nd column. The particular vowel that follows *la* is deduced from what the resulting quality of the vowel is in the first column. For instance, *lo* on the first line is decomposed into *la+u*, because *a+u* is independently known to coalesce into *o*. Once this analysis is in place, an interesting observation emerges, namely that the variable vowel in the demonstrative is identical to the first part of a bi-componential nominal prefix. This is shown in the third column.

Taraldsen has proposed an approach to the relationship between the nominal and the demonstrative prefix, which is identical to what I propose in (25). In particular, if the nominal prefix is decomposed into two parts, e.g., in class 1, $[_{X2P}\ u\ [_{X1P}\ m\ [N]]]$, then we get the right shape of the demonstrative if the demonstrative *la* spells out X1P: $[_{X2P}\ u\ [_{X1P}\ la\ ]]$. There must also be a step of movement that brings the demonstrative to the left of *u*. The emerging parallel between Ossetic and Bantu suggests that we are possibly tapping into something here.

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cells as Digor: in LOC, DAT and INS. Given this parallel, we might be led to conclude that the Iron lexicon actually contains the same lexical entry for *-(m)* as the Digor lexicon. If this was so, then the reason why the augment is missing in the numeral paradigm in the first column cannot be that Iron has a zero augment (because then we would expect a zero augment also in the demonstrative paradigm). Therefore, it has to be the case that Iron numerals spell out X2. In other words, the big-numeral hypothesis must be correct.

However, there is a glitch here. To see it, recall first that in Digor, the places where the consonant *m* shows up are defined phonologically: *m* only appears before vowel-initial endings, and it does not appear other places. This allows us to unify the shape of the Digor augment to *-e(m)* across all the obliques. With this in mind, consider the situation in the Iron adessive case. The Iron ending has the shape *-yl*, which is different from the Digor *bæl*, seen in Table 5.3.

Starting from here, we would expect that when the adessive attaches to *-e(m)*, we get different effects in the two dialects. In Digor, we expect *m* not to surface before *bæl*, because it is followed by a consonant. This is correct. On the other hand, in Iron, we expect the consonant *m* to surface, because it is followed by a vowel-initial suffix (*-yl*). However, this is not borne out, and instead of the expected (but unattested) *uy-m-yl we get *uy-u-yl* (were the the orthographic *u* represents *-w-*). This glide *-w-* probably arises as a hiatus breaker, even though this conclusion is possibly wrong, since in the nominal declension, vowel final nouns break the hiatus by the glide *-j* as in *zærdæ-j-yl* 'heart, ABL.' But no matter whether *w* is a hiatus breaker or not, the question really is why we do not see *m* in between *uy* and *-yl*. The fact that the *-m* does not show up here apparently speaks against the type of analysis proposed for Digor, where a uniform augment appears in all the obliques.

The second problem arises in the locative. Here the *-m* is not followed by the regular *-y*, as it is in Digor, it is followed by a zero. This is irregular, and in need of explanation on its own. Even more surprisingly, *-m* is preserved here, even though it should not surface when not followed by a vowel (liaison consonants do not surface word finally). So the irregularities in Iron go both ways: we get *-m* where we don't expect it, and we don't get it where we expect it. The final irregular thing is the meaning of the locative form, which seems to be 'there' (rather than 'in it').

Based on the unexpected meaning, Erschler (2018: ftn. 14) suggests that the locative form of the demonstrative should not really be considered a part of the paradigm, which is something that has an analogue in the 1st and 2nd personal pronouns (recall, e.g., Table 4.3). I shall follow Erschler in this conclusion and in

the subsequent discussion, I will exclude the locative forms out of discussion, be-
cause they 'contaminate' the paradigm. (Or, put differently, the paradigm struc-
ture is crucially dependent on not placing arbitrary forms in the middle of it. And
there is little reason to think that *uym* is a locative form.)

Given these issues, the evidence for a productive, morphosyntactically inde-
pendent augment *-e(m)* in Iron is rather weak. Even if we dismiss the locative
form, there still remains the issue with the adessive form *uy-w-yl*. It therefore
seems that the Iron demonstratives/pronouns are best analyzed as frozen forms,
i.e., as two different suppletive bases with no segmentation (into a demonstrative
part and an augment part). This, however, leaves us with the task of explaining
how the different bases distribute within the paradigm.

This issue is rather complex, because the distribution of *uym-* and *uy-* appar-
ently shows a *ABA pattern in Table 5.5. By *ABA I mean that the base *uy-* is
found in NOM/ACC/GEN, folowed by the LOC/DAT/INS forms with *uym-* and then
switching back to *uy-* in a way that *uy-* is found in cells that are not contigu-
ous. It is impossible to achieve contiguity by moving the ADE/ALL forms up, be-
cause ACC/GEN/LOC/INS are syncretic in the clitic paradigm in Table 3.4. Therefore,
ACC/GEN/LOC/INS must be adjacent, and this makes it impossible to portray the
distribution of the bases as *ABA compatible. Given these unusual features of
the paradigm, I shall pursue here an analysis where the forms are simply frozen
forms in their entirety.

What I mean by 'frozen form' is an analysis where the pronouns are fully
suppletive in that the whole form is stored as an un-analysed blob. This is shown
in (26) to (28). Here the whole form is stored with no segmentation into root,
augment and the ending. All of these forms are portmanteaus.

(26) GEN $\Longleftrightarrow$ /*uyj*/ (27) INS $\Longleftrightarrow$ /*umæj*/ (28) DAT $\Longleftrightarrow$ /*umæn*/
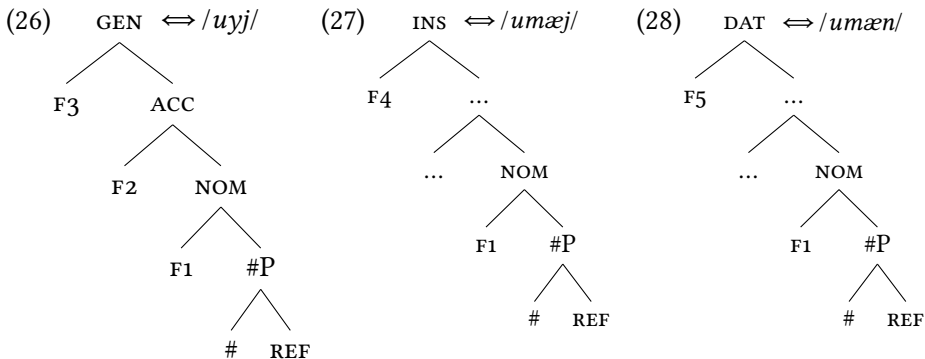
Now one reason for this analysis – that we have already dealt with – is the ir-
regular nature of the augment, and the resulting irregularity of the whole paradigm.

The second reason (that we still have not seen) is the behaviour of these forms in suspended suffixation. To see the point, recall that when in 4.6 we looked at the 1.SG dative *mæn-æn*, we split it into the caseless form *mæn* and the suffix *æn*. This correctly predicted the behaviour of this form in suspended affixation, where the base *mæn* appears in the first conjunct, and the dative ending comes after the whole coordination; see (29).

(29)   Iron Ossetic (Belyaev 2014: 39)

    a.   mæn æmæ Zauyr-æn
        1.SG   and   Zaur-DAT
    b.   *æz æmæ Zauyr-æn
        1.SG and   Zaur-DAT
        'me and Zaur'

Now if we had analogically split the dative 3.SG *uymæn* into the base *uym* (regardless of whether this should be further segmented or not) and the dative ending -*æn*, we would expect examples such as (30) to be possible. But in fact, they are not. The form *uymæn* cannot be split this way under suspended affixation.

(30)   *uym æmæ Zauyr-æn
     3.SG and   Zaur-DAT (Iron Ossetic Belyaev 2014: 41)

The impossibility to split the pronoun in (30) is captured under the analysis where *uymæn* is an un-analysable 'blob:' *uym* is not a caseless base to which the dative attaches, in fact, it is not a morphological unit to begin with.

Let me now turn to the question of what kind of output we actually expect to find in affix suspension with 3.SG pronoun. Under the analysis where the left conjunct is simply a caseless base (as we have been assuming throughout), we expect the first conjunct (for the 3.SG pronoun) to have the structure as in (31):

(31)   #P
       /\
     #   REF

What do we expect (31) to be pronounced as? Well, we expect that all the entries in (26) to (28) will be applicable here, with the winner determined by the Elsewhere. Who will be the winner? The entry which has the smallest number of superfluous case features, which is *uyj*. This prediction is borne out as the

example (32) shows.[3]

(32)   uyj   æmæ Zauyr-æn
        3.sg and   Zaur-DAT (Iron Ossetic Belyaev 2014: 41)

The data point (32) confirms the steps in the analysis of the 3rd person pronouns that we have been following. In particular, based on the irregular forms of the pronouns, we have concluded that the whole form is stored, and this is confirmed by the fact that no such segmentation is allowed in the suspended affixation construction. The fact that we are able to correlate these two phenomena is a non-trivial analytical achievement.

To see why, consider the analysis of suspended affixation explored in Erschler's work (2012; 2018), which says that a full form of the pronoun is conjoined (e.g., *mæn-æn* '1.sg-DAT'), and the suffix inside the first conjunct is surface deleted (*mæn-æn*). Under this analysis, the fact that the dative form *uym-æn* does not yield the expected *uym-æn* (in the 1st conjunct) is unexpected, and requires some additional footwork.[4] I find it interesting that this surprising effect comes out rather neatly under the analysis of the pronouns in (26) to (28), which treats them as unanalysable strings. Once this is adopted, the expected deletion is blocked, because it is no longer deleting a morpheme, but random part of a non-decomposable string.

To conclude. It seems that historically, Iron had the augment *-(m)* (like Digor), and that this augment observed the same regularity. Therefore, it appears in exactly the same cells where the Digor augment appears. However, subsequent phonological processes changed the case endings (*-bæl* went to *-yl*), and the augment, instead of reacting to such changes, stayed put, as a frozen form would. The result is something that looks like a different system than the one we see in Digor, although the overlap in the cases with *-m* suggests a common origin.

I will therefore proceed under the assumption that we have some evidence for the historical existence of the augment *-m* in Iron, and hence, for assigning the Iron numerals a big structure (since there is no frozen augment in numerals). But the evidence for a productive augment is not present in the current language:

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[3]Erschler (2018: ftn.18) says that this kind of structure is not acceptable to the speakers he consulted. I suspect that these may be more conservative speakers who avoid suspension in 3.sg altogether, and we therefore learn nothing about what suspended affixation looks like. As in the previous case, I side with the more permissive speakers, since their grammar allows us to see what the output of affix suspension actually is.

[4]Erschler proposes that the remnant of the deletion (i.e., *uym*) must first of all be an existing word (which it is). In addition, the word that results from deletion should not have an idiomatic interpretation, which *uym* 'there' has, according to Erschler.
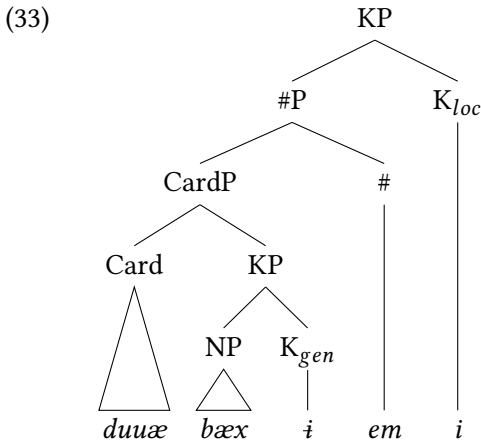
Iron stores the forms with used-to-be augments as un-analysable blobs. The lack of an augment in Iron will become relevant for the theory of prefix formation that I shall explore in the next chapter.[5]

5.3 The function of the augment

In this section, I would like to make a particular suggestion concerning the function of the augment. The reasoning is based on two facts that we already know and a new fact (to be introduced later) that concerns the demonstratives. Let me start from what we already know.

The first known fact is that the augment *-e(m)* must be higher than the lexical NP NUMBER (and the CARD head). The second known fact is that this morpheme must be lower than case (which is even higher up).

Standardly, the projections which are in between the noun and its case marker are gender and number. So if we decided to split *-e(m)* into two markers, it could easily be that *-e* expresses the CLASS part of the *fseq*, and that *-(m)* corresponds to number. In (33), I depict the hypothesis in a simplified form, where I simply merge *-e* and *-(m)* under a single node, labelled # (for number):

(33)

```
                          KP
                        /    \
                      #P      K_loc
                    /    \
                CardP      #
               /    \      |
            Card     KP    |
             /\     /  \   |
            /  \  NP   K_gen
           /    \ /\    |   |   |
         duuæ  bæx  ɨ   em  i
```

The tree entails that numerals (like nouns) include a number projection of their own, and that in Digor, it is the augment that spells it out. The reason for thinking

---

[5]Let us also remind ourselves at this point that storing the augment along with the numeral in Digor is not an option, since the counted noun comes in between the numeral and the augment. As for Digor pronouns, I make no specific claim. Erschler (2018: ftn.15) notes that the type of data in (32) is not allowed in Digor.

that numerals may include this projection is that minimally some numerals may be further counted (*three hundred*) or pluralised (*hundred-s and hundred-s of mistakes*). For the former construction, Ionin & Matushansky (2006; 2018) propose that this should be understood in a recursive fashion, where we first apply a numeral like *hundred* to the complement, and then further (in a recursive fashion) determine the number of such 'hundreds,' as in (34):

(34)

```
        /\
       /  \
   three   \
           /\
          /  \
    hundred   \
              /\
             /  \
            /____\
            books
```
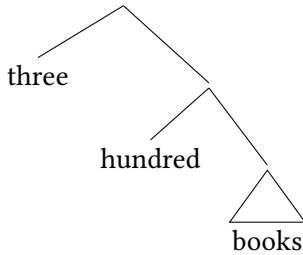
Similarly, when the numeral has a plural marker attached to it, we would have a base-generated scope structure like (35).

(35)

```
        /\
       /  \
      s    \
           /\
          /  \
    hundred   \
              /\
             /  \
            /____\
            books
```
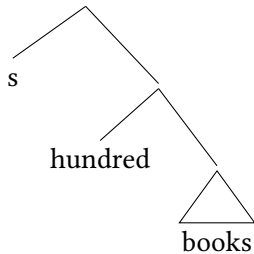
Here I depict the plural marker *-s* as a morpheme that is similar to the numeral *three* in (34). It applies to the numeral and its complement, and expresses how many such 'hundreds of books' there are. The idea depicted in the Ossetic tree (33) is that the singular-number projection # serves a similar function as the number marker in (35).[6]

The hypothesis that the augment corresponds to the singular number ties numerals even more strongly to nouns, with NP NUMBER at their base, and above this base, the regular nominal projections of grammatical number and case. Under this view, the only property that really differentiates between regular nouns

---

[6]In the grammars I consulted, there was no mention of a plural marker applying to numerals. The Digor speaker I consulted did not accept forms such as *dæs-tæ* 'ten-PL' as possible, and similarly for other numerals. So it seems that the number is fixed to the singular in Digor.

and numerals is that numerals express a precise cardinality, due to their ability to spell out CARD. I will heavily rely on this hypothesis in Part III of this book, where Russian numerals are going to be put under a microscope.

The main message of this section is, however, that the (vaguely plausible) proposal in (33) gains support from the plural forms of the demonstratives in Digor. In particular, if the augment *-e(m)* in numerals is a singular-number marker, and if it is, at least historically, related to the augment in the demonstrative, we expect the singular specification of *-e(m)* to be somehow reflected in the demonstrative paradigm. The particular fact that supports the association between the augment augment *-(m)* and the singular number is that *-(m)* disappears in the plural, and it is replaced by *n(e)*, as the table 5.6 brings out.[7]

Table 5.6: Demonstratives in Digor (Belyaev 2014, Erschler 2018)

	that (3.sg)			that (3.pl)			this (3. sg)			this (3.pl)		
NOM	je			je-tæ			a			a-tæ		
ACC	uo		j	uo	n	i	a		j	a	n	i
GEN	uo		j	uo	n	i	a		j	a	n	i
DAT	uo	m	æn	uo	n	æn	a	m	æn	a	n	æn
INS	uo	m	æj	uo	n	æj	a	m	æj	a	n	æj
ADE	uo		bæl	uo	ne	bæl	a		bæl	a	ne	bæl
ALL	uo		mæ	uo	ne	mæ	a		mæ	a	ne	mæ

Each form (except the nominative) in the table is split into three parts: an invariant base (light shade), an invariant case ending (dark shade) and the augment that comes in between them (if any). What we see is that the plural forms consistently have the augment *n(e)*, missing in the singular. The singular has an *-(m)*, missing in the plural (and before consonantal suffixes). The alignment between the singular number and the augment *-(m)* supports our hypothesis that the head X (which hosts the augment) is indeed a # head. I will continue to assume this in the discussion that unfolds in the following chapter.

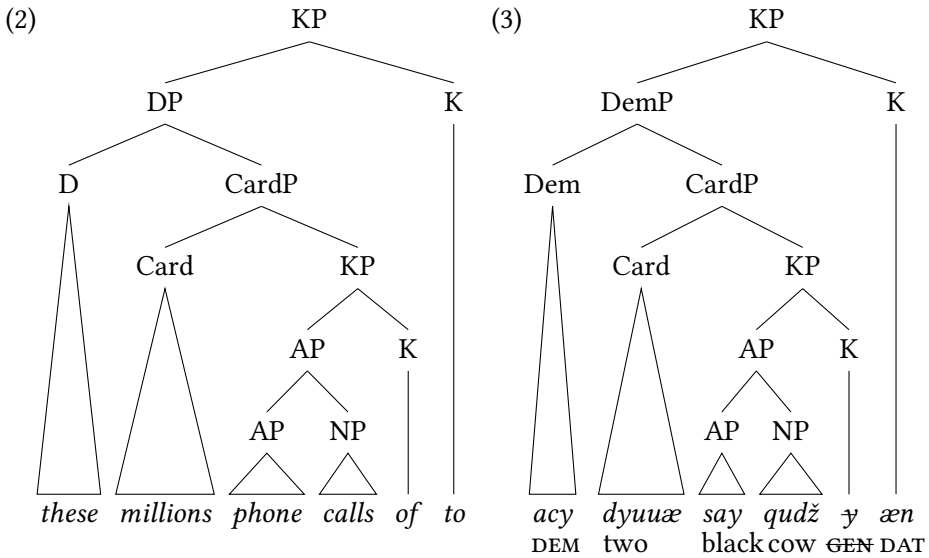[7]The table lacks the locative row, as in Erschler (2018), for the reason that the meaning of the form *uomi* 'there' does not justify its presence in the usual place of the locative (which should mean 'in it'). Belyaev (2014: 36) also offers the form *uo-ne-mi* as the locative plural form, Erschler (2018) leaves it out of the paradigm. My Digor informant did not find the form acceptable.
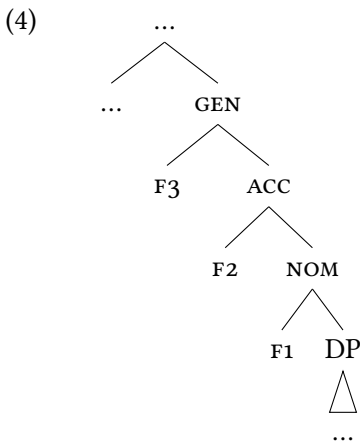
6 Prefixes

The topic of this chapter is how prefixes are accounted for within the Nanosyntax approach to spellout. To have a specific case to discuss, let me consider case marking in English. The basic observation to be captured is that English uses case prefixes instead of case suffixes. Recall, for instance, the discussion of the example (22) in Ch. 2, repeated for convenience in (1):

(1)
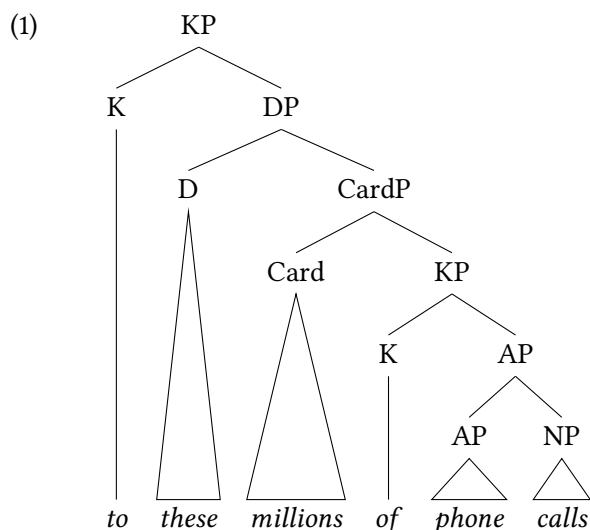
The structure has served the point of illustrating that English has its case markers *to* and *of* in the same place in the hierarchy where Ossetic has them, with the difference that they precede (rather than follow) their complement. I have used the structures in (2) and (3) to bring the point home, showing that if the order of K and DP were to be reversed, English would turn into Ossetic (abstractly):

(2)

```
              KP
         ┌─────┴─────┐
        DP            K
    ┌────┴────┐       │
    D        CardP    │
    │      ┌───┴───┐  │
    │     Card     KP │
    │      │    ┌───┴──┐
    │      │   AP     K
    │      │  ┌─┴─┐    │
    │      │  AP  NP   │
  these millions phone calls of  to
```

(3)

```
              KP
         ┌─────┴─────┐
       DemP           K
    ┌────┴────┐       │
   Dem       CardP    │
    │      ┌───┴───┐   │
    │     Card     KP  │
    │      │    ┌───┴──┐
    │      │   AP     K
    │      │  ┌─┴─┐    │
    │      │  AP  NP   │
   acy   dyuuæ say qudž  y   æn
   DEM    two  black cow G̶E̶N̶ DAT
```

The issue of prefixation is tricky for the following reason. On the one hand, we want to capture the similarity between the function of the English *to/of* and the Ossetic DAT/GEN. The starting point for that would be to let *to/of* spell out the same set of features as the Ossetic DAT/GEN, namely F1-F*n*. On the other hand, we know that in the base structure (4), these features do not form a constituent.

(4)

```
              …
         ┌────┴────┐
        …         GEN
              ┌────┴────┐
             F3        ACC
                   ┌────┴────┐
                  F2        NOM
                        ┌────┴────┐
                       F1         DP
                                  △
                                  …
```

For the Ossetic suffixes, the solution to the constituency issue was movement. Once the DP moved to the left, the case features formed a constituent. However, movement cannot be the solution in case-prefixing languages, as movement

would bring the noun to the left of the case marker, which defeats the purpose. It is also not an option to let the noun move across the case features and then remnant-move the case prefix back across the noun, as this type of movement generates unattested orders (Cinque 2005, Abels & Neeleman 2012).

So what Starke (2018) proposes instead is to use a different strategy. The alternative relies on the fact that grammars allow not only the merger of individual features (as in (4)), but also the merger of full phrases. This is shown in (5), where we see a DP that combines with a complex left branch containing the case features. These are assembled together in an auxiliary workspace, and joined to the DP, projecting their label to the root node. Such complex left branches will therefore be also referred to as 'projecting specifiers' (cf. Starke 2004). This contrasts them with a different class of complex left branches, which do not project. The latter arise as a result of spellout driven movement and they are referred to as 'non-projecting' Specifiers.

(5)

GEN
├─ GEN
│ ├─ F3
│ └─ ACC
│   ├─ F2
│   └─ NOM
│   ├─ F1
│   └─ X
│   *of*
└─ DP
   △
   ...
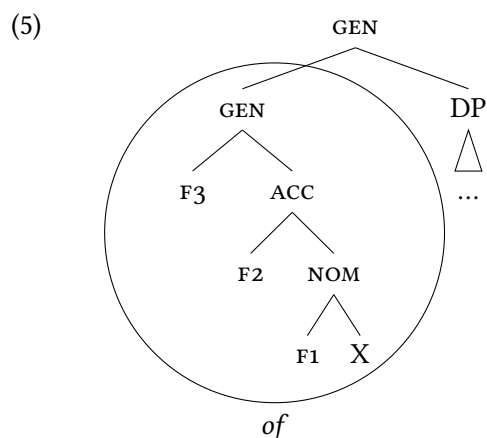
The proposal is similar in spirit to Kayne (2016), where elements formerly analysed as functional heads turn out to be (parts of) complex phrases, placed in the Spec of a head which is silent. Yet another suggestion of a similar sort is present in Bobaljik (2012: 56-60) under the label 'affix branching' structure. Bobaljik too proposes that syntactically complex heads may be forged in a workspace separate from the main projecting line and attached as complex units. There are of course important differences when we compare those two approaches to each other, or to the ideas to be explored here. At the same time, there is a commonality that I think is worth pointing out: all the approaches agree on replacing the picture in (1) by the proposal in (6) (minimally as a possibility). The one crucial difference is that instead of having just single lines going down to individual

case markers (as we had it in (1)) the case markers become analogous to Specs: they correspond to complex structures that are created in a separate workspace before they are merged with the main projection line.

(6)
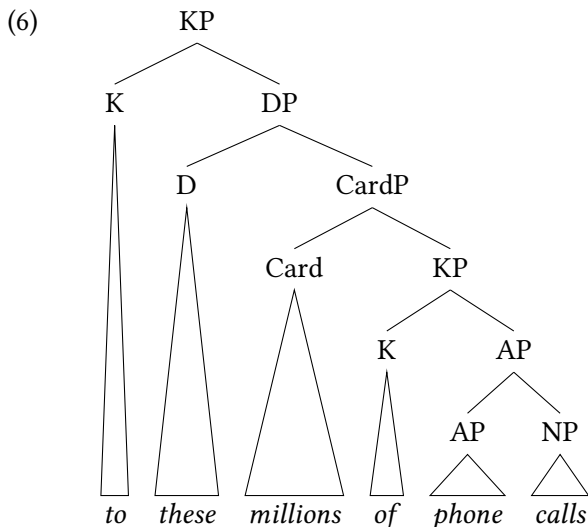
Because of the fact that the case markers become like other left-hand modifiers of the noun, the proposal that case markers are (small) Specs cannot be considered a complication of the grammar. If anything, it simplifies the architecture in a way that all the left hand modifiers are unified.

This chapter is dedicated to setting up an explicit procedure as to how such complex left branches (projecting specifiers) arise. The core questions related to this enterprise are the following:
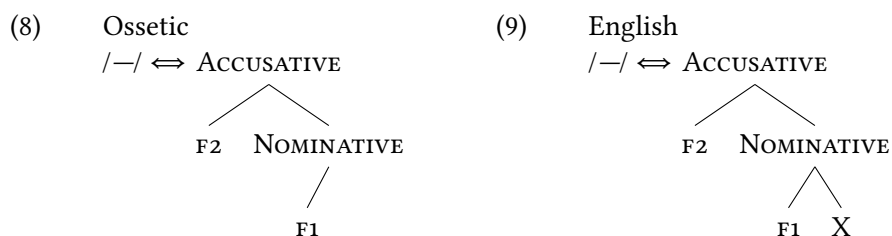
(7)   Issues relating to auxiliary workspaces

    a.   How does the grammar know that it needs to build a projecting Spec? (Why are some markers prefixal and some suffixal?)

    b.   When exactly does a new workspace open, esp. compared to spell-out movements?

    c.   How is the projecting specifier constructed?

    d.   When does the workspace close?

I will provide here a particular view on these issues, which will ultimately lead to a new view on how case competition arises in numerical phrases beyond Ossetic.
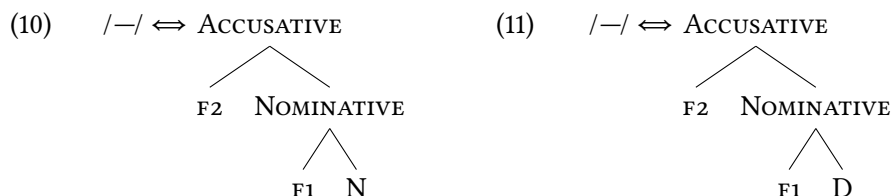
6.1 A lexical difference between prefixes and suffixes

Let me start by the fist issue, namely how to distinguish between prefixes and suffixes. This is encoded by attributing to prefixes a different kind of a lexical entry than the suffixes have. In particular, prefixes are stored as constituents with a 'binary bottom.' This means that the lowest non-terminal in their lexical entry dominates two terminals, rather than a single one.

To show this on a simple example, I turn to NOM/ACC markers. These are the simplest example, since they have the fewest features. I will assume that English has a zero NOM/ACC marker like Ossetic. Unlike in Ossetic, I will assume that this entry is prefixal. Nothing of substance hinges on this; the example is used here mainly as an illustration of how prefixation works, and not necessarily as an example of how English case marking works. With this clarified, I place side by side the lexical entries for the Ossetic and English accusatives in (8) and (9).

(8) Ossetic
$/{-}/ \Longleftrightarrow$ ACCUSATIVE

F2   NOMINATIVE

F1

(9) English
$/{-}/ \Longleftrightarrow$ ACCUSATIVE

F2   NOMINATIVE

F1   X

Both markers pronounce the same case features (F1 and F2) and differ in that the English marker has an additional feature X as a sister to F1. In Ossetic, F1 has no sister.

The identity of the feature X is left open on purpose, but the general idea is that this is going to be one of the features that resides inside the NP below case features. For instance, it can be the lexical head N, as in (10), or a D head, as in (11).[1]

(10) $/{-}/ \Longleftrightarrow$ ACCUSATIVE

F2   NOMINATIVE

F1   N

(11) $/{-}/ \Longleftrightarrow$ ACCUSATIVE

F2   NOMINATIVE

F1   D

---

[1] X in (9) can also be a full phrase as long as its bottom is binary.

The technical motivation behind the 'binary-bottom' proposal is the following. If the English entry (9) is ever to be inserted as a nominative marker, there can be no movement from the complement of the F1 node in syntax. If there were such a movement, it would lead to a syntactic structure with a unary bottom, and the entry (9) would be unusable. So the complement of F1 does not move, if (9) is to be used. But when the complement of F1 does not move, F1 will precede it. Therefore, as a consequence of having a binary bottom, the entry (9) can only be used as a prefix.
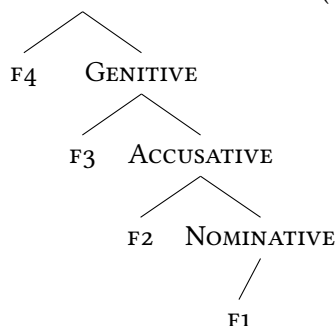
On the other hand, the complement of F1 in Ossetic *must* move. The reason is that the entry (8) has a unary bottom. The only way for syntax to provide a structure with a unary bottom (under the assumption that Merge is binary), is to move the other daughter of the lowest phrasal node out.

In effect, this proposal allows one to distinguish prefixal and suffixal markers in the lexicon. The crucial thing about the proposal is that this is not achieved via some arbitrary diacritic. The strategy, recall, is that the lexicon only links well-formed syntactic structures to well-formed phonological structures and/or concepts. To the extent that structures with a binary bottom are well-formed structures, they can be stored in memory and linked to phonology and/or concept. There is no new element of faith in this.
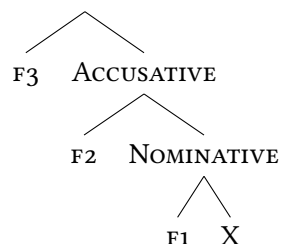
Now as a simple consequence of constituent matching, structures with binary bottom require that no movement takes place within them. Structures with unary bottom (likewise well-formed structures) presuppose movement. The result is a split between prefixal and suffixal markers with no new assumptions added.

With the result in hand, we can (of course) use the same difference (unary vs. binary bottom) to distinguishes also other case markers. In (12), I repeat the entry for the Ossetic -*y*, an ambiguous GEN/LOC suffix. The English genitive prefix *of* would have a lexical entry as in (13).

(12)   /*y*/ ⟺   LOCATIVE   (13)   /*of*/ ⟺   GENITIVE

          F4   GENITIVE   F3   ACCUSATIVE

              F3   ACCUSATIVE   F2   NOMINATIVE

                      F2   NOMINATIVE   F1 X

                              F1

6.2 The opening of an auxiliary workspace

Suppose now that the lexical entries in (9) and (13) are the only two entries that can spell out case features in English. This means that when a case feature is Merged to a DP, as in (14), the spellout algorithm we have been working with so far will get completely stuck, even when backtracking applies. Just to briefly describe how that will happen, suppose that the DP is spelled out by the proper name *John*, as in (15). In this case, Spec movement fails to apply (there is no movable Spec). Complement movement yields (16), which fails to spell out.

(14) NOM / F1 DP / …   (15) NOM / F1 DP / … *John*   (16) NOM / DP NOM / … F1 *John*
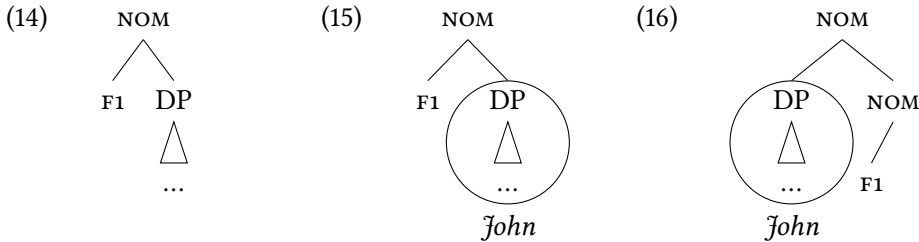
We must backtrack, shrinking *John* down to NP, and try to do movements again, but even this will not help to produce a structure even remotely resembling the case prefix (9). The reason is that the algorithm will never provide a tree with the feature F1 and a binary bottom, unless in the base structure (15). However, (15) did not spell out and there will be no second chance.

What Starke (2018) proposes is that in such cases (when spellout blocks even after backtracking), we return to the problematic stage of the derivation from which we backtracked in vain, namely (15), and we try something completely different: namely to construct a specifier in a separate workspace. The way this happens is that we remove F from the phrase marker and merge it with some other (yet to be determined) feature(s). Starke phrases this as follows:

(17)   *Spec Formation* (Starke 2018: 246):
       If Merge F has failed to spell out (even after backtracking), try to spawn a new derivation providing the feature F and merge that with the current derivation, projecting the feature F at the top node.

As a consequence of the definition, the derivation will split into two workspaces. One will be dedicated to the construction of a phrase where F1 successfully spells out. I will be referring to this workspace as 'the auxiliary workspace,' since its purpose is to construct an 'auxiliary,' a functional word that will help the main lexical

noun (or verb) pronounce the relevant functional category. This workspace is depicted in (18). The other workspace is occupied by the DP *John*. I will be calling this 'the main spine.' The main spine is depicted in (19), and remains – for the time being – passive. We had already tried to merge F1 to this DP, we failed, and there is no sense in trying to do the same again. So in this case, the main spine is just passively waiting for the auxiliary to be constructed, though we will see some parallel action in the main spine later on.

(18)

NOM

F1   X

(19)

DP

...

John
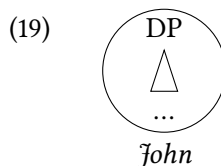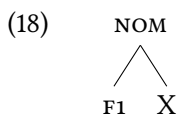
Once we have split the derivation this way, we spell out the NOM projection in the auxiliary workspace by the 'do-nothing' nominative marker, see (20). Then we merge it back to the main spine, yielding (21).

(20)

NOM

F1   X
—

(21)

NOM

NOM

F1   X
—

DP

...

John
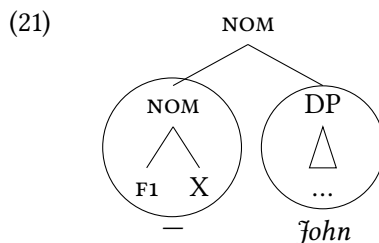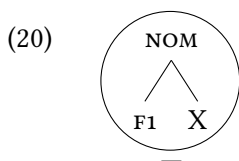
The way we have merged the prefix back is as the so-called projecting specifier (Starke 2004): the Spec provides the label for the whole phrase marker. The projecting Spec is thus a complex syntactic object, but its function is analogous to a simple head – namely to provide the nominative feature F1 to the derivation.

As a result, we now have a theory that can handle both prefixation and suffixation. Moreover, as Starke (2018) points out, the mechanism of prefix formation also brings the theory in line with the idea that external Merge can do more than just merge individual features (Fs); it can also merge phrases (XPs). Before Spec formation was put in place, we really did not have this option in our toolbox, and this is now remedied.

It will be rather important in my analysis that the auxiliary workspace opens only as an absolute last resort: even after backtracking fails (as already stated in (17)). I devote the next section to spell out the theoretical and empirical reasons for this position.

6.3 Prefixes as last resort

Theoretically, prefixes are a 'last resort' operation because opening a new derivational workspace is costly. It is costly first because we need to coordinate the two workspaces: they must be aware of each other's progress, because they ultimately need to be integrated in a non-arbitrary fashion. The second reason for complexity is that potentially, we also double the number of operations compared to having a single workspace. This is based on the idea that both workspaces – even though they are called differently – are both subject to exactly the same rules. They are each a workspace in its own right where we can cyclically merge and spellout features, using exactly the same rules for each of them. As we shall see later on, I will propose that both workspaces may be in principle active and accommodate the same features simultaneously, which then increases the number of operations needed to spell out features that would 'normally' require only a single workspace.

Empirically, the last resort nature of prefixal (prepositional) marking is reflected by the preference for suffixation over prefixation. Such a preference may be observed both cross-linguistically and within individual languages.

When we look across languages, the preference for suffixation is revealed in the fact that many more languages have case suffixes than case prefixes. Dryer (2013), a typological study on the positioning of case markers relative to nouns, reports 452 languages with case suffixes compared to 38 languages with case prefixes. Similarly, the same study finds 123 languages with postpositional case clitics compared to 17 languages with prepositional case clitics. The first two columns of the table 6.1 summarise this.

Table 6.1: Positioning of case markers (Dryer 2013)

	AFFFIX	CLITIC	TOTAL	RATIO
PRE	38	17	55	1
POST	452	123	575	10.45

When we simplify this picture and only track whether case markers precede or follow the noun (i.e., regardless of whether this is an affix or a clitic), we get the numbers as shown in the 'total' column. The ratio is then about 1 pre-marker to 10 post-markers. This is a large asymmetry.

When we look inside individual languages, we note the same preference. In particular, what we find is that when a language can chose between a suffix and

a prefix, it choses the suffix. In order to see that, consider the data in 6.2. They come from a dialect of Serbian spoken in the village of Svinitsa.

Table 6.2: Svinitsa Serbian (Sobolev 2009: 723)

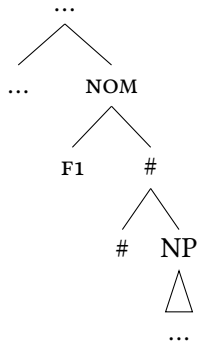|	wife, SG.	wife, PL.
NOM	žen-a	žen-e
ACC	žen-u	žen-e
GEN/DAT	žen-i	na žen-e

What we see is that in this dialect, feminine nouns in the singular have the GEN/DAT suffix *-i*. However, in the plural, the GEN/DAT function is expressed by combining the preposition *na* and the ambiguous NOM/ACC plural form.

The question that this data brings up is why we cannot use the preposition *na* in the singular as well, and produce a uniform paradigm with the hypothetical singular dative form *na ženu* (instead of the actual form *žen-i*). The fact that there is a real choice here between the suffix *-i* and the prefix *na* is strengthened by the observation that "neuter nouns are indeclinable" and require *na* both in the plural and in the singular (Sobolev 2009: 723). The answer to the question why *žen-i* wins over *na žen-u* thus seems to be that the use of the prefix *na* in the feminine singular is simply blocked by the very existence of the feminine dative suffix *-i*.[2]

This informal reasoning is implemented in the Nanosyntactic spellout theory precisely by the ranking of the rescue operations, where prefixation (which requires the activation of a secondary workspace) is the very last resort. To see how this plays out in the Svinitsa dialect, let me show how the paradigm is derived. I start by reminding ourselves of the proposal that the singular has just the feature # (see (22-a)), while plural has an additional feature PL, as in (22-b). The case features come on top of the number projections:

---

[2]This kind of blocking between prefix and a suffix has been called for 'discontinuous bleeding' in the seminal work by Noyer (1997). 'Bleeding' because the use of the suffix 'bleeds' the use of the prefix, 'discontinuous' because this effect targets non-adjacent positions in the string. Cf. Blix (2019) for a treatment of Noyer's original case (Arabic conjugation) in a Nanosyntax inspired framework.

(22) a. singular

        ...
       /   \
     ...   NOM
           /   \
          F1   #
               / \
              #   NP
                   /\
                  ...

b. plural

        ...
       /   \
     ...   NOM
           /   \
          F1   PL
               /   \
             PL   #
                   / \
                  #   NP
                       /\
                      ...
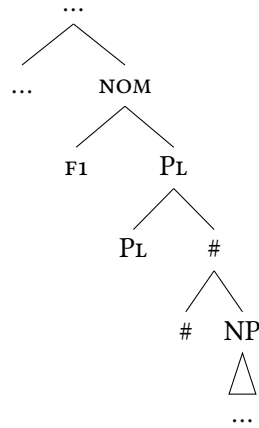
With the underlying *fseq* in place, we can capture the distribution of the singular case markers using the following lexical entries:

(23) a. NP ⟺ /žen/
          /\
         ...

c. ACC ⟺ /-u/
   /   \
  F2   NOM
       /   \
      F1   #P
             |
             #

b. DAT ⟺ /-i/
   /   \
  F4   GEN
       /   \
      F3   ACC
           /   \
          F2   NOM
               /   \
              F1   #P
                     |
                     #
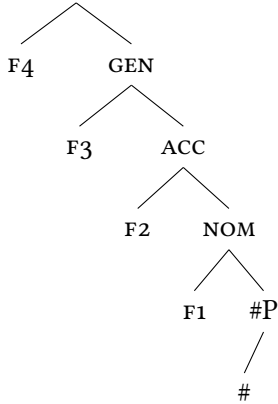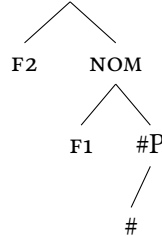
d. NOM ⟺ /-a/
   /   \
  F1   #P
         |
         #
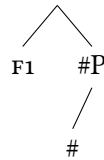
In (23-a), we have the root *žen* spelling out the NP. Recall that inside this NP, there will be features such as 'individual,' 'animate,' 'human,' 'female,' etc. The dative singular suffix *-i* is in (23-b). It has # as its lowest feature and the case features right above, with no Pʟ in between. This effectively restricts this suffix for the use in the singular. The accusative suffix *-u* is shown in (23-c), and (23-d)

gives the lexical entry for the nominative singular -*a*. For simplicity, I do not encode the fact that these markers only appear with feminine nouns, this could be achieved, for instance, by adding a FEM specification below #.

With the lexical entries in place, let us turn to the derivations. These always start by constructing the NP and spelling it out by the root *žen*. After this, the # feature is added, as in (24), and spell out applies. There is no lexical item that can spell out both # and NP. Spec-movement should be tried, but fails, because there is no movable Spec. Complement movement therefore applies, yielding (25) where the lower #P spells out as -*a*. There is a competition between the singular case markers -*a, -u* and -*i*; -*a* wins, because it has fewest superfluous features.

(24)   #P

(25)   #P

(26)   NOM
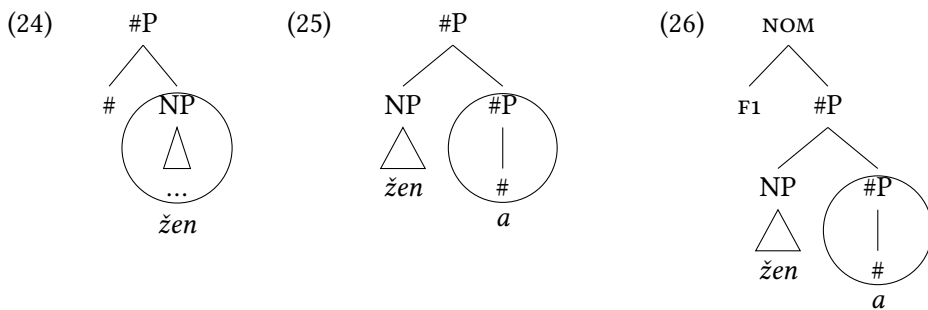
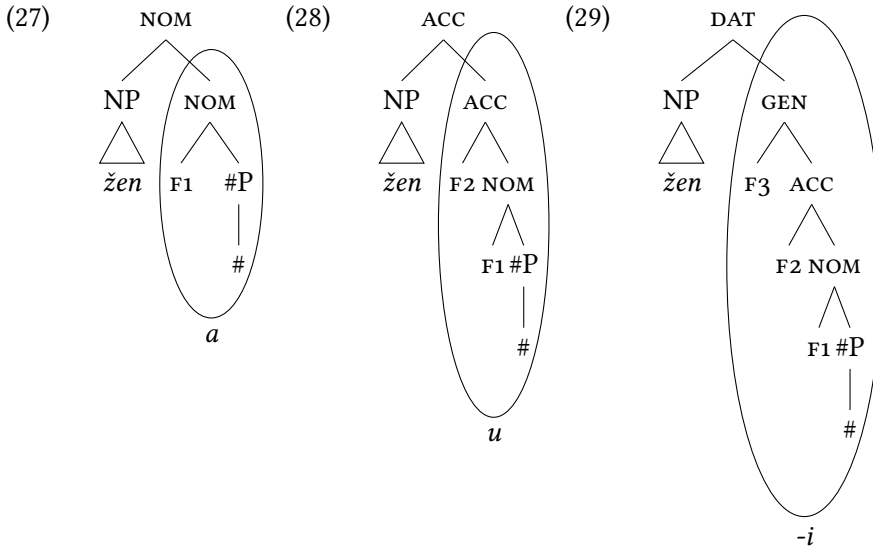After successful spellout, Merge F continues. In the derivation of the singular forms, case features are added directly on top of #P, yielding (26). (26) fails to spell out without movement. Spec movement is tried, yielding (27), where -*a* spells out the nominative singular structure. The derivation then continues in very much the same fashion, with the NP moving out in a successive cyclic fashion. This yields (28) as the structure of the accusative (with -*u* overriding -*a*) and (29) as the structure of the genitive (with -*i* overriding -*u*).

(27)
```
        NOM
       /   \
     NP    NOM
     /\    /  \
   žen   F1   #P
              |
              #
              |
              a
```

(28)
```
        ACC
       /   \
     NP    ACC
     /\    /  \
   žen   F2   NOM
             /  \
           F1   #P
                |
                #
                |
                u
```

(29)
```
        DAT
       /   \
     NP    GEN
     /\    /  \
   žen   F3   ACC
             /  \
           F2   NOM
                /  \
              F1   #P
                   |
                   #
                   |
                  -i
```

The crucial point is that there is never the chance for any prefix to be generated in the genitive, because there is simply no reason to start a new derivational workspace: the structure keeps spelling out using just a single workspace. This is exactly what we need to achieve: we need that the prefix will not get a chance to apply as long as there is an appropriate suffix.

Let me now turn to how the plural forms are derived, starting with the lexical entries. None of the markers we have seen so far is applicable in the plural. This is because none of them actually contains the PL feature in its lexical entry. The only plural marker in the relevant fragment (i.e., in the paradigm in 6.2) is *-e*. I give its entry in (30-a). In (30-b), I give the lexical entry for the GEN/DAT preposition *na*.

(30)   a.
```
        ACC  ⟺  /-e/
       /   \
     F2    NOM
           /  \
         F1    PL
              /  \
            PL    #
                 /
                #
```

b.
```
        DAT  ⟺  /na/
       /   \
     F4    GEN
           /  \
         F3    X
```
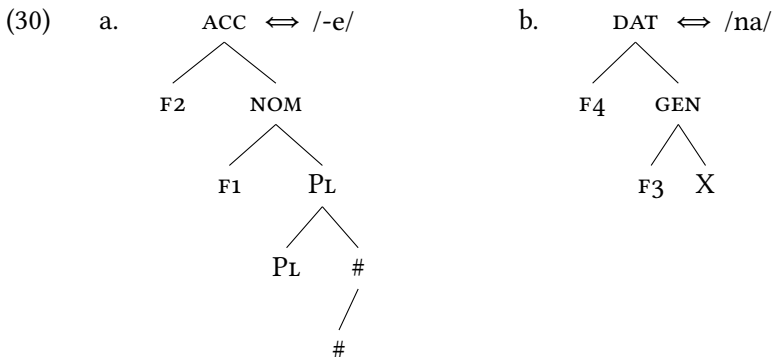
The structures that arise when these lexical entries interact with the spellout algorithm are the following. For the nominative plural, we start again by assembling the NP, which spells out as *žen*. When # is merged, the algorithm yields the structure (25) with #P spelled out by *-a*. However, after Pl is merged and after Spec movement applies, we get a structure that can only be spelled out by *-e*. When the derivation starts merging case features, the NP moves cyclically upwards, yielding (31) as the structure of the acc.pl. However, since the lexical entry of *-e* does not include the genitive feature f3, spellout gets stuck when this feature is merged to (31). This leads to the activation of the auxiliary derivational workspace, see (32). Here the prefix is created and spelled out using the prefix' entry shown in (30-b). After the prefix spells out, it is merged back to the main projection line, yielding (33).[3]
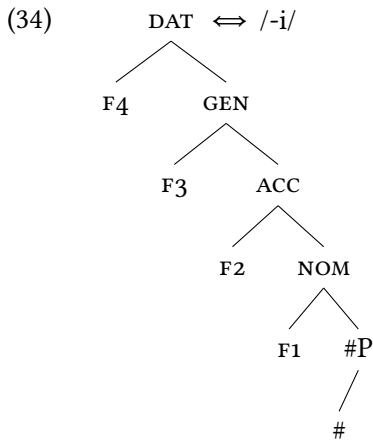
(31)

(33)

(32)
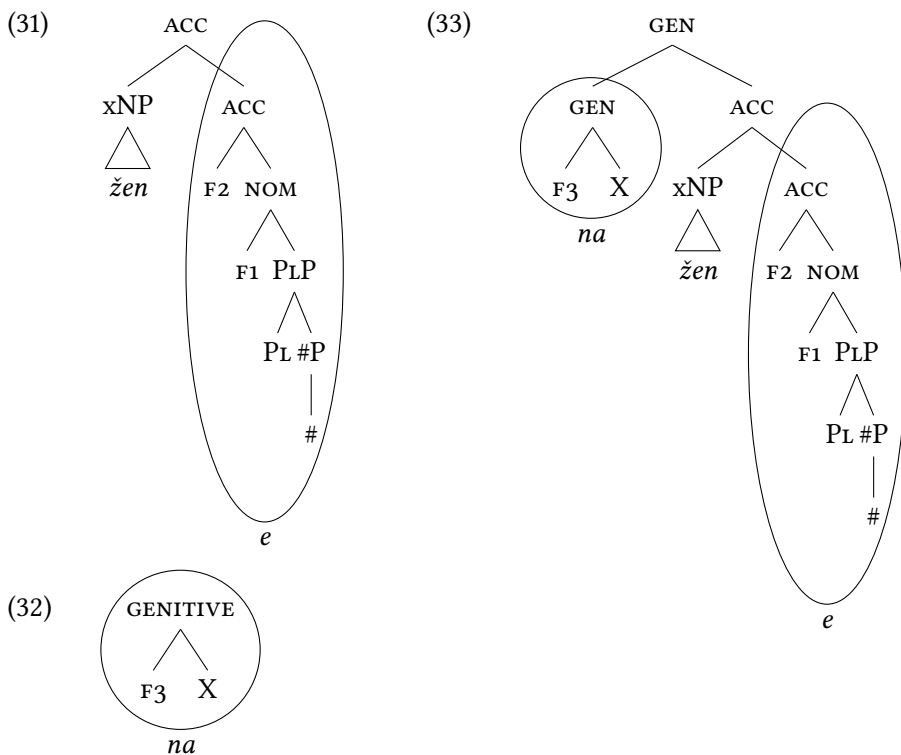
The important take home message from this discussion is that for as long as there is a suffixal marker available for spellout, languages will show suffixal marking.

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[3]Note that the structure of (33) corresponds to the genitive case. I will get back to the issue of how the dative meaning arises shortly.

The Svinitsa dialect shows this in the strongest form possible: we know that it has a prefixal GEN/DAT marker, we know that this marker is of an elsewhere type (it can apply both in the singular and in the plural), but it won't show up if there is a dedicated suffix (for the feminine singular). To capture this, suffixal derivations must have preference over prefixal derivations.

When we generalise the observations concerning the Svinitsa GEN/DAT, an interesting consequence emerges, namely that if a particular case in the syntactic hierarchy is spelled out as a suffix (for a particular noun, in a particular number), all lower cases will be suffixal as well. To see that, consider the dative singular entry for the Svinitsa suffix *-i*. I repeat it below for convenience.

(34)   DAT ⟺ /-i/
```
         DAT  ⟺  /-i/
        /    \
      F4     GEN
            /    \
          F3     ACC
                /    \
              F2     NOM
                    /    \
                  F1     #P
                          /
                         #
```

We know that this entry will take precedence over any potential dative prefix that a language may have. We further know that because of the Superset Principle, the lexical entry in (34) is applicable in all cases it contains: it can spell out the genitive (singular), accusative (singular), etc.; in fact, all the cases contained in the dative.

Can these cases be marked by prefixes? The construction of the spellout algorithm (where pre-markers are the last resort) makes this impossible. Even if the language had a prefixal marker that could spell out the genitive feature (Svinitsa has it, namely *na*), this prefixal marker will not appear, because suffixes are preferred. As a result, an implicational hierarchy of suffixation can be formulated. I state this in (35):

(35)   *The pre-marker/post-marker hierarchy:*
       If a language has a suffixal marker for a case *K* on the syncretism hierarchy, it also has suffixal marking for all cases lower than *K*.

In Caha (2009; 2011), I have shown that this generalisation is valid and coincides to a large extent with a hierarchy of case marking established independently by Blake (2001). I will not enter into a time-consuming empirical discussion, but do note this result as an indication that a theory where prefix formation is the absolute last resort operation is an important part of delivering this result.

6.4 When does a workspace close?

Let me now turn to the question of when an auxiliary workspace closes. There is very little work done on this topic, so I shall explore the territory to stake out my own path through this terrain. However, to give an idea of where this is heading, I will propose here that since having an auxiliary workspace is costly, its closing must happen as soon as possible. This means that immediately after the feature that has triggered the opening of the workspace is spelled out, the workspace is closed and merged with the main projection line. I will call this the Early (AUX) Closure, see (36).[4]

(36) *Early AUX Closure.*
      When F (that has triggered the opening of an auxiliary workspace) is successfully spelled out, close the AUX workspace by merging the FP it has produced to the main projection line. Project the feature F to the top.

Let me start the discussion of (36) by first showing what kind of consequences it has. I will try to bring this out by showing what structures get generated using (36), and how they differ from structures that are generated if the opposite of (36) is assumed (namely that the workspace closes as late as possible). After we know what the consequences are in abstract terms, we shall discuss some empirical data.

To see the consequences of (36), suppose that our cyclic spellout procedure constructs F1P and spells it out. When F2 is added, spellout keeps failing until a new workspace is opened. Here F2P spells out, and so we have the two workspaces in (37). (37-a) is the auxiliary workspace, and (37-b) is the main spine.

---

[4]I note here briefly that Starke (2018: 248) expresses a different view, tentatively suggesting that "spawning a new derivation is so costly that it is kept around as long as possible rather than immediately closed and its result merged in the main line." Caha et al. (2019b: 32) suggest that the auxiliary "workspace remains open and subject to further merge F operations only as long as the Spec spells out as one piece." There are empirical reasons for why such alternatives have been proposed, and I will show how the results achieved by these theories can be subsumed, at least in part, into the current approach based on Early AUX Closure.

(37)   a.   F2P
           △
           β

b.   F1P
    △
    γ
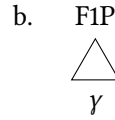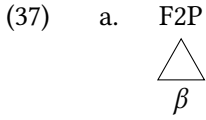
Suppose that we follow an approach where the auxiliary workspace remains open. This entails that when we want to add another feature, F3, we add it in the auxiliary space, producing (38).[5] Now we try to spell it out using the spellout algorithm. Suppose that there is a lexical entry for F3 as in (39).

(38)   F3P
         ╱ ╲
       F3   F2P
            △
            β

(39) $\alpha \Longleftrightarrow$ F3P
              |
             F3
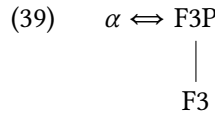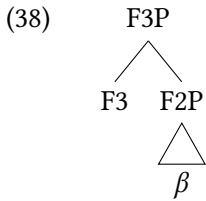
This will lead to complement movement, transforming (38) into (40). Suppose the derivation terminates, so we integrate the auxiliary space and the main spine, leading to the structure in (41). Here the circle (indicating the highest projection in the *fseq*) ends up linearly in between the triangles.

(40)   F3P
           ╱ ╲
        F2P   (F3P)
        △ |
        β   F3
               α

(41)   F3P
              ╱   ╲
           F3P   F1P
          ╱ ╲   △
        F2P (F3P) γ
        △ |
        β   F3
              α
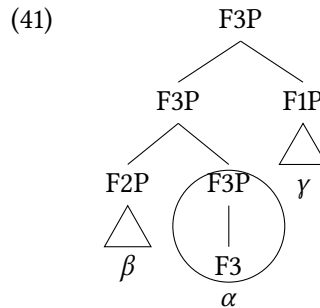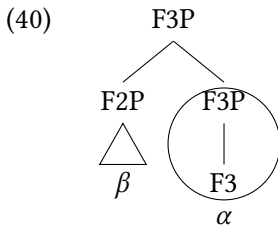
In order to see what such a scenario corresponds to 'in the real world,' consider the fact that F3 is a functional category that is located high in the *fseq*. In the

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[5]For simplicity, I am assuming that when both workspaces are open, the new feature is added in the AUX workspace. I will reject this assumption later in Ch. 7 and investigate the option that the feature is actually merged to both workspaces. Once this later development is in place, the current discussion will be treated as a special case, namely one where F is merged in both workspaces, but its spellout fails in the main spine. The discussion in this chapter does not depend on this, and I am mentioning this here simply so that the reader is not surprised when things change later on.

derivation (41), the high functional category is getting suffixed onto a left branch within an extended projection. This type of structure thus corresponds to cases where, for instance, definiteness or case are expressed on the topmost left branch in the NP, e.g., on a determiner, adjective or a possessor.

Morphemes with such a distribution are rare, but attested. For example, the typological study by Dryer (2013) mentions that "[a] few languages have inpositional clitics which appear inside the noun phrase, most commonly attaching to the end of the first word in the noun phrase." Dryer gives the following example:

(42) kayukayu=ni buru
      soft-ERG   sand
      'soft sand' (Yawuru, Dryer 2013)

While attested, this option is rather rare. In Dryer's sample of 934 languages, it appears in 6. I will have more to say about the rarity of this language type later on, yet to the extent it is attested, we need a way to rule it in, and the Late Closure derivation seems to have the right properties to do so.

I myself could not really find a straightforward example of this phenomenon with no additional complications, possibly a reflex of the fact that this pattern is rare. One candidate for such a type of pattern is the Bulgarian definite article, which is always found suffixed to the highest left branch inside the NP, or, if such is missing, to the NP itself, as illustrated in (43). The article is in bold and it behaves like a second position clitic.

(43) Bulgarian (Embick & Noyer 2001: 568)
      a. kniga-**ta**
          book-DEF
      b. xubava-**ta** kniga
          nice-DEF   book
      c. moja-**ta** xubava kniga
          my-DEF nice   book

The complication here is that the article also carries number/gender marking, which is ignored in the glosses (the article is just *t-*, *-a* is FEM.SG). This of course complicates the apparently simple link between the abstract structures we are discussing and the actual example, but probably not in na way to render it irrelevant.

Another candidate for a morpheme with such a distribution is the German dative marker *-em.* The following examples illustrate that we always find it on

the highest branch within an NP:

(44)   German ([Leu 2008](): 49)

    a.   d-**em**   guten Wein
           the-DAT good wine

    b.   ein-**em** guten Wein
           a-DAT   good wine

    c.   gut-**em**   Wein
           good-DAT wine

However, the example has a slight complication in that when there are multiple adjectives, the dative *-em* may surface either on the highest one, as in (45-a), or on all of them, as in (45-b), with much variation, as [Leu (2008)]() points out. As my proposal is going to be ultimately different than 'Late AUX Closure,' I avoid discussing (45-b) here in this context and settle on the conclusion that the dative *-em* exhibits the relevant type of distribution expected under Late Closure – at least as an option.

(45)   German ([Leu 2008](): 178)

    a.   mit gut-**em**   frischen Wein
           with good-DAT fresh   wine

    b.   mit gut-**em**   frisch-**em** Wein
           with good-DAT fresh-DAT wine

The conclusion is therefore the following: despite the fact that I will argue here in favour of Early AUX Closure, I will, ultimately, need to find a way to provide for the kind of derivations that we see in (41). This need will be strengthened once we return to Ossetic numerical phrases.

Leaving it for the moment open as to how derivations like that will be ruled in, the next point I want to drive home is that if we adopt Early Closure (instead of Late Closure discussed up to now), derivations will look different. To see that, we start from the same configuration, as in (37-a) and (37-b), repeated below for convenience.

(46)   F2P   (47)   F1P

β γ
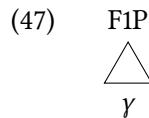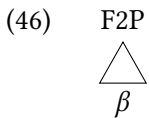
Here we have just spelled out F2 in the auxiliary workspace, see (46), with

the main spine passively waiting. If the auxiliary workspace should be closed as soon as possible, we immediately need to proceed with this task, deriving (48).

(48)

```
              F2P
            /     \
        F2P         F1P
        /\          /\
       β          γ
```
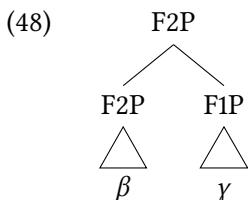
When F3 is merged, we get (49). In order to have a minimal pair with the preceding derivation, we keep the same entry for F3, repeated in (50).

(49)

```
                F3P
              /     \
          F3          F2P
                     /    \
                  F2P       F1P
                  /\        /\
                 β        γ
```

(50) $\alpha \Longleftrightarrow$ F3P
                    |
                   F3
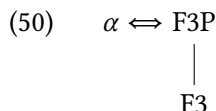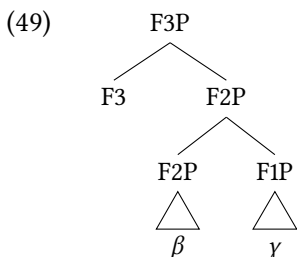
The entry (50) will ultimately trigger complement movement of F2P across F3. Before I get to it, let me address one issue, which is whether Spec movement applies to the derivation (49) before complement movement. The potential step of Spec movement is shown in (51):

(51)

```
                F3P
              /     \
          F2P         F3P
          /\          /   \
         β          F3      F2P
                            /    \
                         F2P       F1P
                         /\        /\
                        β        γ
```
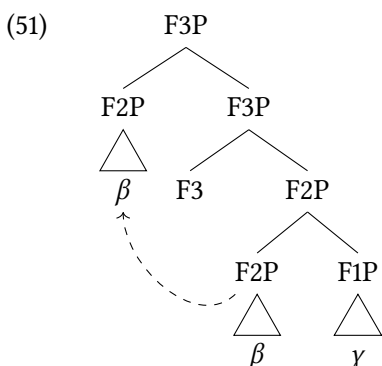
The reason why this is slightly different than regular Spec movement is because we are moving a projecting Spec. In all previous instances, we have been moving a non-projecting Spec. I am not aware of any empirical fact or theoretical argu-

ment that would inform me as to whether such a movement of a projecting Spec is a legal instance of the Spec-movement step contained in the spellout algorithm. In this book, I will treat (51) as an illegal case of Spec movement, and I will be saying that the tree in (49) has 'no movable Spec.'

This will not have any empirical consequences for the derivations I will be doing (as far as I can see), but I simply adopt this here as a convention. The reason why this has no consequences is that such movements (in the cases I shall look at) never lead to anything that gets spelled out. This is mainly because the F1P, which corresponds to the main spine, contains the lexical head of the whole extended projection. In other words, inside F1P, we find a variety of lexical items like 'cat,' 'dog,' etc. For F3 to be spelled out along with F1P in (51), we would need to spell this projection out along with a particular open-class lexical item (like when *mice* spells out *mouse*+PL).

Moreover, the main workspace usually contains not only the root, but also some suffixes. This further decreases the chances for spellout to succeed in (51). Therefore, even if active, the movement in (51) usually fails to produce anything lexicalisable (this is certainly so in the cases I shall look at). As a consequence, the movement is always undone and we get the same result as if this movement did not take place.

Regardless of whether (51) is tried or not, complement movement will have to apply. In the case of (49), this leads to (52) as the result.

(52)

F3P

F2P F3P

F2P F1P F3

β γ F3

α

(53)

F3P

F3P F1P

F2P F3P γ

β F3

α
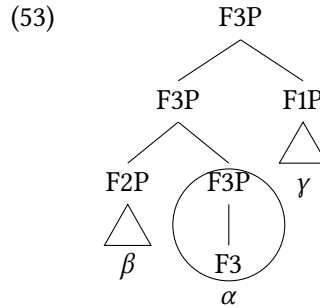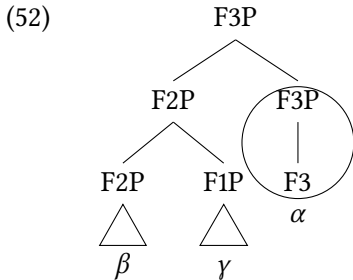
The result in (52) (derived under 'Early AUX Closure') differs from the tree in (53) derived under the assumption that auxiliary workspaces stay open as long as possible. The difference is the position of the circle in the trees, which, recall, indicates the spellout of the hierarchically highest projection. In (52), it comes to the right of the triangles, in (53), it comes in between.

Stepping now again outside of the abstract derivations into the realm of empirical data, we may note that the type of a derivation in (52) (based on Early

Closure) leads to phrasal suffixes. These are suffixes spelling out a relatively high functional category (F3), which is suffixed to a full phrase composed of the lexical head (F1P) and its phrasal modifier (F2P). This is typical for agglutinative languages – Ossetic among them. Recall, for example, that both number and case suffixes are present only once in Ossetic, and they follow the whole phrase. (54) shows this for the dative suffix, (55) for the plural marker (and the allative).

(54)   Iron Ossetic (Abaev 1964: 124)

      a.   mæ zærond fyd
           my old   father

      b.   [mæ zærond fyd]-**æn**
           my old   father-DAT
           'my old father'

(55)   Iron Ossetic (Erschler to appear(b))

      a.   tyng bærzond xox
           very tall   mountain
           'a/the very tall mountain'

      b.   [tyng bærzond xæx]-**tæ**-**m**
           very tall   mountain-PL-ALL
           'to the very tall mountains'

In Dryer's (2013) sample, it is not really clear how frequent this type is. The reason why the precise number is unclear is because Dryer classifies his data differently than I do. To see this, let me start from the relevant category in Dryer's sample, which is 'postpositional case clitics.' Dryer understands the 'postpositional clitic' category as markers that "attach phonologically to some word, [but] the word they attach to need not be a noun, [instead,] which word they attach to is determined syntactically." All languages that Dryer puts here are therefore of the relevant type, and they are 95.

However, from my perspective, the number would have been higher. The reason for discrepancy resides in the analysis of languages that happen to be N-final, just like Ossetic. In such languages, "postpositional-clitic" case markers (even though they follow the whole phrase) happen to follow the noun. As Dryer makes it clear, such markers are treated by him as belonging in the more specific 'case suffix' category (the category of 'postpositional clitics' is therefore reserved only to markers that are separable from the noun by, say, an adjective or a demonstrative).

In sum, Dryer's definition of 'postpositional clitic' only applies to languages

where the noun is not final in the NP, and where some other element may intervene between the noun and the case marker. If this category was extended to languages with N-final NPs, the number would be higher, but just how much higher is unclear. Yet it is still clear is that this type of case marking is a lot more common than attaching the marker on the highest left branch.

Coming back to our choice between Early/Late Closure, we must initially conclude that the signals we are getting from the data are somewhat contradictory. In particular, it seems that for some languages, we need Early Closure (to deal with phrasal affixes). For other languages, we need Late Closure (to deal with Bulgarian and German-style languages).

However, the contradiction is only apparent. To see why, consider the overarching strategy behind the spellout algorithm: we always try one configuration, and if it doesn't work, we abandon it and try a different one. So the way out of the conundrum to be explored is that one of these configurations is always tried *first*, and if it fails, the second configuration is activated. That is why we find both configurations attested.

Once we look at things this way, the roadmap is clear: we must determine which of these configurations is tried first, which second, and how exactly does the transition from trying one to trying the other work. I will do so in the next section. I will explore here a system where the Early Closure configuration (with a phrasal affix) is tried first, and only if it fails, the 'Late Closure' configuration is tried. In other words: phrasal suffixes are preferred, but if phrasal affixation fails, backtracking will reopen the auxiliary workspace and the second option is tried.

6.5 On the interaction of Early Closure and backtracking

Let me now explain in more detail the system sketched briefly in the preceding paragraph. I will illustrate the system on Iron and Digor numerals. Recall first that when the Digor numeral has no noun in its complement, it combines with the augment and the case marker as in (56). When it has a complement in addition, the complement comes in between the numeral and the augment as in (57).

(56) Digor

KP
#P K
CardP #
duuæ *e(m)* CASE

(57)

KP
#P K_{loc}
CardP #
Card KP
NP K_{gen}
duuæ *bæx* *ɨ* *em* *i*
two horse ~~GEN~~ SG LOC
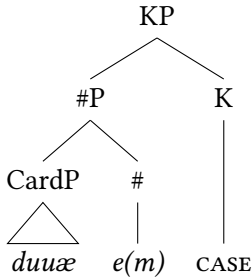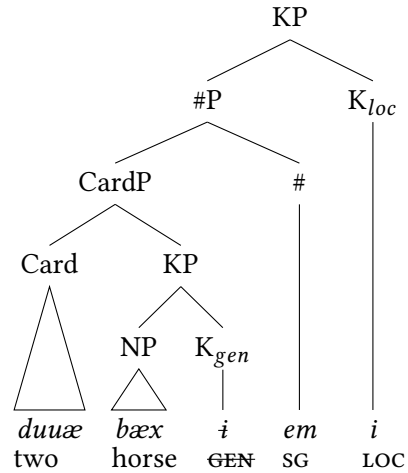
The relevant point in the derivation of (57) is when the numeral and the noun are found in two separate workspaces. At this stage we have the structures depicted in (58) and (59). Here the numeral is found in the auxiliary workspace. The noun is in the main spine. All features are spelled out.

(58) CARDP

duuæ

(59) GENITIVE

bæx.GEN
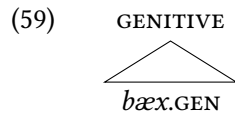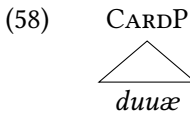
Recall from Ch. 2, section 2.9 that the structure (59) is simplified. In particular, the main spine contains in addition to the noun in the genitive a copy of the numeral. However, I am ignoring this for simplicity; the relevant constituent could have easily been added to the main workspace (59) with no effect on the discussion. The cardinal, I assume, behaves as a projecting specifier regardless of whether it is first merged, or whether a copy of it exists in the main spine.

The next head to be added is # (corresponding to the augment). The choice we have now is whether to first integrate the workspaces, or merge # only in one of them. According to Early Closure, we must close the two workspaces as soon as possible, before we add #. This gives the configuration in (60). This configuration does not spellout without movement, but if we move the complement of #, we get the right result, as in (61).

(60)
```
           #P
          /  \
         #   CardP
            /    \
        CardP   genitive
         /\       /\
       duuæ     bæx.GEN
```

(61)
```
               #P
              /  \
          CardP  (#P)
          /   \    |
      CardP genitive #
       /\     /\   -e(m)
     duuæ  bæx.GEN
```
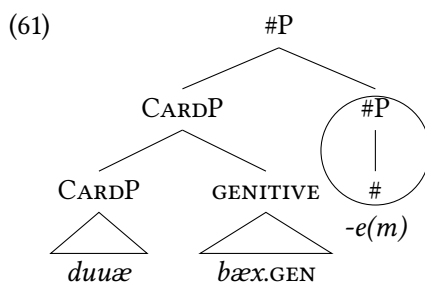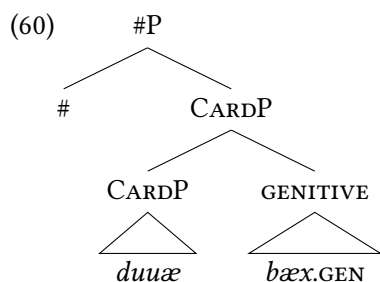
If we did not merge the two workspaces in (58) and (59) before adding #, we would not get the right result. Instead, *-e(m)* would be merged inside the Spec, and it would successfully spell out on the numeral, as in (62). After the numeral would be merged with the main spine, we would get the structure in (63).

(62)
```
           #P
          /  \
      CardP  (#P)
       /\      |
     duuæ      #
             -e(m)
```

(63)
```
                #P
               /  \
             #P   genitive
            /  \      /\
        CardP  (XP) bæx.GEN
         /\     |
       duuæ     #
             -e(m)
```
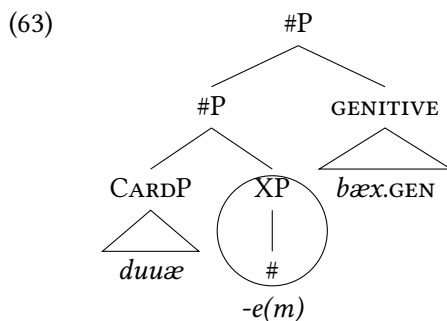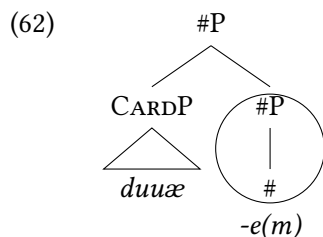
The structure (63) does not correspond to a phrasal suffix. It corresponds to the German/Bulgarian type of an example where the modifier inflects, and the noun remains outside of the inflection. This option may well be attested elsewhere, but not for Digor numerals. Therefore, we need to block it in Digor. Such blocking cannot make reference to a failed lexicalisation in (63) followed by a repair, since the configuration in (63) does not fail. Therefore, Early Closure is invoked to do the job here. Since (61) spells out fine, (63) will never be tried.

In fact, it is hard to see how the 'Late Closure' configuration in (63) could fail, and then the phrasal option in (61) succeed, because from the perspective of spelling out #P, they are the same configuration.

Let me now address the complementary issue of how spellout may fail after Early Closure, leading (due to backtracking) to the reopening of the auxiliary workspace. To have an example in hand, let me turn to numerals in Iron. Recall here from Ch. 5 that the Iron numeral spells out #, see (64).

(64)   Iron

KP
#P   K

CardP   #

...   *e(m)*   CASE

duuæ
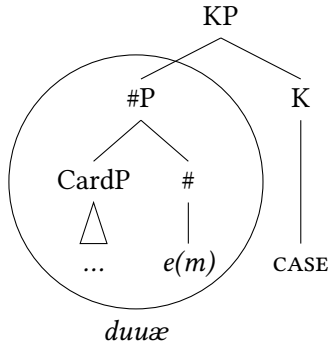
Recall further that the discussion of the pronoun system in Iron led us to the conclusion that Iron in fact has no augment (not even a zero one). The lack of an augment is the decisive factor that influences the derivation of the numeral structure. To see how, let us turn to the details.

The derivation in Iron will initially proceed the same as in Digor. We will derive the CARDP in the auxiliary workspace and have the genitive ready in the main spine.

(65)   CARDP

duuæ

(66)   GENITIVE

bæx.GEN

Following Early Closure, we close the auxiliary workspace as soon as CARD is lexicalised, and merge it with the counted noun in the genitive. To this phrase (containing the genitive and the CARDP) we add the head #, producing (60), repeated below for convenience in (67). This structure fails to spellout in its current form, leading to spellout movements. The phrase has no movable Spec, and so complement movement is tried, producing (68). This stage is present both in Iron and Digor. After this stage, the languages part ways.

(67) #P
     ╱ ╲
    #   CardP
       ╱   ╲
    CardP genitive
     △   △
    duuæ *bæx.*GEN

(68) #P
      ╱   ╲
   CardP   #P
   ╱ ╲   │
CardP gen   #
 △   △
duuæ *bæx.*GEN   *!!! no* AUG *in Iron !!!*
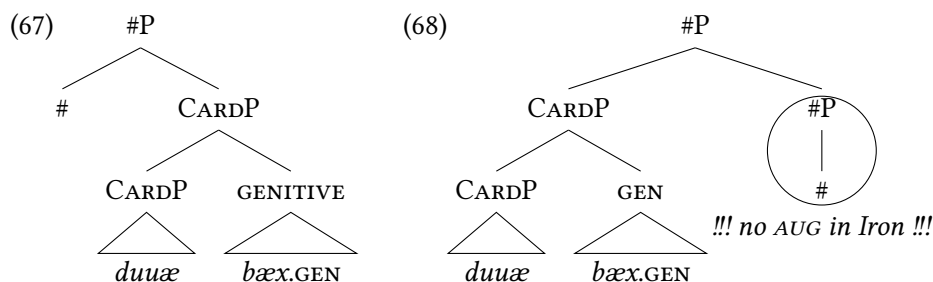
In Digor, we had an augment for the lower remnant #P, and so the step (68) was successful. However, recall that Iron has no augment, and so spellout fails.

What shall now happen in Iron? The derivation in (68) is an instance of complement movement. When complement movement fails, backtracking takes place. I repeat our original formulation of backtracking in (69):

(69) *Backtracking* (Starke 2018)
      When spellout fails, go back to the previous cycle, and try the next option
      for that cycle.

Going to the previous cycle means removing # from (67), and falling back onto what we had at the stage CardP, trying to see if we can do something differently here. And this is where a new type of situation arises, because 'what we had at CardP' were two separate workspaces, as in (70) and (71).

(70) CardP
      △
     duuæ

(71) genitive
      △
     *bæx.*GEN

In the Nanosyntax literature, backtracking has never been applied to cases such as these, i.e., when a Spec has to detach from the main projection line as a result of backtracking. However, it seems to me natural to investigate this scenario. Under backtracking, we go back to previous stages of derivations. (70) and (71) are nothing but an earlier stage in the derivation of (68). So when backtracking is activated, it should be possible for it to take us from (68) to a stage with two workspaces, depicted in (70) and (71).

What is going to happen now? The definition of backtracking (recall (69)) tells us to try the next option for this cycle. However, there is no next option to try, since we are in the 'auxiliary workspace' mode, and this is the very very last option for CARD. So if we now followed backtracking in (69) literally, we should

continue with it. However, it is quite clear that this won't help here. The reason why backtracking does not help is that we have already done backtracking before, and it turned out that there is no other way to add CARD than as a Spec. (Recall that backtracking is a pre-requisite to open the auxiliary workspace to begin with.) So ultimately, more backtracking is pointless in a scenario like (70) and (71), where two complex branches reopen. Given that backtracking fails, we should go back to the original stage where backtracking was triggered due to # (recall (67)), and build a new Spec that will have # in it.

However, there is something special about the stage where backtracking re-opens the auxiliary workspace. The special thing becomes apparent when we forget for a while about the 'procedural' definition of backtracking ('try the next option for that cycle') and focus on its purpose. The main point of doing back-tracking to begin with is that we have merged a feature F to a tree, call it α, and spellout failed. When we backtrack, our main goal is to make some changes to α, so that when we Merge F again, we merge it to a different tree, call it β. This is the only way how to make progress on spelling out F. I state this in (72).

(72)   *The logic of backtracking*
         When spellout of F fails, go back to the previous cycle, and provide a different configuration for Merge F. (Trying a different spellout option at the previous cycle is an instance of this strategy.)

As stated in the parentheses, providing a different configuration is primarily achieved by trying new spellout options. However, when we backtrack to the Spec-formation stage, there is a way of providing a new configuration for Merge F even without doing anything special. In particular, we can fulfill the purpose of backtracking by simply merging the relevant feature into the Spec. I state this in (73), which is a definition of backtracking that is intended to enrich (and replace) the original formulation in (72):

(73)   *Backtracking* (new)
         When spellout fails, go back to the previous cycle.
         a.   Try the next option for that cycle.
         b.   If (a) fails, try to merge F into the auxiliary workspace

In our specific case, this definition applies as follows. Since backtracking went back to a stage where all movements have been tried (including Spec formation), F is merged into the AUX workspace as per (73-b). This yields (74). This structure

spells out in Iron, where numerals spell out the full #P, see (75).[6]

(74)

```
        #P
       /  \
      #   CardP
           /\
          /  \
        duuæ
```

(75)

```
      /‾‾‾‾‾‾‾‾\
     /    #P    \
    |    /  \    |
    |   #  CardP |
    |       /\   |
     \     /  \ /
      _____/
         duuæ
```
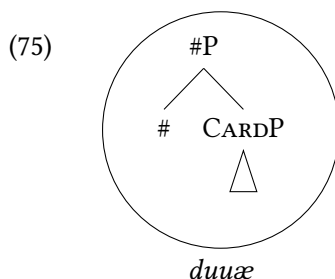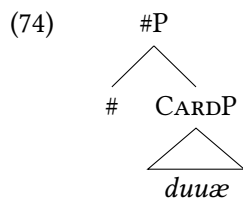
And this is indeed my proposal of how the logic of backtracking applies when the derivation reopens an auxiliary workspace: instead of backtracking further down the line, the derivation simply makes use of the fact that the auxiliary workspace provides the means to Merge F in a new configuration.[7]

After # is spelled out in (75), Early Closure applies, producing (76):

(76)

```
                  #P
                 /   \
        /‾‾‾‾‾\       \
       /  #P   \    GENITIVE
      |  /  \   |      /\
      | #  CardP|     /  \
      |     /\  |   bæx.GEN
       \   /  \/
        _____/
          duuæ
```
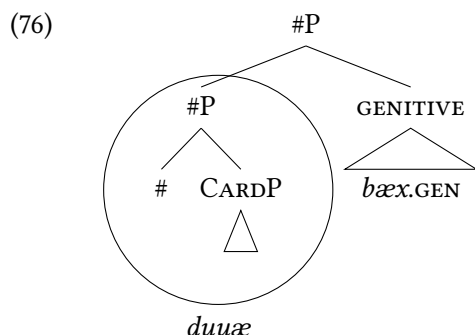
On the general level, the reason why spellout failed in the main projection line (recall (68)) is that Iron has no lexical entry with '#' as its foot. When we try to spell out # in the Spec, we can draw on a wider variety of lexical items, namely those containing # in general (not just as the foot).

This must hold quite generally: if the spellout of F is to fail in the main projection line (as it had in (68)), there must be no lexical item with F as a foot. Now given that there is no lexical item with F as the foot, the only way how F can get

---

[6]If there were no AUX workspace available, we would backtrack even further.

[7]Note that I am still assuming that when both workspaces are open, the feature is added in the AUX workspace only. As highlighted above, I will probe into this assumption later and investigate various alternatives. For now, I just keep this assumption invariant to see how to go about the Early/Late Closure issue. Nevertheless, the question of where features are added when both workspaces are open is shared among (and orthogonal to) the two approaches.

spelled out in the Spec is by getting spelled out with one or more features inside the Spec. I will call this co-spellout (with the Spec).

Just to show how the derivation continues in Ossetic, we return to the structure (76). This case-less numerical structure is subject to further case marking, merging the NOM feature F1 (and so on), see (77). Structures like these spell out by using phrasal suffixes in both varieties of Ossetic, as in (78). The general mechanics of how the derivation proceeds after (78) has been put in place in Ch. 4.

(77)

NOM
├── F1
└── #P
    ├── #P
    │   ├── #
    │   └── CardP
    │   △
    │   *duuæ*
    └── GENITIVE
        △
        bæx.GEN

(78)

NOM
├── XP
│   ├── #P
│   │   ├── #
│   │   └── CardP
│   │   △
│   │   *duuæ*
│   └── GENITIVE
│   △
│   *bæx*.GEN
└── NOM
    │
    F1
    Ø
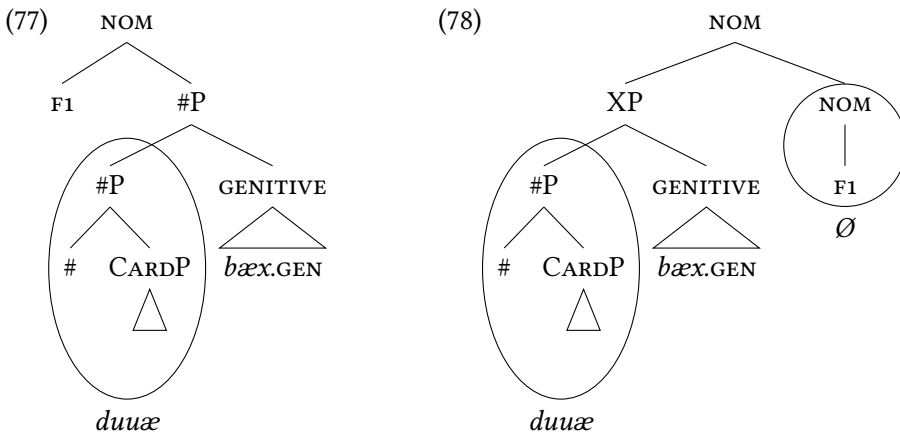
6.6 Prefixal syncretism in Svinitsa

To see one more example of where the same logic applies, let me go back to the Svinitsa dialect of Serbian. Recall from the paradigm in Table 6.2 (repeated in 6.3) that the Svinitsa form *na žen-e* 'of/to wife-PL' is actually ambiguous between the genitive and the dative.

Table 6.3: Svinitsa Serbian (Sobolev 2009: 723)

	wife, SG.	wife, PL.
NOM	žen-a	žen-e
ACC	žen-u	žen-e
GEN/DAT	žen-i	na žen-e

When we discussed the derivation of this form in (33), the structure only showed how the genitive reading of *na žen-e* arises. How is the dative reading

derived? Given our strategy of closing auxiliary workspaces as soon as possible, we first derive the genitive, and close the auxiliary workspace. In order to derive the dative, we merge an additional case feature on top of the genitive, with the result shown in (79).

(79)

```
                    DATIVE
                   /      \
                 F4      GENITIVE
                        /        \
                 ( GENITIVE )   ACCUSATIVE
                 (   /\    )    /         \
                 ( F3   X  )  xNP      ( ACCUSATIVE          )
                     na        △       (  /        \         )
                              žen      ( F2    NOMINATIVE    )
                                       (       /       \     )
                                       (     F1       PLP    )
                                       (            /    \   )
                                       (          PL    #P   )
                                       (                 |   )
                                       (                 #   )
                                                         e
```
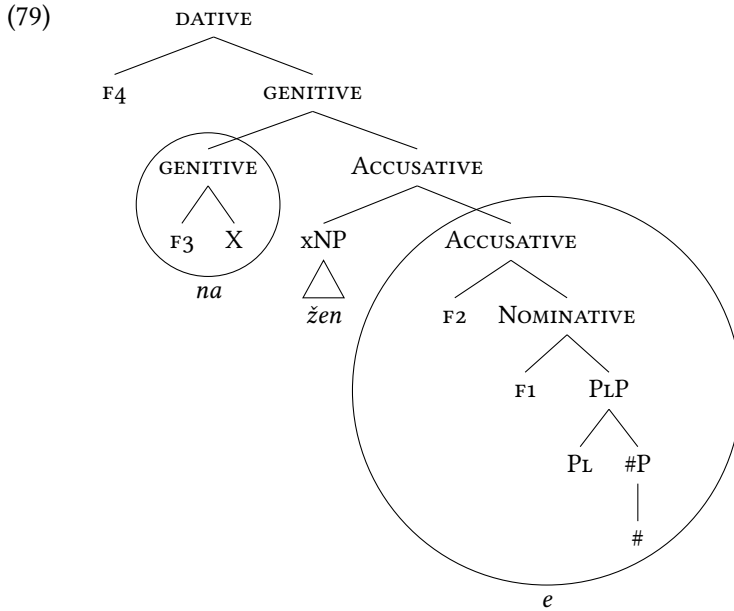
Now we try to spell out. This is impossible without movement (no lexical tree contains this tree). We try complement movement (see (80)), but this fails too.

(80)
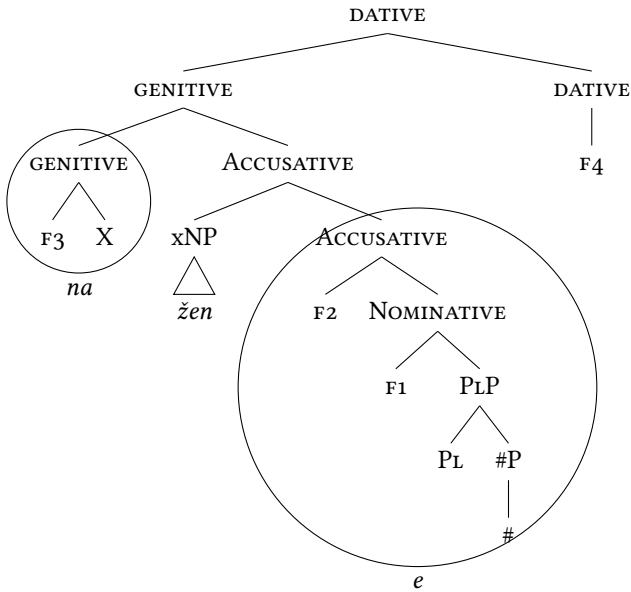
Therefore, we will ultimately be forced to backtrack to the previous (GENITIVE) stage, where we had two workspaces. The auxiliary workspace is shown in (81):

(81)
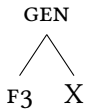
Given that the auxiliary workspace reopened, it becomes a target for merging F4, as per the backtracking definition in (73). When we merge F4 in the auxiliary workspace, (82) arises. This structure is perfectly matched by the entry for *na*, repeated in (83) from (30-b).

(82)
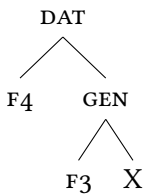
(83)
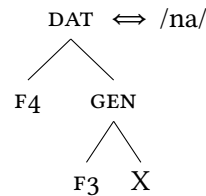
So now we spellout (82) using the entry (83). Early closure now forces us to close the auxiliary workspace. Merging the auxiliary workspace back to the main spine yields (84):

(84)
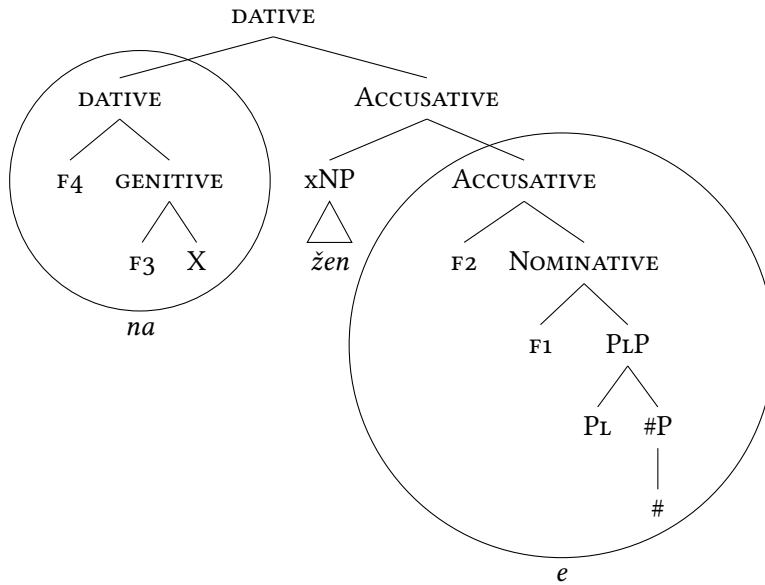
So we see once again the same sequence of steps. (i) The failure of spellout at the FP stage. (ii) Backtracking reopens the auxiliary space. (iii) F is merged in the auxiliary space. (iv) F spells out successfully in the auxiliary space. The reason why spellout fails in the main projection line – but succeeds in the Spec – is that there is co-spellout between F4 and the Spec.

6.7 Complex auxiliaries

So far, we have only looked at auxiliary Specs that are simplex: the addition of a high feature into a reopened Spec has always spelled out as a single morpheme. Is it possible that F spells out inside the Spec, but yielding a Spec that has multiple morphemes? The answer is that when the conditions are right, this can happen. What are these conditions?

Suppose that in order to spell out the feature F, we must build a Spec. This is shown in (85), where the feature F is contributed by a Spec. Features that are lower in the *fseq* than F are marked by minus, e.g., F-X, features that are higher than F are marked by a plus, e.g., F+1. Note that I am assuming that the left branch and the right branch have a different feature below F, that is why the Spec has F-X, and the main spine has F-Y. These are then both features that are lower than F, but they need not be identical. The main spine may not contain F-X at all (for instance, when the left branch is a gradable adjective and the main spine contains

a noun); and vice versa.

(85)

```
                    F+1P
                  /      \
              F+1          FP
                      /  ⌒⌒⌒ \
                    FP         F-YP
                  /    \       /   \
                F    F-xP    F-Y   …
                     /  \
                  F-X    …

                   AUX
```
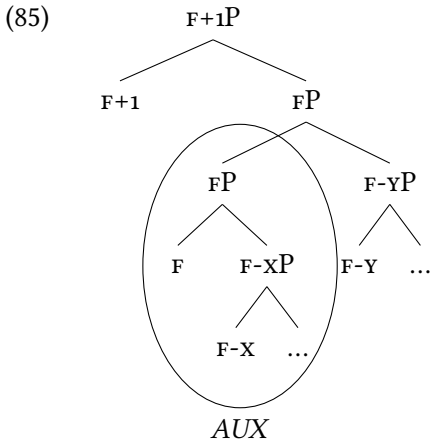
The question that I now want to address in abstract terms is whether it is possible that F+1 is spelled out inside the Spec by a separate morpheme, producing a bi-morphemic Spec.

In order for that to be possible, the spellout of F+1 must fail in the main spine (even after complement movement), which leads (via backtracking) to the re-opening of the AUX workspace, where F+1 is merged, yielding (86):

(86)

```
                F+1P
              /      \
          F+1          FP
                     /    \
                   F    F-xP
                        /  \
                     F-X    …

                     AUX
```
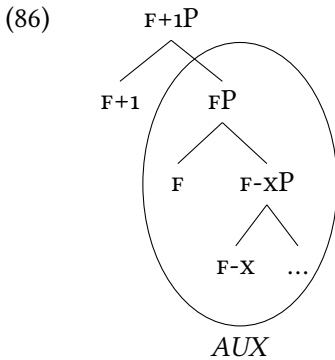
Suppose now that there is no lexical entry for the whole of (86). That will lead to complement movement of the AUX to the left of F+1, as in (87):

(87)

```
                    F+1P
                  /      \
               FP          F+1P
              /  \            \
            F    F-xP         F+1
                  / \
               F-x   …
                AUX
```
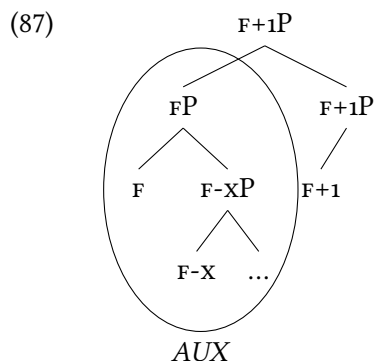
However, it follows from the spellout theory introduced here that the lower remnant F+1P cannot be lexicalised in (87). The reason is that if we had a lexical entry that would match the relevant F+1P in (87), we would not have to backtrack into the Spec to begin with. In particular, we would have used such an entry to spell out the very same F+1P already when F+1 was in the main spine; recall (85). But since spellout in the main spine failed, it follows that there is no entry with F+1 as a unary bottom.

So (87) fails, but that still does not mean that the Spec cannot spellout as two pieces. To see why, consider how the derivation will proceed after complement movement fails: it will backtrack as usual. Backtracking will lead to retreating to the FP stage. On the first passage, we spelled out without any movement, recall (85). So we try to shrink the AUX down to F-xP, and we try to lexicalise FP as a suffix:

(88)

```
                 FP
                /    \
            F-xP      FP
            /  \        \
          F-x   …        F
              AUX
```
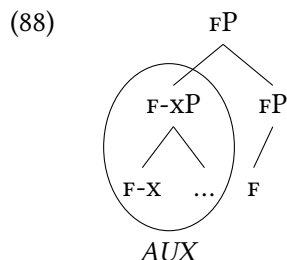
But here FP can't lexicalise either. For matching to succeed in (88), there would have to be a lexical entry with a unary bottom and F as a foot. But with such an entry, we would never get to build a Spec at the FP stage, contrary to the initial assumption in (85).

So we need to backtrack even further down – to F-xP. On the first passage, we spelled out without movement. So now we try moving the complement F-x:

(89)

F-xP
├── AUX
└── F-xP
    └── F-x
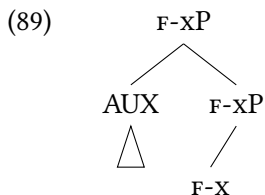
Will (89) lexicalise? In order for that to be so, let me posit the following entry:

(90)   /α/ ⟺   F+1P

F+1P
├── F+1
└── FP
    ├── F
    └── F-xP
        └── F-x
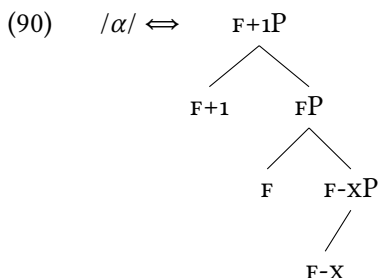
The existence of a lexical entry like the one in (90) is compatible with all the prior steps in the derivation; in particular, it is compatible with F not being spelled out in the main spine by this suffix, because the feature under F in (90) is different than the one found in the main spine.

This entry will allow for a successive cyclic movement of the shrunk auxiliary above F+1, yielding the structure (91), where we have a bi-morphemic Spec, consisting of the original (shrunk) auxiliary and a suffix α. This Spec successfully incorporates F+1, and it is bi-morphemic. Following Early AUX Closure, we merge the Spec with the main spine, yielding (92).

(91)   F+1P

F+1P
├── AUX
└── F+1P
    ├── F+1
    └── FP
        ├── F
        └── F-xP
            └── F-x

α

(92)

```
                        F+1P
           ┌─────────────┴──────────┐
         F+1P                      F-YP
      ┌────┴─────┐              ┌────┴────┐
    AUX        F+1P           F-Y        ...
     △       ┌──┴───┐
            F+1     FP
                  ┌──┴───┐
                  F    F-XP
                         │
                        F-X

                    α
```
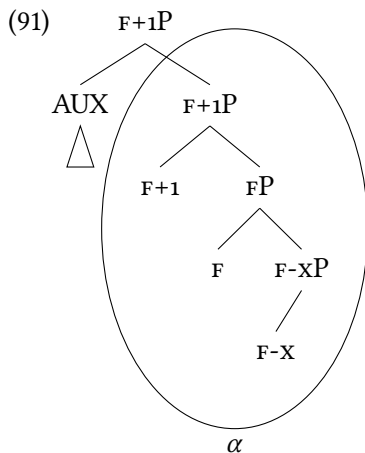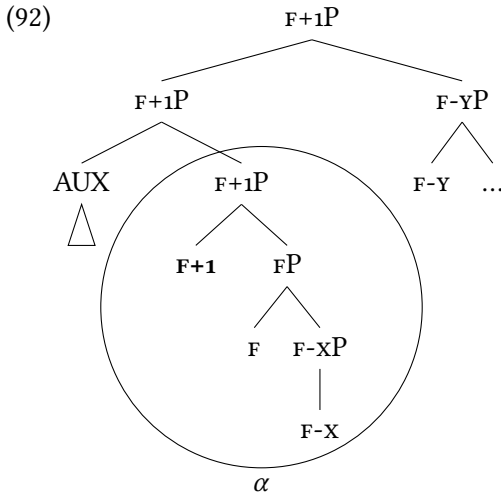
Derivations like these will play a role in the next part of the book in the discussion of Russian numerals. For the purpose of that discussion, it is also good to keep in mind that a Spec may not only *become* multi-morphemic as it grows, it may be born multi-morphemic, as in (93):

(93)

```
                        FP
           ┌─────────────┴──────────┐
          FP                       F-YP
      ┌────┴─────┐              ┌────┴────┐
    AUX         FP            F-Y        ...
     △       ┌──┴───┐
            F    F-XP
                   │
                  F-X

                  α
```
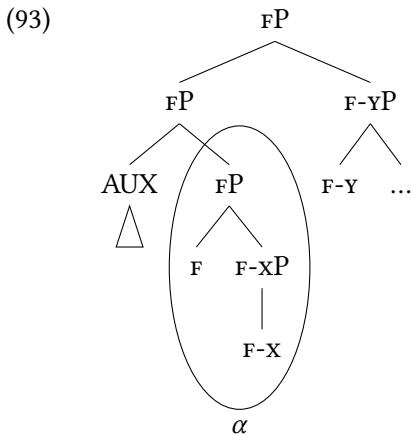
For (93) to be built as a Spec that provides F, it is crucial that the only piece of morphology that can contribute F is a suffix, α, which at the same time has a bottom that fails to match the main derivation. Therefore, a Spec must be build that provides F, and since the only entry containing F is a suffix like the one in (93), the Spec must make sure that the suffix gets to be used. Else the derivation crashes.

6.8 Head movement

Let me now return to the transformation that takes us from (85) to (92). This type of derivation resembles head movement. The reason for saying this is that the net effect of backtracking into the Spec stage – followed by Merge F in AUX – is that a feature that initially scopes over the entire phrase (the F1 in (85)) becomes a part of a suffix on the projecting Spec in (92). If we were to depict this transformation as movement, we get a tree that is non-distinct (in its output) from a head-movement type of representation, see (94).

(94)

```
                        F+1P
                _____/_____
            F+1P                   FP
           __/\__               __/\__
         FP    F+1         FP      F-YP
         /\      |        /\        /\
        /__\     |       /__\      /__\
       AUX       α      AUX        ...
        ⌐ _ _ _ _ _⌐
```
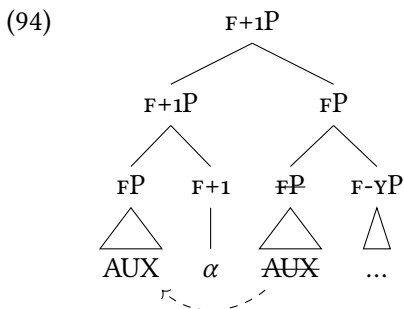
Similarly, the Svinitsa dative feature F4 in (79) becomes a part of the projecting Spec in (84). If we were to model such transformations using movement-like representations, we would be led to depict them as shown in (95) (modeled on the basis of the Svinitsa trees). This type of movement strongly resembles the type of 'sideways Merge' explored in Sportiche (2005) or the (complement-forming) Undermerge operation of Pesetsky (2013), both of which share with head movement the property that the landing site does not extend the root node.[8]

---

[8]The resemblance of the transformation to head movement led me to in fact model this as head movement in my previous work, see Caha (2011).

(95)

```
                              F4P
                         ┌─────┴─────┐
                       F4P          F3P
                     ┌──┴──┐      ┌───┴────┐
                    F4   F3P    F3P        F2P
                        ┌─┴─┐  ┌─┴─┐    ┌───┴───┐
                       F3   X F3   X   NP      F2P
                                          △   ┌──┴──┐
                            na           žen F2   F1P
                                                   │
                                                  F1
                                                  -e
```
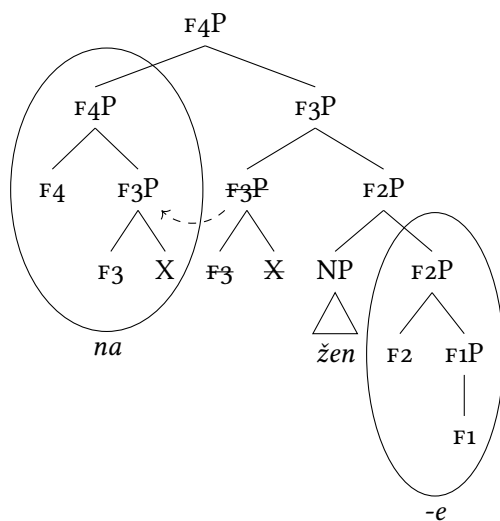
It is important to keep in mind, however, that despite the resemblance to head movement (including some of its modern (re)interpretations), the current execution of the transformation does not rely on movement at all. Rather, it relies on the idea of two independent workspaces, a proposal that is first made to my knowledge in Bobaljik & Brown (1997). Within each workspace, Merge and Move extend the root node. What is added to Bobaljik & Brown (1997) here is a specific procedure through which the two workspaces are interrelated – connected as early as possible, but separated again if needed – and with Merge attempted within the reopened auxiliary workspace. This once again leads to the absence of traces, which is like in the case of spellout movements in general (recall Ch. 4) and unlike in Bobaljik & Brown (1997).

I do believe that incorporating head-movement type of derivations into the overall theory of traceless spellout movement (contrasting with feature-driven movement) is a good result. As has been pointed out a number of times, head movement (if it is understood as regular movement) is a real outlier in the typology of movement operations. The following is a non-exhaustive list based on Dékány (2018) (cf. Matushansky 2006):

(96)   Issues with head movement (Dékány 2018)

   a.   It violates the Extension Condition (does not extend the root node).
   b.   It complicates the definition of c-command (the moved head does not c-command its trace, unless c-command is stretched).
   c.   It violates the Chain Uniformity Condition (a non-maximal projec-

d.   It violates Anti-Locality (the movement is too short).

e.   It has no semantic effect (like spellout movements in general).

So in general, the idea that backtracking reopens left branches, and that features may be added into those branches is to be welcome (as far as I can see), since (like a number of other alternatives, including the seminal work by Koopman & Szabolcsi 2000) it tries to dispense with the oddities enumerated in (96). It dispenses with them (qua properties of movement) because no literal movement is, in fact, involved.

The fact that there is no movement involved in our derivations leads to an additional difference with head movement, namely that there is no actual displacement of the lower 'head.' In particular, if things work as I have proposed, the effect of backtracking into the Spec stage – followed by merging F in AUX – is that a higher head gets smuggled into a lower left branch. The relevant left branch will never move across anything. In this sense, the current operation rather resembles lowering operations, e.g. like that of lowering *-ed* down onto little *v* in English.

6.9 Conclusion

As we are leaving the second part of the book, I shall repeat here all the spellout principles introduced in the second part of the book. One last update will appear in the third part (Multiple Merge).

The first two conditions are very much the necessary part of any theory of realisational morphology. In (97), we have a principle which determines when a match between the syntax and the lexicon obtains. The principle says that it obtains when the lexical entry contains a tree that is identical to the syntactic tree.

(97)   *The Superset Principle* (Ch. 4, (6)):
       A lexically stored tree matches a syntactic node iff the lexically stored tree contains the syntactic node.

The second principle is a competition principle. It tells us what happens when two items compete for insertion.

(98)   *The Elsewhere Condition* (Ch. 4, (11)):
       When two entries can spell out a given node, the more specific entry

wins. Under the Superset Principle governed insertion, the more specific entry is the one which has fewer unused features.

The next part of the spellout theory I introduced in Ch. 4, (32) was the cyclic spellout algorithm. It executes derivations in a stepwise cyclic fashion, where each step of Merge F must be followed by spelling out FP. If FP cannot be spelled out (no matching lexical item exists), the tree is rejected at the interface and returned to syntax. Syntax performs evacuation movements as defined by the algorithm, always leading to a new attempt at spellout.

(99)   Merge F and
    a.   Spell out FP
    b.   If (a) fails, attempt movement of the spec of the complement of F, and retry (a)
    c.   If (b) fails, move the complement of F, and retry (a)

The machinery replaces some feature driven movement by spellout movements. The relevant movements thus affected have different properties from feature driven movements: they do not lead to a new interpretation, they do not leave traces, they are extremely local. Even though not feature driven, spellout movements are not unmotivated. They arise from the need to provide the correct configuration for phonological interpretation (spell out) to succeed.

    In a cyclic spellout procedure, when a new match is found, it replaces all previous matches at lower nodes.

(100)   *Cyclic Override* (Ch. 4, (39)):
    Lexicalisation at a node XP overrides any previous match at a phrase contained in XP.

If the spellout procedure described in (99) fails, backtracking is triggered. The original definition of backtracking was as in (101).

(101)   *Backtracking* (Ch. 4, (54)):
    When spellout fails, go back to the previous cycle, and try the next option for that cycle.

When even backtracking does not help, we go back to the problematic stage, and construct a Spec that spells out F.

(102)   *Spec Formation* (Ch. 6, (17)):
    If Merge F has failed to spell out (even after backtracking), try to spawn a

new derivation providing the feature F and merge that with the current derivation, projecting the feature F at the top node.

When the Spec is formed, it is immediately merged back to the main projection line.

(103)   *Early AUX Closure* (Ch. 6, (36)):
When F (that has triggered the opening of an auxiliary workspace) is successfully spelled out, close the AUX workspace by merging the FP it has produced to the main projection line. Project the feature F to the top.

However, if spellout fails in a subsequent step, backtracking may lead to the re-opening of the auxiliary workspace and the main projection line as two separate workspaces. This on its own is enough to provide a new configuration for the repeated merger of F, so no other steps are needed. This led me to reformulate backtracking as in (104).

(104)   *Backtracking* (Ch. 6, (73))
When spellout fails, go back to the previous cycle.
a.   Try the next option for that cycle.
b.   If (a) fails, try to merge F into the auxiliary workspace

When the two workspaces are split again, then F is Merged (minimally) in the AUX workspace (I will shortly explore a more permissive option). Once it is added, the AUX workspace tries to spellout FP, following the regular spellout procedure, leading potentially to movements and backtracking. F can only be incorporated in AUX if it undergoes co-spellout together with some feature of the Spec.

Part III

The override account

7 Russian higher numerals and Multiple Merge

In this chapter, I turn my attention to numerals in Russian. I will identify two main differences between Russian and Ossetic, and lay the theoretical groundwork within which these differences are to be captured.

7.1 Numerals in Russian

In Russian, numerals are formally much more of a heterogeneous category than they are in Ossetic, and almost every numeral has its own quirks and peculiarities. In this chapter, I will focus on a particular subset of these numerals (5 and higher), which form a natural class in that they require the genitive plural on the counted noun. In oblique cases, however, the genitive is replaced by the relevant oblique case. An example (using the dative) is in (1).

(1)   Russaian, Pesetsky (2013: 2)[1]

    a.   pjať   stol-ov
           five.NOM tables-GEN
           'five tables' (SUBJ/OBJ)

    b.   pjať-i   stol-am
           five-DAT tables-DAT
           'to five tables'

As highlighted in Ch. 1, the bifurcation (with the counted noun either in the numeral-determined case vs. grammatical-role case) aligns perfectly with the Russian syncretism scale, repeated in (2):

(2)   The Russian syncretism sequence
        NOM—ACC—GEN—LOC—DAT—INS

---

[1]I have simplified Pesetsky's examples to the core of the pattern, ignoring adjectives and other expressions that will be added back later on.

This makes it tempting to apply the same analysis to Russian as the one we have developed for Ossetic.

But there is a catch. Once we start doing this, we quickly discover that Russian numerical phrases differ from the Ossetic ones in two crucial properties. I give them in (3).

(3)   Two differences between Russian and Ossetic

   a.   Both the numeral and the counted noun are marked for case in Russian. In Ossetic, the numeral was not marked for case; there was only one case marker in the whole phrase, and it appeared at the very end of the whole phrase.

   b.   In Russian, the actual allomorph which replaces the genitive (*-am* in (1)) is determined by the noun, not by the numeral (which takes *-i*). This is different from Digor, where the particular allomorph that replaced the genitive (e.g., the dative *-emæn*) was determined by the numeral (the noun would normally take *-æn*).[2]

.

My goal in this chapter is to show how we can analyse the Russian pattern using the theory introduced in the preceding discussion, adding one more idea, namely Multiple Merge. The result is going to be a 'new' type of account of case competition, even though its ingredients will be very much like those used for Ossetic.

7.2 The override account

Let me begin by looking again at the example (2), repeated in (4).

(4)   Russaian

   a.   pjať   stol-ov
         five.NOM tables-GEN.PL
         'five tables' (SUBJ/OBJ)

   b.   pjať-i   stol-am
         five-DAT.SG tables-DAT.PL
         'to five tables'

---

[2]There is an apparent third difference, which is that the noun is plural in Russian but singular in Ossetic. I do not address this here. The reason is that this variation seems orthogonal to the two points raised above (as further languages show). Plus there is the fact that some sources on Ossetic provide examples with plural on the noun also in Ossetic, recall Ch. 2, footnote 9

In (4-b), we clearly see that we have a dative case marker present both on the numeral and on the noun. Recall that in Ossetic, we only had a single case marker in the whole phrase:

(5)   dæs bon-æn
        ten days-DAT

The way I shall approach this difference theoretically is the following. Recall that in Ossetic, the numeral – notated as CARDP in (6) – corresponds to a separate left branch. Following Early AUX Closure, the numeral is merged with the counted noun in the genitive, and an attempt is made to add the 'external' case (expressing the function of the full numerical phrase) as a phrasal suffix. This derivational option succeeds in Ossetic, and we thus have a sequence of two cases, where the inner one is eliminated by ellipsis, as I have argued in part one of this book. To distinguish the two cases in (6), I put the subscripts K_N (for the internal nominal case) and K_{Num} (for the external case belonging to the whole numerical phrase).

(6)
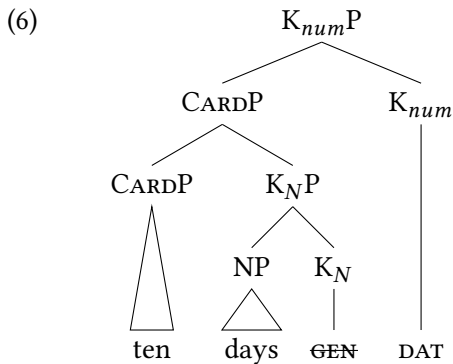
The tree in (6) is of course rather simplified and gives only the bare bones of the analysis; we know very well that each of the cases (both the inner GEN and the external DAT) decompose into several projections, and that as a consequence, the actual derivations are more complex.

An additional complexity (not shown in (6)) is that the numeral in Iron also includes the singular # projection corresponding to the Digor augment. I gloss over that now, though I intend to come back to more elaborate derivations in the following chapter (Ch. 8).

Crucially, the structure in (6) is a language specific structure in the sense that if spellout of K_{num} had failed in (6), we would be forced to backtrack, reopen the two separate workspaces and merge K_{num} inside the AUX workspace, see (7).

(7)

K$_{num}$P
├── K$_{num}$ ── DAT
└── CardP ── five
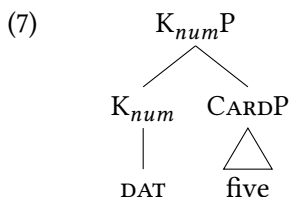
I propose that this is indeed a part of what happens in Russian, leading to the emergence of case on the numeral. The reason why the derivation in (6) fails in Russian is that this language has fusional case markers for number and case (as we shall see), and so the configuration in (6) fails to provide the right kind of foot. This leads the spellout procedure inevitably into trying (7) as the next derivational step.

If we do not have a lexical item large enough for (7), this will lead to spellout movements with the result that a dative marker is affixed to the numeral, as in (8).

(8)

K$_{num}$P
├── CardP ── five
└── ⟨ K$_{Num}$P ── -i
     ├── K$_{num}$ ── DAT
     └── ...
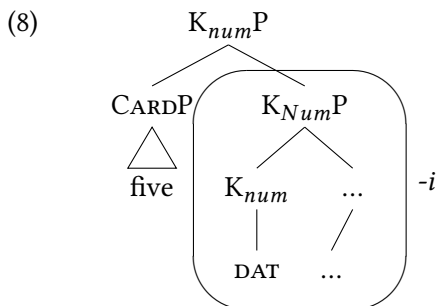
The picture in (8) is, for the moment, left vague. In particular, we know that a co-spellout between K$_{num}$ and some ingredient of CardP must take place. This, recall, is forced by the theory. If co-spellout in (8) did not take place, matching would have succeeded in the main spine (as it does in Ossetic). For the moment, I am, however, leaving the precise projection spelled out by *-i* vague, using just three dots instead.

Nevertheless, the fact that there is some such overlap becomes clear when we look more closely at the dative marker (*-i*) found on the numeral. In particular, it is identical to a dative marker found in the 3rd declension on feminine nouns like *tetrad'* 'notebook.' The table 7.1 brings this out.

What the table also shows – contrasting the singular and plural of the relevant declension – is that case in Russian is fusional, with case markers coding simultaneously minimally case and number (and sometimes also gender, though this

Table 7.1: The numeral 5 and a 3rd decl. FEM noun (Timberlake 2004)

	five	notebook, SG.	notebook, PL.
NOM	pjať-Ø	tetraď-Ø	tetraď-i
ACC	pjať-Ø	tetraď-Ø	tetraď-i
GEN	pjať-**i**	tetraď-**i**	tetraď-ej
LOC	pjať-**i**	tetraď-**i**	tetraď-ach
DAT	pjať-**i**	tetraď-**i**	tetraď-am
INS	pjať-**ju**	tetraď-**ju**	tetraď-ami

is not demonstrated). This can be concluded on the basis of the fact that there is not a single example where the singular and plural version of the same case could be decomposed into a separate number marker and a case marker, like, e.g., the Ossetic plural dative *-t-æn* can be split into *-t* (found in all plural cases) and *-æn* (found both in the dative singular and plural).

This means that the Russian suffixes are associated to constituents containing both # and case. Possibly, they also spell out some lower NP head CLASS, which ties the endings to a particular declension and/or gender. I will investigate this later; for the time being I conclude that there are reasons to think that a theory which predicts some degree of co-spellout between case and some functional head inside the Spec is – if not necessarily on the right track – definitely not far off the mark.

Realising this is important, because these independently established properties of markers allow us to predict (in an algorithmic fashion) that they are incompatible with the Ossetic phrasal case pattern in (6) and lead to backtracking. Backtracking leads to the detachment of the Spec, which in turn gives us case marking on the numeral. But this is old news.

The real news here is that Russian does not stop at that. In particular, it seems that when the numeral and the counted noun split due to backtracking, the dative feature is added *also* in the main spine, producing (9) as the output of merging the dative feature on top of the genitive of the counted noun.

(9)

```
                    K_{num}P
                   /        \
              K_{num}         K_N P
                 |           /      \
                 |         NP        K_N
                 |        /  \        |
                F4     table       GEN
```
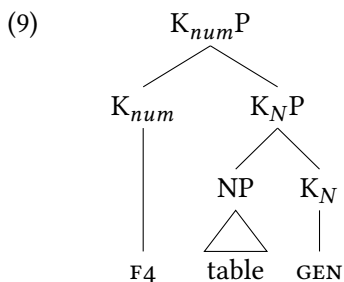
In (9), I am – for the moment – using a double standard compared to (7). In (7), I have simply merged the full DAT case to the CARD. In (9), I am adding only the extra feature that the dative has in addition to the genitive. These double standards will be removed in due course, the idea being that the lower features (F1, F2, etc.) will also be (cyclically) merged in the main spine (like F4 in (9)), but rejected one by one, because they will fail to co-spellout with the nominal.

However, once we get to (9) as the relevant stage of the derivation, co-spellout of the dative feature F4 and the main spine genitive will be successful. In particular, when we add the dative feature on top of a prior genitive, the noun will simply undergo Spec movement, and spell out the case feature of the numeral as if it was its own:

(10)

```
                    K_{Num}P
                   /        \
              NP              K_{num}P
             /  \            /       \
           table       K_{num}       K_N
                          |           |
                         F4          GEN
                              DAT
```
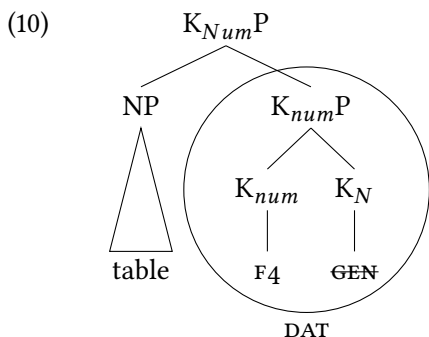
The details of the derivation will come in due course, but the main message is that in languages like Russian (where case is marked both on the numeral and on the counted noun), the inner genitive case is not 'eliminated' due to ellipsis. It is still marked by strike-through in (10), but its surface disappearance has a different rationale. In particular, while the actual morpheme disappears, its features are preserved, and spelled out jointly with case features originating as phrasal case features. In (10), we see this 'hybrid' nature of the dative on the subscripts inside the dative morpheme. Some features correspond to the internal case features of

the noun, these have the subscript K_N. The second part corresponds to the extra features of the full phrase, these have the subscript K_{num}.[3]

Even though this is a new account compared to ellipsis, the ingredients are old. Specifically, the way in which the genitive is replaced by the dative in (10) turns out to be nothing but an instance of Cyclic Override. Hence I will be calling this the 'override' account. Sometimes, I will also call this the 'co-spellout' account, to reflect the fact that the dative spells out case features of two different case stacks. Such co-spellout is possible when the phrasal case features 'naturally' extend the feature specification of the GEN to turn it into DAT, INS etc., which delivers the observation that the override of GEN happens only when the phrasal case contains GEN.

Once K_{num} is spelled out within each of the two workspaces, they are joined back together, as in (11). The result is the doubling of case: we have one case on the numeral, and the same case on the noun.

(11)
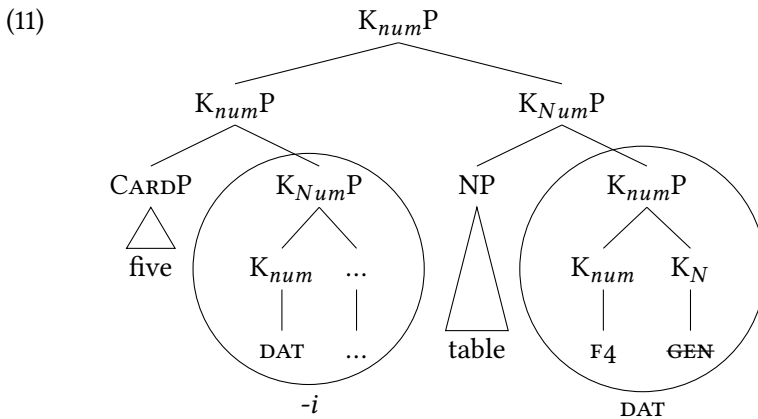
As a by-product, this account of double case also delivers the second difference between Ossetic and Russian, namely that the case which 'eliminates' the genitive is not the case of the numeral, but the noun's own dative.

The account thus captures both of the new properties, while adding only one new theoretical ingredient. The new ingredient is the idea that features (which fail to be spelled out in the main spine) are always merged in both workspaces that get reopened under backtracking. For ease of reference, I will call this idea Multiple Merge. The current chapter presents the Multiple Merge idea in more

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[3]A rather similar account of case attraction has been proposed by Bergsma (2019) for relative clauses. Her paper also builds on the idea that attraction in Gothic relative clauses arises as a consequence of merging 'surplus' case features onto a nominal that is already case marked.

detail and sets it against similar proposals in the literature. Ch. 8 then shows in detail how these idea apply to the Russian numerals ('five' and higher).

7.3 Multiple Merge and Concord

To see how Multiple Merge enriches the analytical options, it is best to first recall the type of derivations we have been investigating in Ch. 6. The basic setup was that when F does not spell out in the configuration (12) (even after complement movement), backtracking was triggered, detaching the projecting Spec XP from the main spine YP. When XP and YP split, we got a new configuration for the merger of F inside the AUX workspace, see (13-a). Here (as throughout Ch. 6), we merge F into the auxiliary space and try to co-spellout with the Spec.

(12) FP [F XP [XP YP ...]]   (13) a. FP [F XP ...]   b. FP [F YP ...]
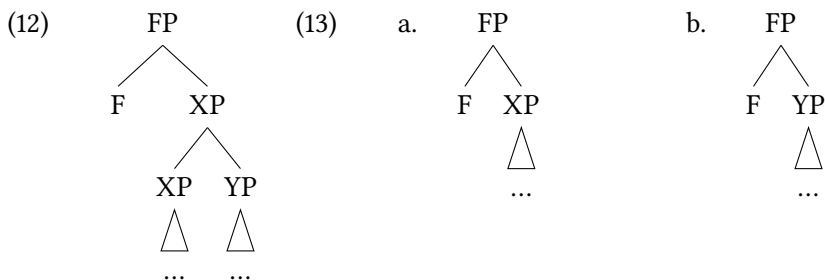
However, the discussion has (for simplicity) ignored the fact that there is one more workspace available where such a 'new' configuration can be obtained. In particular, merging F to the main spine also leads to a new configuration, as in (13-b). The hypothesis of Multiple Merge says that both options in (13) are tried. I state that in (14).

(14)   *Multiple Merge.* When backtracking reopens multiple workspaces, merge F in each such workspace.

It is not clear to me to what extent this represents an enrichment of the system introduced in Ch. 6, numbered point (73). In particular, when two derivational workspaces become available under backtracking, the derivation has to make some kind of a decision where to introduce F. Up to now, I have been claiming that F is merged in the AUX workspace only, but this is just one of three logical options (Merge F can be tried in both workspaces, in the AUX workspace only, or only in the main workspace). Which of the three options is tried probably requires some statement in any case, and so saying that Merge F is tried in both

workspaces is not an 'addition' to the theory we have had, but rather exchanging one logical possibility for a different one.

(15)   *Backtracking* (final)
          When spellout fails, go back to the previous cycle.
          a.   Try the next option for that cycle.
          b.   If (a) fails at the Spec stage, try to merge F on top of each workspace

Note further that Merging F in both workspaces still leaves it open as to where F is ultimately realised. I am assuming that the two workspaces are completely independent, and they each follow the very same procedure which applies also in cases where we are dealing with just a single workspace. So it could easily be the case that F spells out successfully only in one of the workspaces (failing in the other), or there is successful spellout of F in both workspaces. I will, in any event, assume that in order for the next round of external merge to proceed, spellout of F must succeed in at least one derivational workspace. (This is still just a consequence of 'Spell out FP after every Merge'). When spellout succeeds, the auxiliary workspace is closed again and new round of Merge F targets the root node. If spellout fails in both workspaces, then the derivation proceeds as it normally would: it returns to the point before F was merged, and an auxiliary workspace is opened to incorporate F (yielding, in case this is successful, yet another Spec to the phrase marker).

It is interesting to note that when spellout succeeds in both workspaces, Multiple Merge leads to the presence of F at multiple branches of a larger phrase. Interestingly, because of the recursive nature of the spellout procedure, features can appear even on branches that are relatively deep in the tree. To see that, suppose that main-spine YP in (14-b) is complex, and includes an additional left branch, as in (16). In this structure, the attempt to spell out F will lead to further backtracking (exactly as it did (12)). This leads to the separation of YP and ZP, see (17). Here, F is merged within each of these re-opened workspaces. (There is nothing new here compared to (14), we just play the same game one more time.)

(16)   FP   (17)   a.   FP   b.   FP
            /   \   /   \   /   \
          F   YP   Z   YP   F   ZP
                / \   △   △
              YP   ZP   …   …
              △   △
              …   …
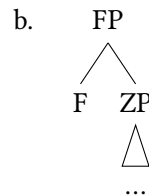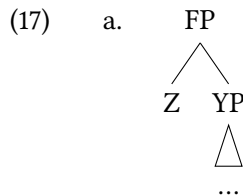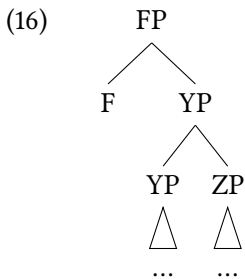
After the two branches in (17) successfully incorporate F (i.e., if F can co-spellout), they are integrated into (18) as required by Early Closure. (18) is then further integrated back with the XP of (13-a), yielding (19). The order of the phrases XP, YP and ZP is kept the same as before backtracking.[4]

(18)

```
            FP
          /    \
        FP      FP
       /  \    /  \
      F   YP  F   ZP
          △       △
         ...      ...
```

(19)

```
                FP
              /    \
            FP       FP
           /  \     /    \
          F   XP   FP      FP
              △   /  \    /  \
             ... F   YP  F   ZP
                     △       △
                    ...      ...
```
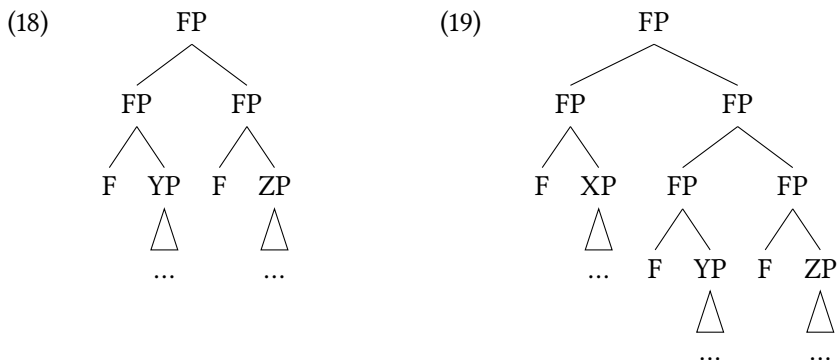
In effect, once we adopt the Multiple Merge proposal, we (abstractly) achieve the step-wise transformation of the configuration in (20) into the configuration in (21) (if the lexical items allow for co-spellout between F and the relevant phrase).

(20)

```
          FP
        /    \
       F      XP
            /    \
          XP      YP
          △      /  \
         ...   YP    ZP
               △     △
              ...   ...
```

(21)

```
                FP
              /    \
            FP       FP
           /  \     /    \
          F   YP   FP      FP
          △       /  \    /  \
         ...     F   XP  F   ZP
                     △       △
                    ...     ...
```
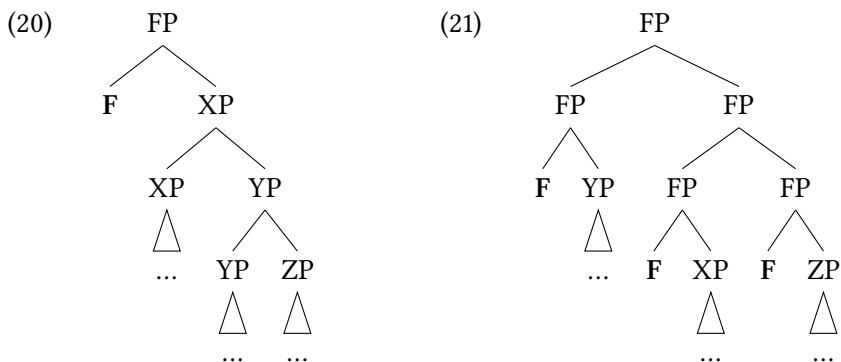
What we can conclude when we compare the pair of trees in (20) and (21) is

---

[4]Note that the order of the phrases does not seem to follow from the tree geometry, as far as I can tell. In principle, I am thus opening here the option that the original order Modifier > Head turns into Head > Modifier after the phrases are re-assembled. As to how serious the issue is (or whether it is an issue to begin with) depends very much on the theory of how we order modifiers and heads (Cinque 2005, Abels & Neeleman 2012, Medeiros 2018). I have too little to say about this at the moment, so I simply adopt the convention that whatever the order was before backtracking, the same order is reproduced (cf. Fox & Pesetsky 2005).

that a feature that originally scopes over a complex phrase in (20) is spelled out on each branch with a binary bottom.

In the 'real world,' structures such as (21) correspond to examples where a high category (say case) is expressed on multiple branches within the NP, as well as on the lexical head, a phenomenon known as concord. Consider, for instance, the derivation of the Russian numerical phrase. What I have proposed is that when the 'surplus' dative case feature is merged on top of the main spine, it undergoes a co-spellout with the genitive of the counted noun in the main spine. Suppose now that the constituent in the main spine is complex and includes an adjective in addition to the noun, see (22-a).

(22)   a.   [F4 [[beautiful-GEN] [tables-GEN]]]
        b.   [F4 [beautiful-GEN]]
        c.   [F4 [tables-GEN]]

In such case, we predict that the attempt to spell out the dative feature in the main spine will lead to further backtracking. This will lead to splitting (22-a) into two derivational workspaces, one belonging to the adjective and the other to the noun, see (22-b,c) respectively. The 'surplus' feature will be merged within each such workspace, and an attempt will be made to spell it out within each workspace. We have already gone through the derivation of (22-c) in (9), where we saw that the dative feature F4 can co-spellout with the genitive, replacing it by the dative due to cyclic override. The same happens in the adjectival spine of (22-b), yielding a dative marked adjective as the result. We therefore predict (or minimally can account for) the fact that the dative case will be reflected on both the adjective and the noun.

And this is indeed the case in Russian, as the pair of examples in (23) shows.

(23)   Russian (Pesetsky 2013: 2, simplified)

        a.   pjat'   krasiv-yx   stol-ov
            five.NOM beautiful-GEN.PL table-GEN.PL

        b.   pjať-i   krasiv-ym   stol-am
            five-DAT beautiful-DAT.PL table-DAT.PL
            'these last beautiful tables'

The transformation of a 'base structure' like the one in (20) to (21) is – in a way – just a special way of encoding what many believe that case concord looks like. For instance, in a rather early work on the topic, Nikanne (1993: 80) has proposed that semantic cases in Finnish are 'alternative realisations' of a semantically content-

ful, but phonologically empty high adpositional 'P' head (echoing Joe Emonds' 1987 proposal about English). This high P head scopes over the whole DP, like our F in (20), and it is silent. Under my approach, it is silent because it failed to spell-out in the main spine, and so it was reintroduced on the modifiers. In Nikanne's account, the silence of the high P is allowed by the presence of case markers on the noun and its modifiers (as in (21)), which serve to identify the content of the silent P. Similar ideas are echoed in work by McFadden (2004) Pesetsky (2013) Norris (2014), Norris (2018), den Dikken & Dékány (2018) and many others.

To see the parallel between the structures in (21) and other theories in more detail, consider, for instance, the proposal by Pesetsky (2013). In Pesetsky's work (cf. Bayırlı 2017), concord (along with case assignment) is implemented by the rule in (24).

(24) Feature Assignment (FA) (Pesetsky 2013: 8)
  a. Copying: When α merges with β, forming [$_\alpha$ α β], the grammatical features of α are immediately copied onto β, …
  b. Realization: … and are realized as morphology on all lexical items dominated by β.

It does not require much comment to see that the rule (24) is just a different formulation of the process that transforms (20) to (21). The α in (24-a) is like my F in (20). In the definition of (24-a), α merges with β, so β in (24-a) corresponds to the XP of (20). What (24-b) says is that α should be realized on all lexical items in β; in our case, the F in (20) is realized on every branch with a binary bottom inside XP. Since such phrases are roughly equivalent to the phrase 'lexical items' in (24-b), the definition in (24) enforces a similar type of distribution for F as the theory based on Multiple Merge (plus the general working of the spellout algorithm).

The most interesting feature of the current account is that unlike the various alternatives, it is compatible with representing case features as separate heads. This is important from the perspective of grammatical architecture. In particular, rules such as (24) presuppose that features can be copied 'onto' other categories, which entails that syntactic nodes are essentially bundles of features. The Nanosyntax model that I adopt here is build around the idea that feature bundles do not exist, and that they must be reinterpreted as regular binary syntactic constituents built out of the relevant features. The idea of Multiple Merge is what it takes to incorporate a rule like (24) in a system of this type.

An additional difference between the current system and statements such as (24) is that the realisation of F on each left branch is subject to cross-linguistic

variation, because each language has different lexical items. Therefore, merging F onto every branch – and attempting spellout – does not always lead to its actual realization on a given branch. Co-spellout may also fail, and this is what I turn to immediately below.

7.4 Multiple Merge and left-branch inflection

In particular, if the idea of Multiple Merge is correct, the question arises what to do about the examples I have been discussing in Ch. 6, where F was only present in the left branch. The idea is to derive these examples as a special case of the Multiple Merge scenario, namely one where F fails to spell out in the main spine.

For instance, recall from Ch. 6, numbered point (79), that when the dative feature F4 is added to the main projection line in Svinitsa, it cannot spellout.

(25)
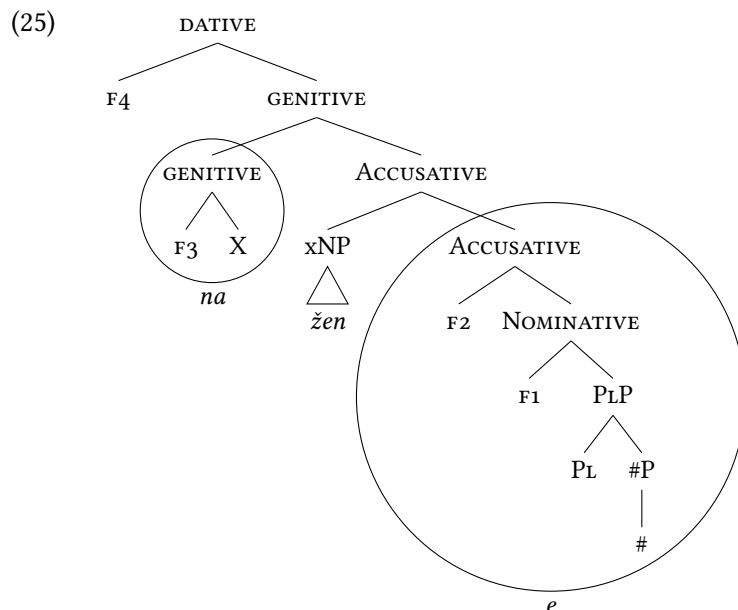
This leads to backtracking. The auxiliary workspace reopens, and provides a new possibility for merging F4 in a new configuration, see (26). This structure was perfectly matched by the entry for *na*, repeated in (27) from Ch. 6, numbered point (30-b).

(26)

```
          DAT
         /    \
       F4     GEN
             /   \
           F3     X
```

(27)

```
          DAT  ⟺  /na/
         /    \
       F4     GEN
             /   \
           F3     X
```
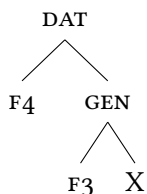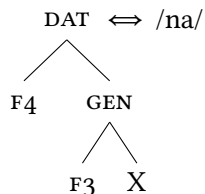
Originally, I claimed that Early AUX Closure applies after (26) spells out, which leads directly to (28).

(28)
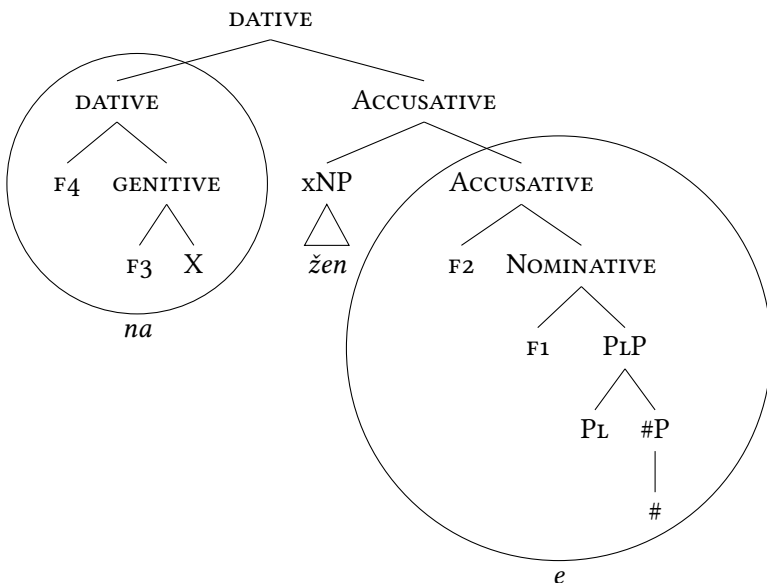
However, once Multiple Merge is in place, then before reintegrating the two workspaces, we need to merge F4 in the main spine as well, yielding (29). The derivation in (29) proceeds in parallel with the derivation in the AUX workspace, given in (26).

(29)

DATIVE
F4 ACCUSATIVE
xNP ACCUSATIVE
žen F2 NOMINATIVE
F1 PₗP
Pₗ #P
#
e
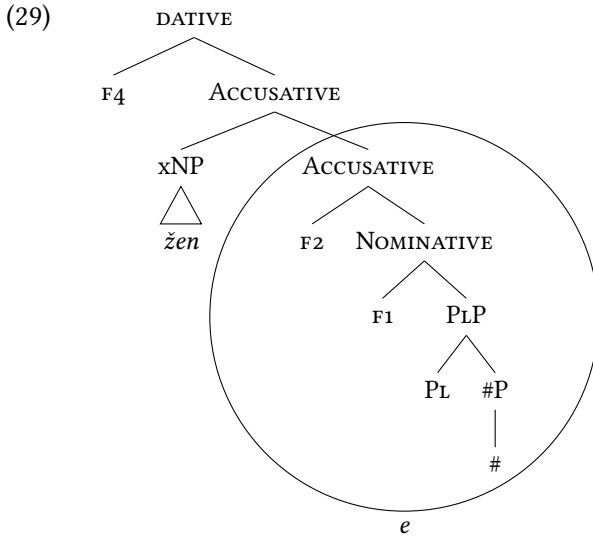
However, (29) fails to spell out. Spec movement of *žen* provides a slightly bizarre structure, where F4 comes on top of F2, which is not matched by anything. Complement movement would require an entry with F4 as the unary foot, but we know that there is no such entry, otherwise we would never backtrack into Spec from (25).

Spellout in (29) keeps failing even with backtracking. When this happens in a regular derivation, we should activate the Spec option. The Spec option tells us to remove F4 from (29) and build a Spec in an auxiliary workspace to incorporate the problematic feature F4. But we have already done this when we successfully spelled out F4 in the auxiliary workspace, recall (26). Therefore, instead of building yet another Spec that provides F4, the auxiliary workspace (which already includes F4) is simply merged with the main spine, providing F4 as a label. The result of the Svinitsa derivation is therefore the same even after Multiple Merge has been introduced.

An interesting set of examples which nicely illustrate the logic of Multiple Merge is provided by indeclinable nouns in Bosnian/Croatian/Serbian (BCS). To see what indeclinable names look like, consider the examples in (30). The focus is on the proper names *Larisa* and *Miki.*

(30) BCS (Pesetsky 2013: 130-1)

    a. Divim   se   moj-oj   { Laris-i   / Miki.}
        admire.1.SG REFL my-F.DAT.SG   Larisa-DAT / Miki
        'I admire my Larisa / Miki.'

b. Oduševljena   sam   moj-om   { Laris-om / Miki. }
impressed.FEM.SG AUX.1SG my-F.INS.SG Larisa-INS / Miki
'I am impressed by my Larisa / Miki.'

(30-a) is a dative environment, (30-b) an instrumental one. The instrumental is present both on the modifier 'my' and on the name *Larisa*. The noun *Miki* does not differentiate between the two environments, because it is indeclinable. Two analytical options arise.

The first option is that the noun *Miki* is lexically stored with a number of case projections, and it is therefore capable of spelling them out. If that was the case, then the relevant case projections would be spelled out in both workspaces, exactly as with the noun *Larisa*. The fact that *Miki* shows no case distinctions would then be a matter of syncretism.

The second option is that the noun is defective: it does not spell out case, and it is incapable of combining with the regular case markers (whatever the reason).[5] Therefore, it is incapable of expressing case. If the latter was the case, the acceptability of the indeclinable nouns in (30) would be directly caused by the fact that the case projections are spelled out on the left branch modifier. In this case, we predict that of the left branch was removed, ungrammaticality would arise.

The latter turns out to be the case for the relevant noun:

(31)   Serbian (Pesetsky 2013: 130)

a. Divim   se   Laris-i   / *Miki.
admire.1.SG REFL Larisa-DAT / Miki
'I admire Larisa / Miki.'
b. Oduševljena   sam   Laris-om   / *Miki.
impressed.FEM.SG AUX.1SG my-F.INS.SG   Miki
'I am impressed by Larisa / Miki.'

The data set (30) and (31) thus nicely illustrates the logic of Multiple Merge: case features are merged in both workspaces, and an attempt is made to spell them out in both workspaces. When spellout succeeds in both workspaces, the pattern of *Larisa* emerges. However, when the noun is *Miki*, case features cannot be spelled out in the main workspace, as (31) shows. However, it is enough if case features are successfully spelled out on the left branch.

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[5]One option would be that the noun lexicalises a constituent that is very small, and that the foot of the case endings is too high for this noun to reach, so that inevitably a non-lexicalised gap emerges in between the endings and the noun.

Similar facts have been reported for the genitive of bare plurals in German.[6] Bare plurals are in principle allowed in German, but in the genitive case, a bare plural is ungrammatical, see (32-a). The reason (as Bayer et al. 2001: 467 suggest) is that "no morphological lack of Case is tolerated at all in (post-nominal) genitival contexts." However, when the bare plural is preceded by an adjective (with the relevant case marker), the example improves to full grammaticality.

(32)   German (Bayer et al. 2001: 467)

    a.   *Benachteiligungen Frauen / Männer / Schotten
        discriminations   women / men   / Scots

    b.   Benachteiligungen andergläiubig-er Frauen / Männer / Schotten
        discriminations   heterodox-GEN women / men   / Scots

Generalising beyond the particular examples, we see that Multiple Merge does not necessarily lead to concord (and it is therefore not directly equivalent to a rule of concord). Rather, it is a general mechanism of introducing features in workspaces under backtracking, which leads to concord as a special instance of how such features can be realised. However, its effect on the surface form varies depending on where F gets successfully lexicalised, which in turn depends on the lexical resources of individual languages. So far, we have been looking at the two options in (33).

(33)   Two possible outcomes of Multiple Merge

    a.   F undergoes successful co-spellout in the auxiliary workspace only (= Left-branch inflection).

    b.   F undergoes successful co-spellout in both workspaces (= Concord).

Under both of these scenarios, the lexicalisation of F succeeds, the two workspaces are integrated due to Early Closure and the next round of Merge F can begin.

I take the greater variability of outcomes to be a good result not just for Russian numerical phrases (where we crucially need the option (33-b)), but overall. To give just one reason, recall that the number of languages where case appears on the left branch of an NP (instantiating (33-a)) is just 6 out of 954 in Dryer (2013). This is a rather small number; so while we need to allow for such derivations, we do not want them to be very prominent. The fact that the concord option in (33-b) now exists alongside the Left Branch option is therefore a good result, because

---

[6]Recall from Ch. 6, numbered example (45) that German is one of the languages where (at least some) cases are marked on the left branch, but not on the right branch (the cases actually differ on this).

that decreases the prominence of this option in the system.

What decreases the prominence of left-branch spellout even further is the fact that the two options in (33) are not the only two possible outcomes of Multiple Merge. Quite obviously, the full list will also include (34-a) and (34-b).

(34)   Two more outcomes of Multiple Merge
      a.   F undergoes successful co-spellout in the main space only.
          (= Head marking)
      b.   F does not undergo successful co-spellout in either workspace.
          (= New pre-marker)

In the next section, I shall explore the option (34-a).

7.5 Main-spine spellout and Bracketing Paradoxes

When considered in abstract terms, main-spine spellout has a good (functional) rationale, but intriguing consequences. The rationale is the following. For a language to be usable, the lexicon will usually contain resources to pronounce a noun – or in general, any lexical head – with the accompanying functional categories. So suppose we have a noun spelling out an xNP, as in (35). xNP, recall, is a stand-in for whatever it is that the nominal root spells out. On top of the root, we have the functional categories, F_1 and F_2.

(35)
F_2P
      F_2P F_1P
             F_1 xNP
                     …

(36)
F_2P
   xNP F_2P
     … F_2P F_1P
                    F_1
                   aff
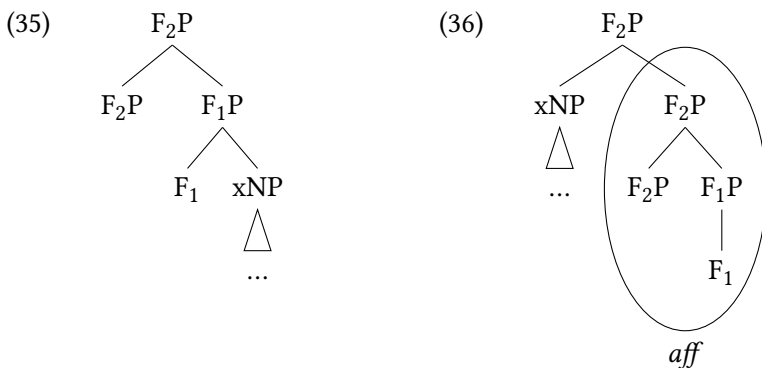
In this setup, it is customary that the noun evacuates to allow for a joint spellout of the functional categories, as in (36). This is what a prototypical derivation looks like.

Now imagine that a phrasal modifier is base-generated in between F_1 and F_2, as in (37). In such case, the strategy that was successful in (36) fails, as (38) shows.

The modifier (in bold) gets in the way of spellout.

(37)

F_2P
- F_2P
- ModP
  - ModP
    - …
  - F_1P
    - F_1
    - xNP
      - …

(38)

F_2P
- xNP
  - …
- F_2P
  - F_2P
  - ModP
    - **ModP**
      - …
    - F_1P
      - F_1

!!! spoiled match!!!
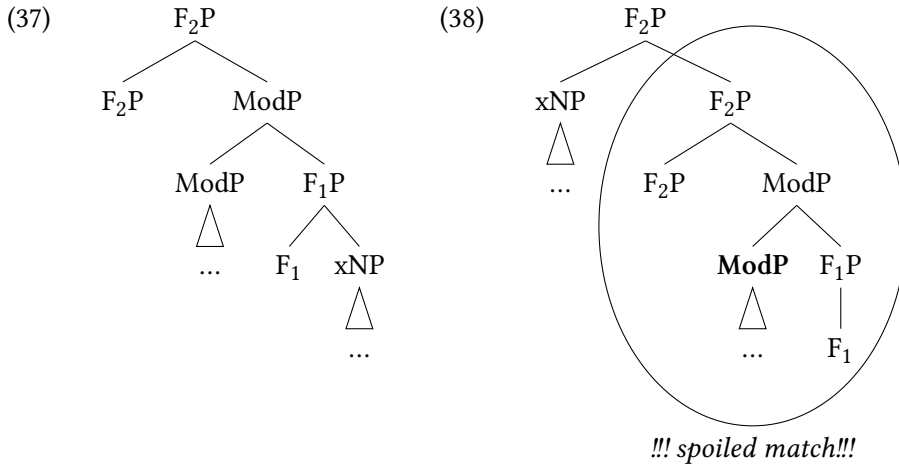
What Multiple Merge allows us to do is get the modifier out of spellout's way, so it can proceed as if the modifier was not there. How does it work?

Let me start by the stage of the derivation where F_1 is merged on top of xNP (xNP spelled out by the root). xNP moves out and F_1P undergoes successful spellout, see (39). Then the modifier is added as a left branch, followed by the merger of F_2, yielding (40):

(39)

F_1P
- xNP
  - …
- F_1P
  - F_1

aff

(40)

F_2P
- F_2P
- ModP
  - ModP
    - …
  - F_1P
    - xNP
      - …
    - F_1P
      - F_1

aff
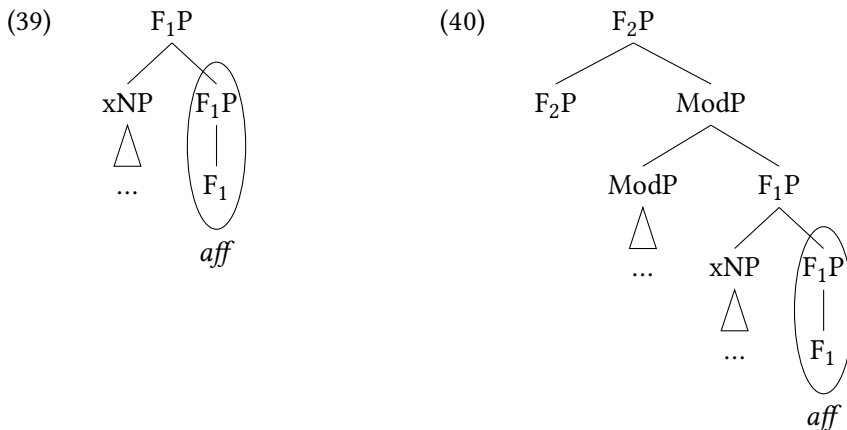
At this stage, Spec movement is unavailable, since the modifier is a projecting Spec. A complement movement is therefore tried, creating a constituent containing just F_2. If the language can spellout such a phrase, all is well and good, and no

backtracking will be needed. However, suppose that the language does not have such a lexical item. This means that all movements fail in (40) (as in (38)), and backtracking must be activated. This will lead to ModP and F_1P each becoming a derivational workspace of their own. The Mod is in (41), the main spine in (42). According to Multiple Merge, F_2 is added into each of the workspaces:

(41)

F_2P
- F_2
- ModP
  - …

(42)

F_2P
- F_2
- F_1P
  - xNP
    - …
  - (F_1P | F_1P)
    aff
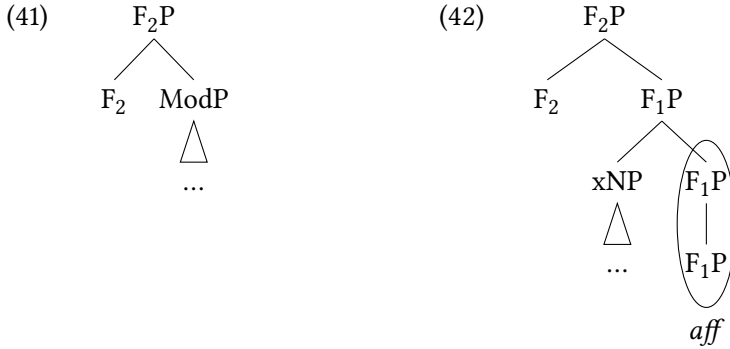
Disregarding the modifier, the main workspace in (42) will spell out fine. The reason is that when xNP moves out of F_2P, as in (43), we reach exactly the same configuration as in (36). (36) is a tree where we had no modifier. Therefore, the net effect of splitting the modifier off under backtracking will lead to the effect that the spellout of the main spine is undisturbed, and proceeds exactly as if there was no modifier.

(43)

F_2P
- xNP
  - …
- (F_2P → F_2P F_1P → F_1)
  aff

(44)

F_2P
- ModP
  - …
- F_2P
  - xNP
    - …
  - (F_2P → F_2P F_1P → F_1)
    aff
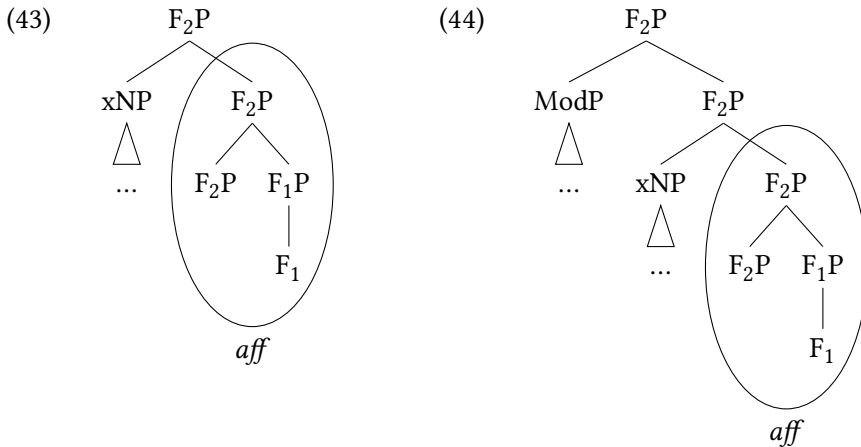
Suppose further that F_2 does not co-spellout successfully with the modifier. In the current case, this is no obstacle to satisfying 'Spell out FP,' because we have

incorporated F_2 into the main spine. Therefore, following Early Closure, the two workspaces can be integrated again, as in (44). The way the two workspaces are integrated is worth a comment. Their ordering stays the same as before back-tracking, we have Mod to the left of the main derivational space. However, the main space provides a label to the whole phrase, because in the *fseq*, F_2 is higher than Mod. As a result, a projecting modifier turns into a non-projecting one.

Let me now compare the stage of the derivation where F_2 is introduced above the modifier with its final point – when F_2 is successfully spelled out. The relevant stages are depicted in (45) and (46) respectively:

(45)

```
            F₂P
           /   \
        F₂P    ModP
              /    \
          ModP     F₁P
          / \      /  \
         ... xNP  (F₁P)
             / \    |
            ...     F₁
                    |
                   aff
```

(46)

```
            F₂P
           /   \
        ModP    F₂P
        / \    /    \
       ... xNP      F₂P
           / \     /   \
          ... (F₂P  F₁P)
                      |
                      F₁
                      |
                     aff
```
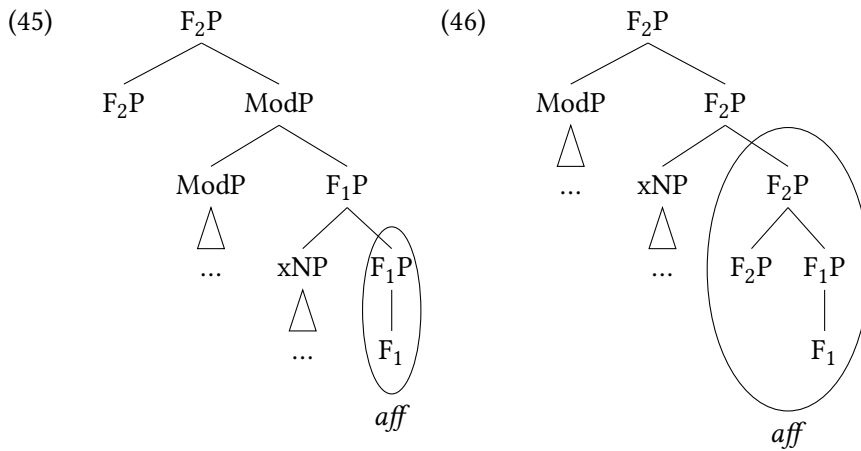
If we were to depict the derivation graphically within a single tree, with an arrow connecting the initial point (above the modifier) and the final point (below the modifier), the derivation would strongly resemble affix hopping, as when T is merged above an adverb, and lowers across an adverb down onto V):

(47)
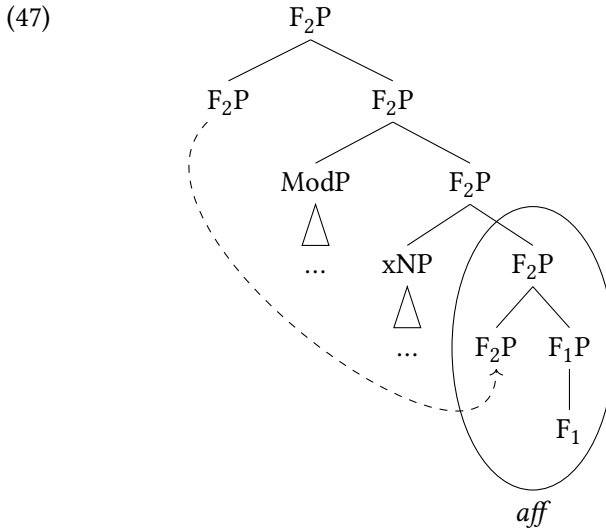
To make this a clean affix hopping scenario, we would need to assume (in addition) that F$_1$P spells out as Ø, and that the F$_2$P spells out as *-ed*.

Another case that may be thought of in similar terms is comparative formation. At least since [Pesetsky (1979)](#) it has been recognised that while the scope structure of forms like *un-happy-er* has *-er* scoping over *un-happy*, as in (48-a), the morphological structure has *-er* attaching to *happy*, as in (48-b).

(48)   a.   [-er [un [happy]]]
       b.   [un [happy - er]]

If this is the correct way to characterise the structure of these forms, the current system allows for their derivation using the derivational option described above. In particular, if *un-happy* is the wrong type of host for *-er*, then complement movement in (48-a) will fail. This leads to backtracking, where *un-* (a Spec) detaches from the main spine, and (following Multiple Merge) the comparative features are merged both to *un-* and to *happy*. They fail to spellout on *un-*, but succeed with *happy*, producing *happy-er*. The two workspaces are reintegrated, yielding (48-b).

Whether this type of derivation is actually the correct one for *un-happy-er* is an open question. In the next chapter, I will, however, argue that this type of derivation is attested for a class of numerals in Russian (in particular 'forty' and 'hundred'). I shall turn to this in the next chapter.

8 On defective numerals

Over the next three chapters, I am going to apply the general ideas described above to Russian numerals. In the current chapter, I will investigate numerals of the so-called first declension. These have a defective paradigm, and they fail to take on oblique case morphology. I analyse this in terms of failed spellout: oblique case features cannot be spelled out on these numerals no matter what rescue operations we perform. However, the whole derivation does not crash, and the reason for that is that the relevant case features are spelled out on the counted noun instead. The derivation therefore instantiates a case where features merged with the whole phrase spell out on the noun within the main spine, skipping the numeral; a bracketing paradox of sorts.

My goal will be to get as detailed as possible, providing concrete derivations for all the relevant numerals. In order to do so, we must get our hands 'dirty' with the basic facts of the Russian declension. The reason is that the relevant numerals have the same endings as nouns, with small differences to be discussed as we proceed.

The organisation of the chapter is as follows. I will first provide a general background on Russian declension classes and follow up on that with a detailed account of the first declension. Then I turn to the numerals belonging in this declension.

8.1 Russian declension

In introducing the relevant facts, I will follow here Timberlake (2004) and distinguish three main declension classes (I-III) with a bifurcation within the first declension (I_A and I_B).[1]

Example paradigms of the main declension patterns (labelled I-III) are in Table 8.1. Declension I is divided into two sub-types (labelled I_A and I_B), both are represented in the table. Their identical parts are shaded. The table takes note of

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[1]For a very helpful overview of various traditional approaches as to how the various paradigms should be grouped into declensions see Corbett (1982). The numbering of the patterns, which I adopt here, is one of those that are commonly assumed.

stress assignment. Stress is marked by the acute accent sign ′ over vowels, so e.g. *á* is a stressed *a*. Stress is distinctive in Russian.

Table 8.1: The three declensions ([Timberlake 2004])

	factory I_A (MASC)	place I_B (NEUT)	lip II (FEM)	notebook, III (FEM)
NOM	zavód-Ø	mést-o	gub-á	tetráď-Ø
ACC	zavód-Ø	mést-o	gub-ú	tetráď-Ø
GEN	zavód-a	mést-a	gub-ý	tetráď-i
LOC	zavód-e	mést-e	gub-é	tetráď-i
DAT	zavód-u	mést-u	gub-é	tetráď-i
INS	zavód-om	mést-om	gub-ój	tetráď-ju

The two subtypes of the 1st declension (I_A and I_B) are mostly populated by masculine and neuter nouns respectively. The second and third declension contain mainly feminine nouns. All these statements have some exceptions and I shall introduce them in due course.

The corresponding plural paradigms are in Table 8.2.

Table 8.2: The three declensions, plural ([Timberlake 2004])

	factory I_A (MASC)	place I_B (NEUT)	lip II (FEM)	notebook, III (FEM)
NOM	zavód-y	mest-á	gúb-y	tetráď-i
ACC	zavód-y	mest-á	gúb-y	tetráď-i
GEN	zavód-ov	mést-Ø	gúb-Ø	tetráď-ej
LOC	zavód-ax	mest-áx	gub-áx	tetráď-ax
DAT	zavód-am	mest-ám	gub-ám	tetráď-am
INS	zavód-ami	mest-ámi	gub-ámi	tetráď-ami

What we can see is that the endings are the same for all declensions from the LOC case on. What I also highlight in the table is the overlap between the declension I_B and II in the genitive plural (both with Ø). The homophony between the nominative plural *y* of the declensions I_A and II will be treated as accidental, since they interact with stress placement in different ways. Since stress must be to a large extent lexically coded, this gives grounds to treat these endings as

lexically different (Melvold 1989).

Let me now turn to the numerals. The relevant numerals (whose complement undergoes case overriding) inflect mostly like nouns in the singular. However, numerals of each declension show specific quirks; in fact, none of the relevant numerals inflects exactly like the corresponding noun. The biggest difference lies in the fact that some inflectional endings are incompatible with numerals that show the type of syntax (case attraction) that I am concerned with here.

To present the facts in a compact form, let me turn to Table 8.3. The table gives the full set of nominal endings. The endings that combine with numerals are in the cells without any shading. Endings that do not combine with the numerals are in the shaded cells. To indicate what happens when the expected ending refuses to combine with the numeral, the bracket in the shaded cells contains the ending that the numeral actually has when appearing in the relevant case environment.

Table 8.3: The three declensions (Timberlake 2004)

	I$_A$ (MASC)		I$_B$ (NEUT)		II (FEM)	III (FEM)
NOM	-Ø		-o		-a	-Ø
ACC	-Ø		-o		-u	-Ø
GEN	-a		-a		-y	-i
LOC	-e	(-a)	-e	(-a)	-e	-i
DAT	-u	(-a)	-u	(-a)	-e	-i
INS	-om	(-a)	-om	(-a)	-oj	(-ju)	-ju

The distribution of the unavailable endings does not seem random. Within each 'defective' paradigm, there is a division line such that below that line the endings are unavailable, while above that line, the endings are allowed.[2]

The 'repair' ending chosen does not seem completely random either. In particular, the relevant ending is always drawn from an adjacent cell in the table. The 1st declension endings are supplied by the genitive *-a*, which is found above

---

[2]The numerals of the 3rd declension take the same endings as nouns, but show a difference in stress placement in the instrumental. I have looked at some of the accounts of stress placement in Russian (Halle 1973, Melvold 1989) in order to see if this requires me to posit a difference between the endings of the numerical paradigm and the nominal paradigm. The conclusion I reached is that one can explain this by proposing that numerals have post-accented roots (in the terminology of Melvold 1989), while nouns do not. This assumption alone explains the difference in stress placement, and so I do not enter into a lengthy discussion of possible morphosyntactic consequences.

the shaded cells. In the 2nd declension instrumental, a 3rd declension ending *-ju* is used instead. The goal of this chapter is to find out what is going on with the numerals of the 1st declension. I will argue that their behaviour can be explained by an analysis (introduced already for Ossetic) where a feature specific for the numerals (Card) appears between the xNP number and the # projection, which makes spellout of case impossible on the numeral.

8.2 The internal structure of the noun

In order to deliver on these promises, I will assume that nouns in Russian contain a specific set of functional projections. The bottom layer will consist of a constituent that I shall label the xNP, topped of with the feature ref. We have already seen the ref feature in the discussion of pronouns (Ch. 4, numbered item (55)). Here it corresponds to the referential base of the pronoun to which person features are added. Nouns (on this approach) will be like pronouns in containing ref, and they will differ in having the xNP component in addition.

On top of the ref feature, I distinguish two genders, feminine and non-feminine. Masculine and neuter nouns will contain simply a class node, while feminine nouns will have an extra projection fem (cf. Ж in Pesetsky 2013). On top of the gender features, # and K are added in that order. The full structure of feminine nouns I will be assuming is thus as in (1), non-feminine nouns are in (2).

(1) KP / (2) KP
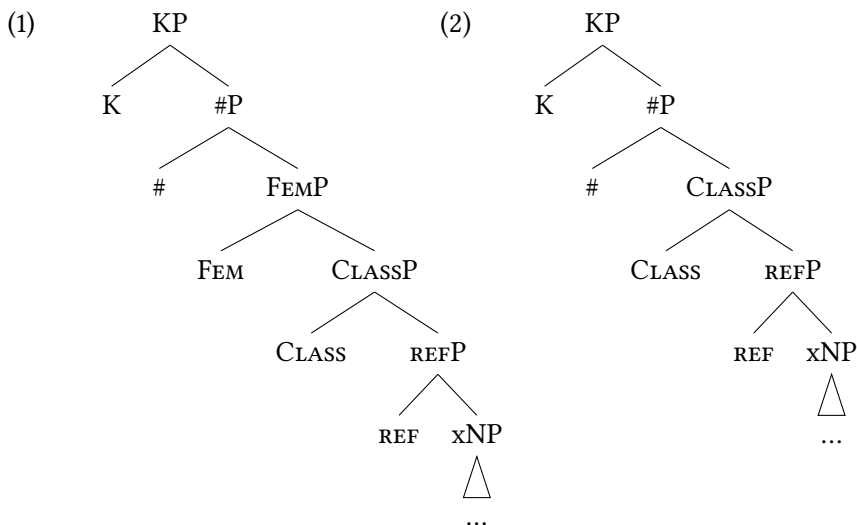
The structures represent the singular number, the plural number has an addi-

tional PL head in between # and K.

The features used in (1) are a subset of the features proposed in Harley & Ritter (2002) for pronominal systems. The proposal by Harley & Ritter (2002) is depicted in (3). The subset of features that are re-used in my proposal are in large caps. I do not add any features on top of what Harley & Ritter (2002) propose.

(3)

```
                                REF
          ┌──────────────────────┼──────────────────────┐
    PARTICIPANT          INDIVIDUATION = #             CLASS
       ┌───┴───┐            ┌───────┴────┐           ┌────┴────┐
     SPKR    ADDR      GROUP = PL      MIN         ANIM      INAN
                                        │         ┌──┴──┐
                                       AUG      MASC    FEM
```
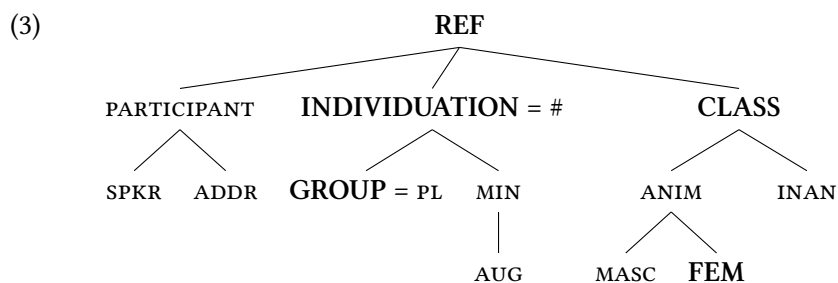
The reason why I only use a subset of these features is because I am primarily interested in numerals and their relationship to nouns. Numerals (just like nouns) are of the 3rd person, so I have little use for the PARTICIPANT part of the tree (3). I label the INDIVIDUATION node for #, and call the GROUP feature for PL. I do not use MIN and AUG as these are not relevant for the domain I look at. I note this here to make it clear that my goal is not to revise or reduce the number of the features proposed in Harley & Ritter (2002); I simply take a relevant subset of them. The reason for using pronominal features for nouns is based on the assumption that nouns contain essentially the same features as pronouns – plus they also have descriptive content (xNP).

The only major difference compared to Harley's and Ritter's proposal is that following Vanden Wyngaerd (2018), I structure the features in a binary branching syntactic tree. This is in line with the general Nanosyntax approach, where multiple features cannot reside in a single terminal (as they do on Harley's and Ritter's approach). They must be assembled by merge, and they must therefore exhibit all the hallmarks of syntactic structures (binary branching). This is what the proposal in (1) achieves.

However, the hierarchy in (1) bears a clear relationship to the feature hierarchy in (3). In particular, every dominance relation in the tree proposed by Harley and Ritter (e.g., CLASS dominates FEM) is represented in (1) in the reverse (FEMP dominates ClassP). This reversal is purely formal, and maintains in fact the spirit of the proposal by Harley and Ritter; in their tree, FEM is an elaboration of CLASS and presupposes its presence. In order to preserve this insight in a regular binary branching tree, I must say that FEM can only come after CLASS.

The second crucial ingredient of my analysis will be phrasal spellout. In particular, I will model the declensional differences within the class of feminine nouns as arising from nothing else but the size of the root's lexical entry (following an approach outlined in Caha et al. 2019b, cf. Holaj 2018, Janků & Starke 2019, Vanden Wyngaerd et al. 2019). On this approach, the feminine declensions II and III will have the same functional sequence, but the size of the root will differ. 3rd declension nouns (*tetráď*) will be lexically stored with a large root, as in (4). 2nd declension nouns will only spell out xNP, as in (5). Note that the trees are simplified (they lack the REF and the CLASS node).

(4)
(5)
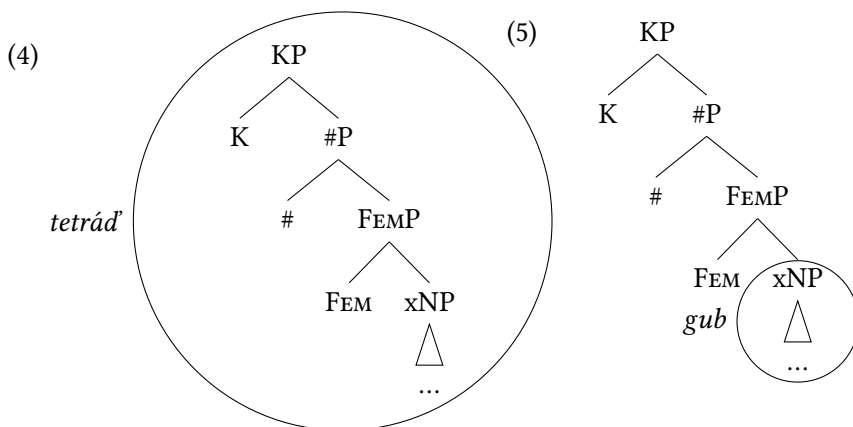
Note that the bi-furcation rather straightforwardly reflects the status of NOM.SG, which has no ending for *tetráď* 'notebook,' but needs an *-a* for *gub-á* 'lip.'

An analogous difference will cut across non-feminine nouns, as in (6) and (7). Once again, *zavód* 'factory' in (6) needs no ending in the NOM, *mést-o* 'place' needs one.

(6)
(7)
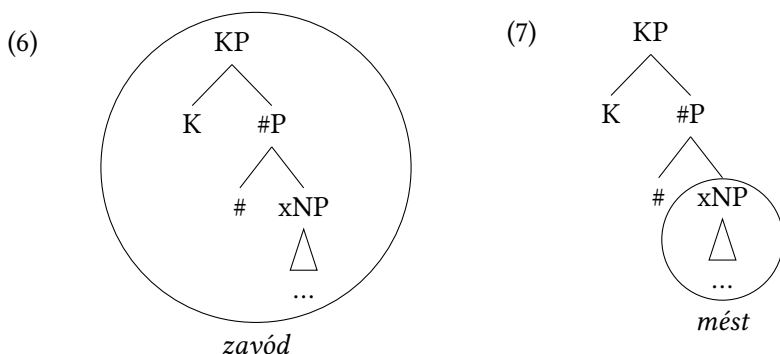
The reason why this analysis is attractive is that it completely removes from our grammar any reference to language-particular objects (declension classes), and replaces them by a system that only uses a constrained set of universally available features, namely those uncovered by the cross-linguistic study of pronominal systems (Harley & Ritter 2002).

The system to be proposed also completely dispenses with contextual specification of the endings, and derives their distribution by simply associating each ending to a well-formed syntactic tree. Crucially, the system will also be able to account for the fact that some of these endings fail to combine with numerals.

With the basic outline in place, let me turn to the details.

8.3 The first declesnion

The goal of this section is to present a detailed analysis of the 1st declension, focussing on the division of labour between the noun and the ending.

I start by noting that Declension I contains only masculine and neuter nouns. There are no clearly feminine nouns in the declension, though this statement requires some comment. In particular, there is a special class of nouns denoting professions like, e.g., *vrač* 'doctor.' When referring to a male doctor, these nouns trigger only masculine agreement. When referring to a female doctor, these nouns may trigger both masculine and feminine agreement, as discussed recently in detail by Pesetsky (2013).

Such a behaviour is illustrated here by the data in (8). In all of these examples, the noun refers to a female doctor. What the data shows is that with a female referent, the noun *vrač* 'doctor' may trigger 'formal' – masculine – agreement (as in (8-a)), or it can show feminine concords based on its 'sense.' The feminine concord markers show up either on the verb, see (8-b), or both on the verb and the adjective, see (8-d). The fourth logical option is impossible, see (8-c).

(8)   Russian (Pesetsky 2013: 36)

    a.   Nov-yj   vrač-Ø   prišël-Ø.
           new-M.NOM.SG doctor-NOM.SG arrived-M.SG

    b.   Nov-yj   vrač-Ø   prišl-a.
           new-M.NOM.SG doctor-NOM.SG arrived-F.SG

    c.   *Nov-aja   vrač-Ø   prišël-Ø.
           new-F.NOM.SG doctor-NOM.SG arrived-M.SG

    d.   Nov-aja   vrač-Ø   prišl-a.
           new-F.NOM.SG doctor-NOM.SG arrived-F.SG

I will adopt here a (perhaps simplistic) approach and treat *vrač* – on the basis of examples like (8-a) – as a grammatically masculine noun, namely one which lacks the feature FEM. This means that when FEM shows on the modifiers, I will treat this as agreement by 'sense,' where the FEM feature is present only on the modifier, but not (simultaneously) on the head noun. The conclusion I shall draw from this is that the nouns of the 1st declension lack the feature FEM in their *fseq*, and the lexical entries I shall propose will reflect this.

With this issue clarified, let me start investigating the formal patterns of the 1st declension. As we already know, the declension is usually described as split into two sub-types, called I_A and I_B in Timberlake (2004). Two typical representatives are shown in the first two columns of the table 8.4.

Table 8.4: The 1st declension (Timberlake 2004)

	factory I_A (MASC)	place I_B (NEUT)	house-DIM, I_B (MASC)
NOM	zavód-Ø	mést-o	dom-íšk-o
ACC	zavód-Ø	mést-o	dom-íšk-o
GEN	zavód-a	mést-a	dom-íšk-a
LOC	zavód-e	mést-e	dom-íšk-e
DAT	zavód-u	mést-u	dom-íšk-u
INS	zavód-om	mést-om	dom-íšk-om

The difference between the two nouns is twofold. First, there is a formal difference in the NOM/ACC.SG, where the noun *mést-o* 'place' has an *-o*, while the noun *zavód* 'factory' has *-Ø*. The second difference is that *mést-o* 'place' is neuter, and *zavód-Ø* is masculine.

It could be tempting to interpret this in a way that *-o* spells out some specifically NEUT feature, but this would be problematic in the long run. The reason is that there exist derived MASC nouns with *-o* in NOM; one type of such nouns – the so-called pejorative diminutive – is shown in the last column. The conclusion is that if we linked *-o* to neuter gender only, we would then encounter problems if we wanted to account for such nouns.

Gender neutrality (between MASC and NEUT) is also characteristic also for the oblique endings – marked by light gray shade. Therefore, the evidence that the endings of the 1st declension spell out some specifically masculine or neuter gender features is not very strong. I therefore conflate masculine and neuter nouns into one group and attribute to them the same *fseq*. Nouns of the feminine gender

need, however, a different *fseq*.

Turning now to number, consider the data in Table 8.5. The table shows the singular and plural of the declensions I$_A$ and I$_B$ side by side.

Table 8.5: The 1st declension: SG. and PL. (Timberlake 2004)

	factory I$_A$ (SG)	factory I$_A$ (PL)	place I$_B$ (SG)	place I$_B$ (PL)
NOM	zavód-Ø	zavód-y	mést-o	mest-á
ACC	zavód-Ø	zavód-y	mést-o	mest-á
GEN	zavód-a	zavód-ov	mést-a	mest-Ø
LOC	zavód-e	zavód-ax	mést-e	mest-áx
DAT	zavód-u	zavód-am	mést-u	mest-ám
INS	zavód-om	zavód-ami	mést-om	mest-ámi

As I have already remarked earlier, there is a clear contrast with Ossetic here in that not a single cell can be straightforwardly decomposed into a case marker – common between the singular and plural – and an invariant number marker. I will therefore treat the singular as well as the plural case markers as portmanteaus for # and case.[3]

Let me now turn to the lexical entries of the actual endings. Recall first the functional sequence of masculine and neuter nouns proposed in the preceding section, repeated for convenience in (9).

---

[3]It is likely that the endings *-ax, -am* and *-ami* should be decomposed into a nominal augment *-a* and a case/number portmanteau *-x, -m, -mi*. The reason for splitting the endings into *-a* and *-x/-m/-mi* is that the invariant endings *-x, -m, -mi* are preceded by a different augment in the adjectival/pronominal declensions.

Note, however, that the vowel *-a* or the other vowels should be analysed as plural markers, because in the adjectival/pronominal paradigms in particular, the same vowel appears as an augment also in the singular (prototypically in the instrumental singular). See Halle & Matushansky (2006) for an analysis along similar lines.

In what follows, I shall not segment the plural endings.

(9)

```
              KP
           ╱      ╲
          K        #P
                ╱      ╲
               #      CLASSP
                    ╱      ╲
                CLASS      REFP
                         ╱     ╲
                       REF     xNP
                                △
                                …
```
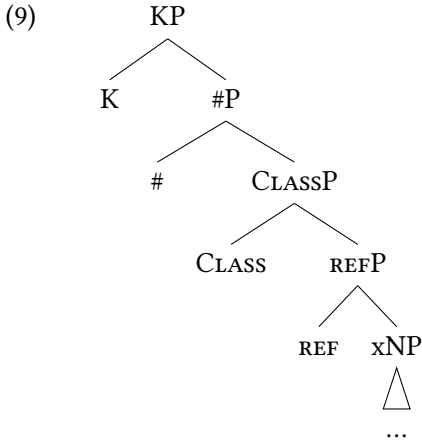
As discussed in Chapter 1, the Russian syncretism sequence is NOM–ACC–GEN–LOC–DAT–INS. I will be using cumulative decomposition to capture this, and the K projection will therefore be split into individual case features, each feature a head.

With these assumptions in place, let me turn to the I_B declension of *mést-o* 'place.' The simplest analysis of this paradigm (to be modified) is that the the noun spells out REFP, and the case markers spell out the remaining projections. This means that each ending spells out the relevant number of case features along with # and CLASS. Such lexical entries are given in (10)-(14). I present them in an order where their complexity decreases, starting with the INS in (10) and gradually moving towards the ACC/NOM -*o* in (14).

(10) INS ⟺ -*om*

```
         INS
       ╱      ╲
      F6       …
            ╱     ╲
           …      NOM
                ╱     ╲
               F1      #P
                     ╱    ╲
                    #    CLASSP
                         ╱
                      CLASS
```

(11) DAT ⟺ -*u*

```
         DAT
       ╱      ╲
      F5       …
            ╱     ╲
           …      NOM
                ╱     ╲
               F1      #P
                     ╱    ╲
                    #    CLASSP
                         ╱
                      CLASS
```

(12) LOC ⟺ -e   (13) GEN ⟺ -a   (14) ACC ⟺ -o

```
(12)      LOC ⟺ -e
         /        \
       F4         ...
                 /    \
               ...    NOM
                     /    \
                   F1     #P
                         /    \
                        #    CLASSP
                               \
                              CLASS
```

```
(13)      GEN ⟺ -a
         /        \
       F3         ...
                 /    \
               ...    NOM
                     /    \
                   F1     #P
                         /    \
                        #    CLASSP
                               \
                              CLASS
```

```
(14)      ACC ⟺ -o
         /        \
       F2         NOM
                 /    \
               F1     #P
                     /    \
                    #    CLASSP
                           \
                          CLASS
```
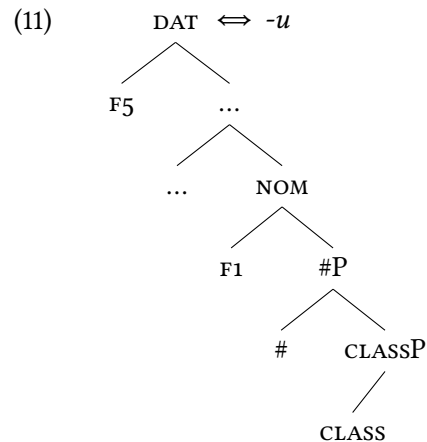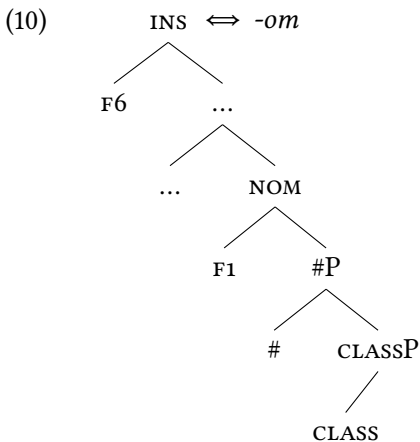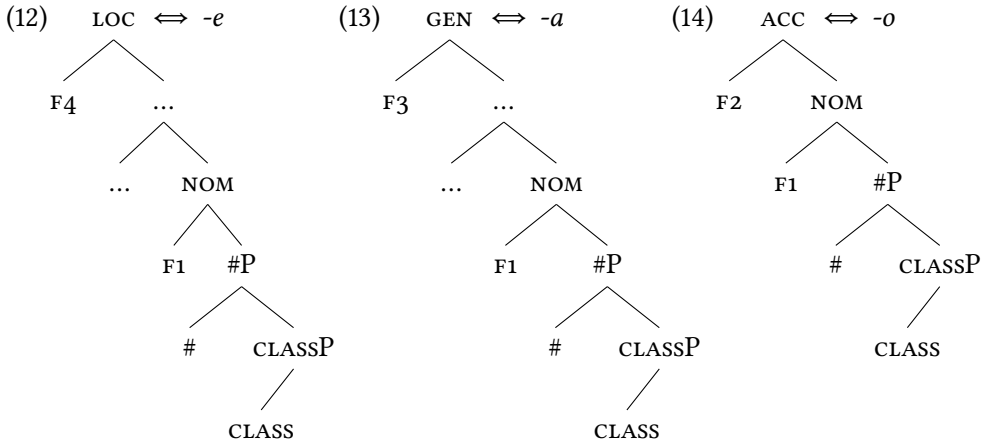
Due to a specification like this, the endings are effectively tied to the masculine/neuter gender and the singular number. The reason why these endings are incompatible with feminine nouns is that they cannot be inserted in the feminine *fseq*, which contains the FEM feature in between CLASS and #. Bacuse of the Superset Principle, these endings will never match such a constituent.

Similarly, since the plural *fseq* contains the plural head PL between # and the lowest case feature F1, these endings are useless in the plural.

The endings trigger the successive cyclic movement of the complement of CLASS – spelled out as *mést* – to the very top of the case sequence, yielding the correct form for each case, with the GEN *-a* overriding *-o*, etc.

As the analyses of additional declension types will become increasingly more complex, let me adopt here a graphical way of keeping track of the derivations in the form of the so-called lexicalisation table. A lexicalisation table for the neuter noun *mést-o* 'palce' is shown below in 8.6.

Table 8.6: The lexicalisation table of *mést-o* (to be modified)

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM	mést			o						
ACC	mést				o					
GEN	mést					a				
LOC	mést						e			
DAT	mést							u		
INS	mést								om	

On the first line, the table lists the projections that need to be lexicalised in the course of cyclic spellout. Each line below the table's header corresponds to one particular case. Each case includes the nominal core (= xNP). On top of the xNP, there are the REF, CLASS and # projections. Above #, each case has a different number of case features, with their number monotonically growing (the essence of cumulative decomposition). The root *mést* 'place' is placed under the projection it spells out (xNP+REF), and the extent of its lexicalisation is shaded in a dark shade. The endings are similarly placed under the projections they spell out, their lexicalisation extent marked in a lighter shade.

Let me now turn to the issue of how to distinguish the two classes of nouns within the 1st declension (i.e., those that take -Ø and those that take -*o*). One way to achieve this is to propose that nominal roots come in various sizes. Specifically, the root of *mést-o* 'place' will correspond to REFP, see (15), but the root of *zavód-Ø* will spell out all the features of the singular ACC, as in (16).

(15) REFP ⟺ /*mést*/
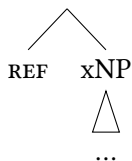
(16) ACC ⟺ /*zavód*/
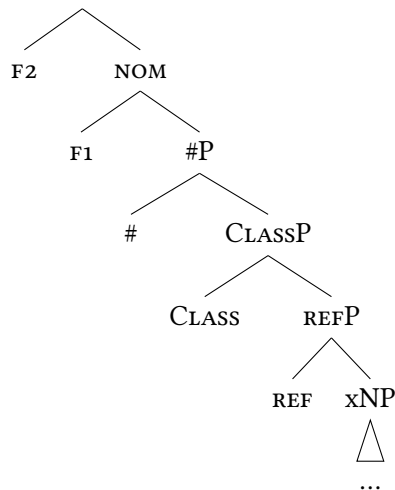
The entry in (16) will lead to a derivation where all the features up to F2 spell out without any movement as a part of the nominal root. But as soon as the GEN feature F3 is merged on top of a noun like *zavód* 'factory,' there will be no lexical entry that spells out just F3. Therefore, nouns like *zavód* will need to backtrack down to REFP, attain the same size as nouns of the *mést-o* 'place' paradigm, and the genitive -*a* will emerge. The basic mechanics for this type of derivation have been described in Ch. 4, Sec. 4.5. The lexicalisation table in 8.7 shows the result of such derivations.

Table 8.7: The lexicalisation table of *zavód* (to be modified)

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM			zavód							
ACC			zavód							
GEN	zavód				a					
LOC	zavód				e					
DAT	zavód					u				
INS	zavód					om				

With the basic analysis in place, let me address the issue of the declension of the pejorative diminutive. The relevant nouns have a base of a masculine gender, which would 'normally' inflect like *zavód*. For example, the noun *dóm* 'house' would have a nominative structure as in (17), where the whole nominative constituent is spelled out by the noun root.

(17)

dóm
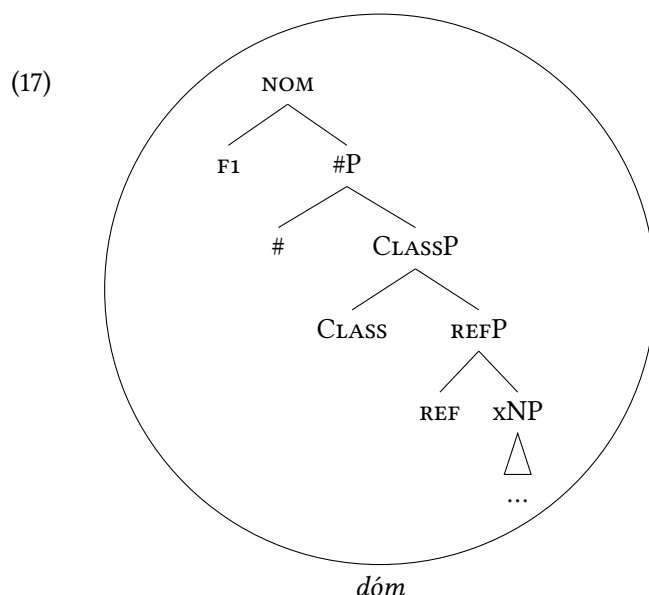
However, when the pejorative diminutive suffix *-íšk* is added to such a noun, it starts inflecting like a noun of the declension I$_B$, i.e., *dom-íšk-o*, while keeping its masculine gender. The way I will model this is by proposing that the locus of the diminutive projection is between REFP and CLASSP, as shown in (18).

(18)

```
                    NOM
                   /    \
                  F1    #P
                       /   \
                      #    CLASSP
                          /     \
                       CLASS    DIMP
                               /    \
                             DIM    REFP
                                   /    \
                                 REF    xNP
                                         △
                                         …
```
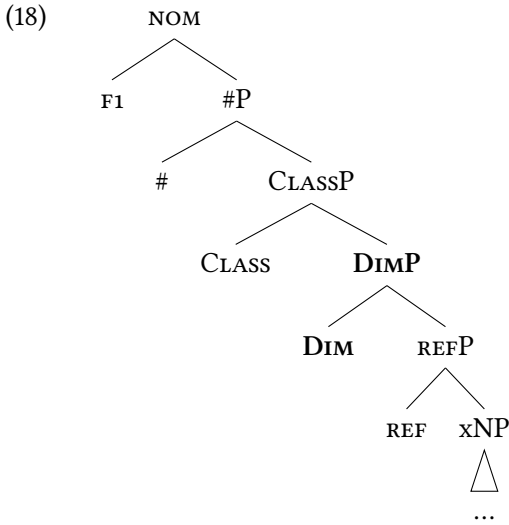
What will happen when such a structure undergoes spellout is that the masculine nouns (which normally spell out the full NOM) will need to shrink to REFP, because they do not match DIM. DIM is spelled out by the diminutive *-íšk*, and then case markers with the CLASSP foot must be added, see (19).

(19)

```
                          NOM
                        /      \
                    DIMP        NOM
                   /    \      /    \
               REFP    DIMP  F1    #P
                △       |         /   \
               dom     DIM       #    CLASSP
                                         |
                       íšk              CLASS

                                         o
```
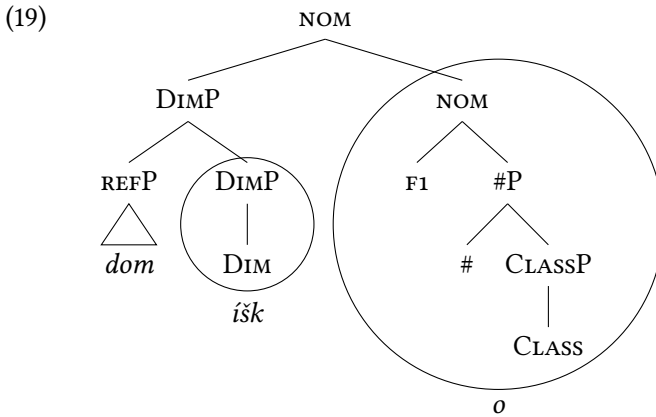
Note that the derivation in (19) yields the same gender of the noun *dóm* 'house' as the derivation in (17), because (19) has the same features as (17) (except DIM, of course). The reason why we can capture the sameness of gender is because the case marker *-o* has no NEUT gender feature; *-o* simply appears when the noun does not spell out the NOM/ACC features on its own.

I depict the distinction between regular nouns of the declension I$_A$ and their

(pejorative) diminutive counterparts in Table 8.8.

Table 8.8: The lexicalisation table of *dóm*/*dom-íšk-o* (to be modified)

	xNP	REF		CLASS	#	F1	F2	F3	F4	F5	F6
NOM		dom									
ACC		dom									
GEN		dom			a						
LOC		dom				e					
DAT		dom				u					
INS		dom					om				

	xNP	REF	DIM	CLASS	#	F1	F2	F3	F4	F5	F6
NOM	dom		íšk		o						
ACC	dom		íšk		o						
GEN	dom		íšk		a						
LOC	dom		íšk			e					
DAT	dom		íšk			u					
INS	dom		íšk				om				

What we see in the upper part of the table is that when there is no diminutive, the root *dóm* can reach all the way to F2, and no case marker is needed.

In the lower part of the table, which depicts the pejorative diminutive form, we see that the DIM projection intervenes between the REFP and CLASS. The root, therefore, cannot extend to F2, and the *-o* marker must be used.

A similar type of an intervention effect can be observed in the paradigm of the cardinal numerals belonging in this declension. I turn to this immediately.

8.4 Numerals of the 1st declension: 40, 100, million

The first declension contains two kinds of numerals. The first kind is represented by high numerals like 'million' or 'billion,' with a representative example in the second column of Table 8.9. The numeral is placed next to the 1st declension noun 'factory,' so that the identity of the endings can be observed.

Table 8.9: The numeral million (Timberlake 2004)

	factory	million
NOM	zavód-**Ø**	million-**Ø**
ACC	zavód-**Ø**	million-**Ø**
GEN	zavód-**a**	million-**a**
LOC	zavód-**e**	million-**e**
DAT	zavód-**u**	million-**u**
INS	zavód-**om**	million-**om**

What sets these very high numerals aside as a special type is the fact that their complement remains in the genitive plural throughout the paradigm, see (20). In particular, (20-a) is a dative case environment, where the complement of a numeral like *pjat'* 'five' would have to be in the dative, recall (1) in Ch. 7. However, the counted noun stays in the genitive after 'million.'

(20)   Russian (Timberlake 2004: 189)

    a.   Ja spustilsja po krajnej mere po   million-u   lestnic-Ø
          I   descended at least   DISTR million.DAT stairs-GEN.PL
          'I have descended at least a million stairs.'

    b.   IBM proektyruet kompjuter s   million-om processor-ov
          IBM envisions   a computer with million-INS processors-GEN.PL

Similarly, (20-b) is an instrumental case environment, where we would expect case overriding to be possible. But with numerals like 'million,' the counted noun stays in the genitive.

Given that these high numerals inflect like nouns and their complement is genitive throughout (like with nouns), the traditional wisdom is that these numerals *are* nouns. I will basically adopt here this assumption as well. The way this will be technically implemented is by saying that these numerals lack the dedicated CARD head.

Now recall from Ch. 2, that I treat regular adnominal genitives (which fail to undergo overriding) as located in a structurally different position than counted nouns. The tree I have proposed for Ossetic in Ch. 2 tree (53) is repeated below in (21) for convenience. The lack of case competition on the high genitive is due to c-command relations within the NP. Specifically, I have suggested that since the possessive genitive is not c-commanded by the dative case marker, it cannot

be targeted by ellipsis (unlike the genitive on the counted noun).

(21)

```
                              PossP
                  ┌─────────────┴──────────────┐
               PossP                          KP
                 │              ┌──────────────┴──────┐
                 │           DemP                      K
                 │       ┌─────┴──────┐                │
                 │     Dem          CardP              │
                 │      │        ┌────┴─────┐          │
                 │      │      Card         KP         │
                 │      │       │       ┌────┴───┐     │
                 │      │       │      AP         K    │
                 │      │       │    ┌──┴──┐      │    │
                 │      │       │   AP    NP      │    │
                 │      │       │    △     △      │    │
            soslan-GEN acy  dyuuæ  say  qudž     ɏ   æn
            Soslan-GEN DEM   two  black cow    G̶E̶N̶ DAT
```
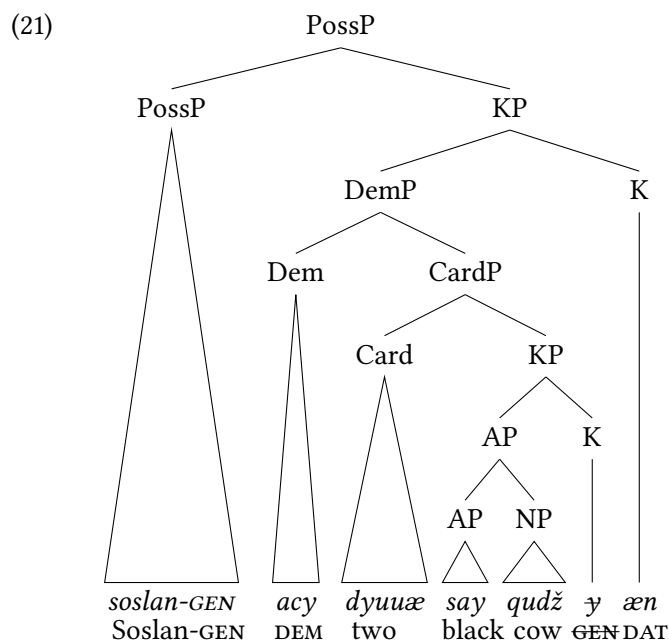
I assume the same type of analysis for Russian stable genitives. This means that such genitives occupy a structurally high position also in Russian, but order to the right of the KP. For instance, the analysis of an example like (22-a) would be (schematically) as shown in (22-b):

(22) Russian (the example is taken from Pesetsky 2013: 82)

  a. krasivyj   stol   molodogo   aktëra
      beautiful.NOM table.NOM young.GEN actor.GEN
      'a beautiful table of a young actor'

  b.
```
                PossP
         ┌────────┴────────┐
        KP              PossP
         △                △
   krasivyj stol    molodogo aktëra
```
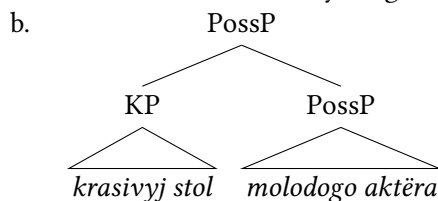
While I do not think that the genitives with numerals like 'million' would be possessors, I assume that they also occupy a high position in the NP, i.e., above K. The genitives presumably reach this high position via movement (extraposition).

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The basic idea behind the proposal is that whatever reasons there are for the high position of the genitive with nouns, this analysis will ideally carry over to numerals like 'million' (because these numerals are like nouns).

An interesting fact to be investigated below is that this 'nominal' syntax of the genitive – i.e., when it occupies a high position as in (22-b) – correlates with the fact that the numeral inflects like an ordinary noun, which is something we have seen in Table 8.9. The reason for stating such a correlation is because the second type of 1st declension numerals contrast with 'million' in both properties: the genitive of the counted noun is replaced by an oblique case marker, and the numerals themselves have a different declension.

This class of numerals is represented by numerals like *st-o* 'hundred,' *sorok-Ø* 'forty,' *devjanost-o* 'ninety' and includes also some fractions. The declension of the first two numerals is shown in the table 8.10 side by side with 1st declension nouns that seem to pattern alike to a certain extent. The identical parts of the paradigms are shaded.

Table 8.10: The numerals of the 1st declension (Timberlake 2004)

	face	100	forty	sin
NOM	lic-ó	st-ó	sórok-Ø	gréx-Ø
ACC	lic-ó	st-ó	sórok-Ø	gréx-Ø
GEN	lic-á	st-á	sorok-á	grex-á
LOC	lic-é	st-á	sorok-á	grex-é
DAT	lic-ú	st-á	sorok-á	grex-ú
INS	lic-óm	st-á	sorok-á	grex-óm

The striking property of the paradigms is that the numeral inflects like the corresponding noun only half way; below the genitive row, the numeral as if gives up, and preserves the genitive ending.

As already announced, this behaviour (which sets these numerals aside from 'million' and its kin) correlates with the fact that the complement of these latter numerals undergoes case attraction, as shown in (23).

(23)   Russian (Ionin & Matushansky 2018: 170, Paperno 2012: 760)

    a.   My priglasili sorok   student-ov
            we invited   forty.ACC students-GEN.PL
            'We invited forty students.'

b. Novogrodovka naxodit=sja v sorok-a kilometr-ax ot   Donecka.
    Novogrodovka finds=REFL in forty   km-PL.LOC   from Donetsk
    'Novogrodovka is forty kilometers from Donetsk.'

In (23-a), the numerical phrase *sórok studentov* is the direct object of the verb 'invite,' and it therefore shows what the ACC shape of the whole phrase is. In (23-b), the phrase 'forty kilometers' follows the preposition *v* 'in,' which requires the locative case. In this environment, the shape of the numeral is *sorok-a*, which looks like the genitive ending of the relevant declension (the expected locative would be *-e*). This unexpected shape correlates with the fact that the complement of the numeral is marked by LOC, which overrides the original GEN, seen in (23-a).

In other words, what we see is that within the first declension, the special declension pattern in Table 8.10 perfectly correlates with the counted noun undergoing overriding, as in (23). I will interpret this in a way that for the numerals in Table 8.10, the spellout of case features is successful only until GEN. When the locative feature is added, something happens, and spellout becomes impossible: the numeral is frozen in the genitive form. Under this view, the reason why the full phrase survives (as in (23-b)) is because the counted noun – which occupies the main spine – successfully incorporates the relevant case features. This is something that is predicted under the Multiple Merge scenario, which allows us to merge features not only in the AUX workspace, but also in the main spine.

The question to be addressed now is what exactly happens to the numeral.

Let me start from the numeral *sorok-Ø*, and highlight the main strategy for analysis. One thing we know about numerals is that compared to regular nouns, they express the precise cardinality of some set. I have been assuming that this is due to the fact that they contain the feature CARD. The main goal of my analysis will be to explain the contrast in the declension of nouns and numerals from this very fact, namely that numerals contain the feature CARD – and regular nouns (as well as high numerals) don't.

The way I will use the feature CARD to model the inflectional differences is that I will place CARD in the *fseq* in a place where it disrupts the spellout of some cases, but not others. How can one do this? The strategy is going to be similar as with the augmentative suffix *íšk*. The DIM appeared in a place where its presence made it impossible for the root to spell out certain features (because of intervention). I will now try to use the same strategy.

As a first attempt, consider the table 8.11. The table provides a solution to the issue that is incomplete, yet instructive, because it illustrates the logic that will ultimately lead to the correct result. After I explain the logic, I will fine tune the details.

Table 8.11: 1st declension numerals (to be modified)

	xNP	REF	CLASS		#	F1	F2	F3	F4	F5	F6
NOM			zavód								
ACC			zavód								
GEN	zavód				a						
LOC	zavód					e					
DAT	zavód					u					
INS	zavód						om				

	xNP	REF	CLASS	CARD	#	F1	F2	F3	F4	F5	F6
NOM			sorok								
ACC			sorok								
GEN	sorok		a				*a				
LOC	sorok		e				*e				
DAT	sorok		u				*u				
INS	sorok		om				*om				

What the table 8.11 does is that it compares the spellout of a regular noun like *zavód* 'factory' with the spellout of a numeral *sórok* 'forty.' In the table, I assume that numerals have all the features like nouns, including REF. The reason for including REF is that in some uses of numerals (*three plus three is six*), they presumably refer to numbers (Wągiel to appear). However, as far as I can tell, the result of my proposal would be the same even if numerals lacked REF below CARD.

Now the place where I put CARD in Table 8.11 is in between the CLASS feature and the singular #. Such a position is in agreement with the tentative suggestion made for Digor, where the augment (presumably spelling out #) is higher than CARD (which is spelled out by the numeral). Let me now see how the presence of the feature CARD influences the spellout of the remaining projections.

On the first two lines of the lexicalisation table of the numeral *sórok*, I am assuming that *sórok* is like *zavód*, in that it spells out all the features up to and including the case feature F2. This entails that it also spells out CARD along the way. Being lexically specified for the CARD feature is what distinguishes the numeral from a regular noun. I give the lexical entry (to be revised) in (24).
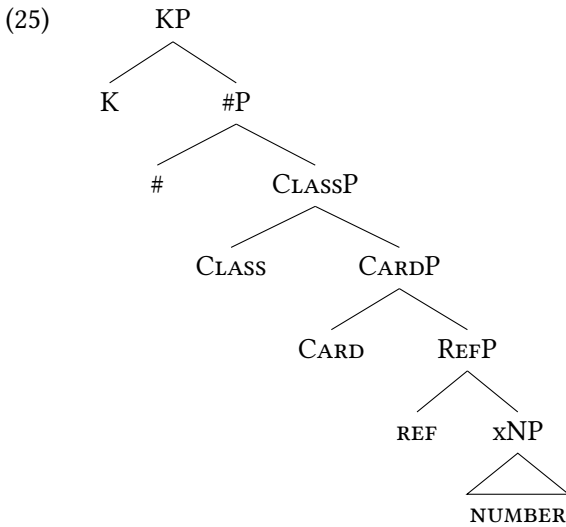
(24)   /*sórok*/ ⟺ [F2 [F1 [# [CARD [CLASS [REF [xNP]]]]]]]

The interesting thing is what happens in the genitive of the numeral. We know that the numeral cannot spell out F3 on its own. Analogously, nouns like *zavód* 'factory' cannot spell out F3 either. The only way to spell out F3 with the noun is to backtrack, allowing for the Class foot of *-a* to be matched, see the GEN line of the noun's lexicalisation table. Therefore, in order to allow for the spell out F3, the numeral must backtrack too.

Suppose then that the numeral shrinks down to RefP (just like *zavód* 'factory'). This indeed leads to the result that *-a* can match its foot with the Class projection; insertion of *-a* at classP is unproblematic. However, when we now try to continue the derivation by adding back all the features we have removed, the derivation blocks. In particular, as soon as we add the Card feature, *-a* is no longer a match; it cannot spell out CardP. In fact, there is no way to spell out F3 given the lexicalisation resources we have at our disposal. So far, F3 can only be spelled out by suffixes that bottom out at the Class projection, and so Card will always be in the way of spellout. As a consequence, spellout of F3 fails completely, leading to ungrammaticality. By simple logic, since F3 can't spell out, no case that includes F3 will be able to undergo spellout (these are all the case below GEN).[4]
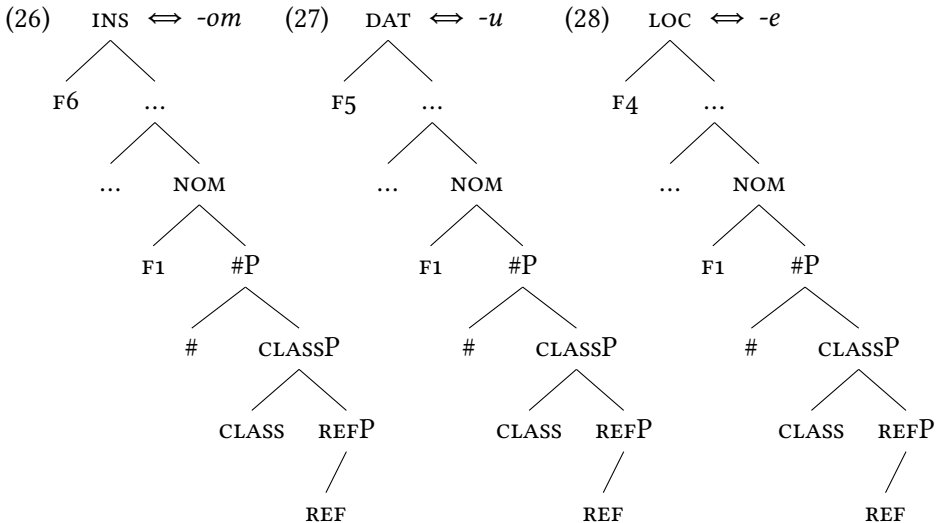
This idea provides us with the general outline of a solution. However, the specific implementation in Table 8.11 does not match the exact details of the pattern. In particular, the current implementation predicts that the numeral *sórok* 'forty' only has the NOM and ACC form, and predicts the GEN-INS forms to be unavailable. However, this is true only for the stretch from LOC-INS, but it is not correct for GEN, because the numeral has a genitive form with *-a*. Given this fact, I will need to update the details of the analysis (while preserving its logic). In particular, what I shall do is place Card below the foot of *-a*, that is, below CLASS. This proposal for the new position of CARD is in (25).

---

[4]Recall that the projection spelled out by the pejorative diminutive *-išk* is below the foot of the case endings, hence the contrast between the effect of a high feature like CARD and a lower feature like DIM.

(25)

```
                         KP
                    ╱         ╲
                   K            #P
                           ╱        ╲
                          #          CLASSP
                                ╱         ╲
                            CLASS          CARDP
                                      ╱        ╲
                                   CARD         REFP
                                            ╱      ╲
                                          REF        xNP
                                                    ╱╲
                                                  NUMBER
```

This structure allows for *sórok* 'forty' to combine with -*a*, since -*a*'s foot – namely CLASS – is above CARD.

The question then becomes how to block the locative -*e*, the dative -*u* and the instrumental -*om* to combine with *sórok*. Building on the observations in Table 8.11, we know that the numeral cannot combine with endings whose foot is below CARD. The idea therefore is to attribute to these last three endings the REF feature as their foot. The lexical entries are therefore updated as in (26), forcing their complement (the xNP) to move to their left.

(26) INS ⟺ -*om*   (27) DAT ⟺ -*u*   (28) LOC ⟺ -*e*

```
       ╱    ╲              ╱    ╲              ╱    ╲
     F6      …           F5      …           F4      …
          ╱    ╲              ╱    ╲              ╱    ╲
        …       NOM        …       NOM        …       NOM
             ╱    ╲              ╱    ╲              ╱    ╲
           F1      #P         F1      #P         F1      #P
                ╱   ╲              ╱   ╲              ╱   ╲
               #    CLASSP        #    CLASSP        #    CLASSP
                   ╱    ╲             ╱    ╲             ╱    ╲
               CLASS    REFP     CLASS    REFP     CLASS    REFP
                        ╱                ╱                ╱
                      REF              REF              REF
```

Once these proposals are adopted, the lexicalisation table of the 1st declension nouns needs to be updated. The update consists in attributing to the three last endings a lower foot, as a result of which the noun has to backtrack as we move from GEN to LOC. Everything else remains the same.

Table 8.12: The lexicalisation tables of *zavód* and *mést-o* (final)

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM	zavód									
ACC	zavód									
GEN	zavód			a						
LOC	zavód			e						
DAT	zavód				u					
INS	zavód					om				

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM	mést			o						
ACC	mést			o						
GEN	mést			a						
LOC	mést			e						
DAT	mést				u					
INS	mést					om				

Once the picture of the declension has been updated like this, the impoverished numeral paradigm comes out as shown in Table .

Table 8.13: The lexicalisation tables of the 1st declension (final)

	xNP	REF	CARD	CLASS	#	F1	F2	F3	F4	F5	F6
NOM			sorok								
ACC			sorok								
GEN		sorok					a				
*LOC	sorok	e					e				
*DAT	sorok	u						u			
*INS	sorok	om							om		

	xNP	REF	CARD	CLASS	#	F1	F2	F3	F4	F5	F6
NOM		st			o						
ACC		st				o					
GEN		st				a					
*LOC	st	e					e				
*DAT	st	u						u			
*INS	st	om							om		

Starting from the NOM/ACC forms, what we see here is that the two numerals both spell out CARDP, and differ in whether they spell out CLASS, # and K in addition. The numeral root *st-* 'hundred' does not spell them out, and it therefore needs *-o* to do this. The numeral *sórok* can spell out these projections, and needs no ending in NOM/ACC.

In GEN, *sórok* cannot spell out F3: it needs a suffix. There is no suffix spelling out just F3; *sórok* therefore needs to shrink (due to backtracking) below CLASS (to CARDP), so that *-a* (which can spell out the genitive F3) can match its foot. At this point, *sórok* 'forty' attains the same size as *sto* 'hundred;' both numerals therefore have the same GEN ending.

Once the numerals attain the same size, they pattern alike. In particular, in order to spell out the LOC feature F4, they must backtrack even further (there is no ending that starts at CLASS and spells out F4). When the derivation backtracks, we go to the CARDP stage. The first time around, we spelled out CARD without any movement, and now the derivation tries to spell out the CARD feature in some other way. However, this is going to be impossible, since (as a hypothesis about the Russian lexicon) there is no CARD suffix. So once the derivation backtracks to this stage, there is no way of saving it.

In particular, when we backtrack even further, the endings for LOC-INS can

match the REF feature inside the numeral (if the numeral has one). But there is no suffix that spells out REF and can spell out CARD later on. This is exactly like in the original table 8.11: there is no way to spell out F4 given that for all relevant endings, CARD is in the way.[5]

We therefore get into a position where we have an account of why the numerals have an 'impoverished' paradigm. We have derived this from assuming that nouns have a relatively rich nominal projection, with the noun at the bottom, followed by the projections of gender, number and case. With the basic sequence in place, I have proposed lexical entries for the Russian endings, which are portmanteau markers spelling out constituents of different sizes, and, importantly, with different "feet." Once the lexical entries are in place, the difference between the declension I_A and I_B emerged simply as a consequence of the difference in the root size (Caha et al. 2019b).

Once this proposal was in place, I have placed the CARD feature above the REF feature, and below the projections of class, number and case. As an automatic consequence of this single proposal – namely of placing CARD at this position – we have derived the fact that numerals associated to this feature have a defective paradigm. The reason for this was that the position of CARD disturbs the spellout of some cases (those which have a foot below CARD, i.e., LOC-INS), which leads to the consequence that there is no way to spell out all the features, and ungrammaticality arises. There is simply no way how the numeral could combine with the relevant endings.

Looking forward, enforcing ungrammaticality of certain numerical case forms through individual lexical entries turns out to be a good thing, because numerals in other declensions pattern differently, which is going to preoccupy me in the following chapter 9.

Note further that under this view, numerals such as 'million' must be characterised as expressions that lack CARD, having a composition (and syntactic behaviour) characteristic of regular nouns (which is what the tradition takes them to be).

8.5 Combining the numerals with the counted noun

With this result in place, let me now start addressing the issue of how the numeral and the noun combine together. The two examples I will try to derive are repeated in (29) (recall (23)).

---

[5]The same result would arise if the numerals lacked REF. In such case, the last three endings would be unable to even match their foot.

(29)   Russian (Ionin & Matushansky 2018: 170, Paperno 2012: 760)

    a.   My priglasili sorok   student-ov
          we invited   forty.ACC students-GEN.PL
          'We invited forty students.'

    b.   Novogrodovka naxodit=sja v soroka kilometrax ot   Donecka.
          Novogrodovka finds=REFL in forty   km.PL.LOC from Donetsk
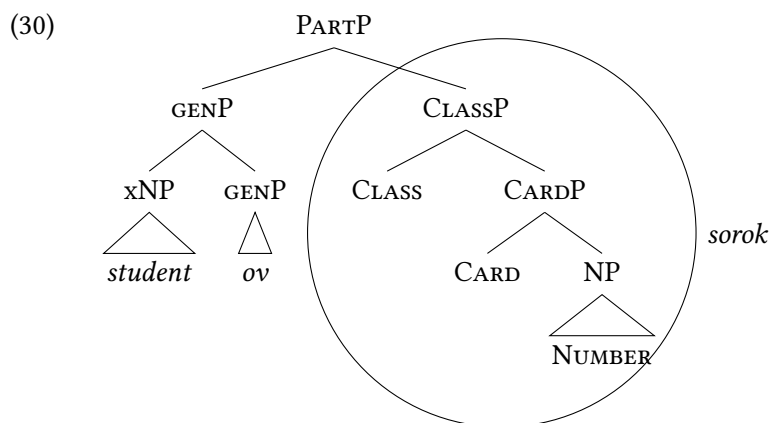   'Novogrodovka is forty kilometers from Donetsk.'

The main goal of this section is to demonstrate the claim that the ingredients of the numerical construction are exactly the same in Ossetic and Russian, and that they are added into the derivation in exactly the same order. However, their realisation in the structure is influenced by language-particular lexical resources (interacting with the cyclic spellout procedure), and this is how the languages come to differ.

Specifically, Ossetic is a language with number-neutral agglutinative case suffixes, whose foot does not reach below the case projections. As a consequence, we never see any case marking on the numeral, and all the action happens at the phrase final position. In Russian, I was independently led to conclude that case suffixes spell out number and gender, some of them reaching even below CARD. The point of the following discussion is to show that as a result of this independently needed proposal, case features are not expressed at the phrase-final position in Russian, but interchangingly on the numeral and/or the noun.

The discussion is split into several subsections for clarity.

8.5.1 The base structure

Recall first from Ch. 2 (example (56)) that the counted noun is introduced as a subject of predication, with the numeral as the predicate. The base structure I am assuming is shown in (30).

(30)

PartP
├── genP
│   ├── xNP
│   │   └── student
│   └── genP
│   └── ov
└── ClassP
    ├── Class
    └── CardP
        ├── Card
        └── NP
            └── Number

sorok

One thing which is new here is related to the fact that our *fseq* has meanwhile gotten more complex. This is reflected in (30) by the appearance of the Class feature below the point where the counted noun is introduced. (The # projection will be higher up than the projection of Part, where the noun is introduced. We have concluded this because of the Digor augment.)

The reason for the low position of Class is first of all guided by theory internal reasons: if I placed class higher than the counted noun, we would get wrong morphology on the numeral. (This would be caused by the counted noun intervening between CardP and its Class.) In order to avoid this wrong result, I must assume that the Class of the numeral is lower than the subject of which the numeral is predicated. When I assume this, the results come out right.

While the decision to order the projections has been reached on theory internal grounds, the literature on the semantics of Slavic numerals contains independent suggestions to the effect that class marking on numerals is essential in turning the cardinal into a predicate (Wągiel to appear). On Wągiel's approach, the numeral spelling out CardP denotes an individual – a particular number. The class projection serves to turn CardP into a counting device (a predicate modifier). On Wągiel's approach, the fact that class is lower than card is thus essential for the semantic composition to come out right. If correct, this line of reasoning provides an independent support for this decision.

The final thing to note is that the possibility to introduce an argument in this position must be somehow linked to the presence of Card in the structure; recall that there is a perfect correlation between having the type of Card that disturbs spellout, and the possibility to have a counted noun whose genitive undergoes overriding.

These are all the relevant ingredients that make sure that the argument is in-

troduced in the right place with the right type of numerals, exactly as shown in
(30).

Note that a numeral like *st-o* 'hundred' will be bi-morphemic already at the
point when the counted noun is introduced, as in (31). The reason for this is that
the lexical entry for *st-* only spells out CardP, and Class is spelled out by *-o*,
recall Table 8.13.

(31)
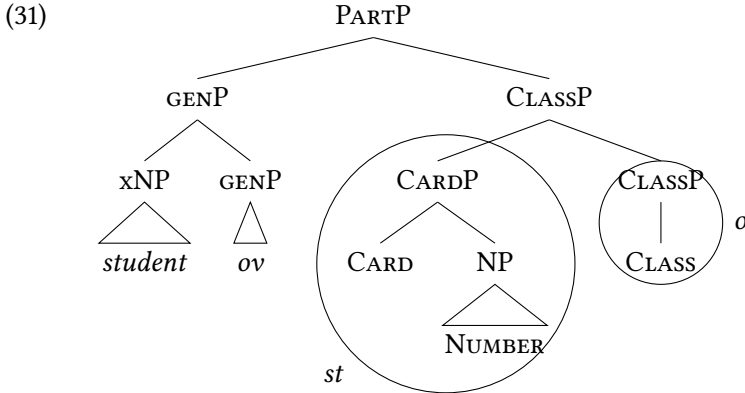
8.5.2 Predicate inversion

Recall now that the numeral must undergo feature driven movement, which is
referred to in the literature as 'predicate inversion' (see in particular Corver 2001),
yielding the structure in (32) for the numeral *sórok*. For the numeral *st-o*, the
structure would be different in that the bi-morphemic ClassP would be moving.

(32)
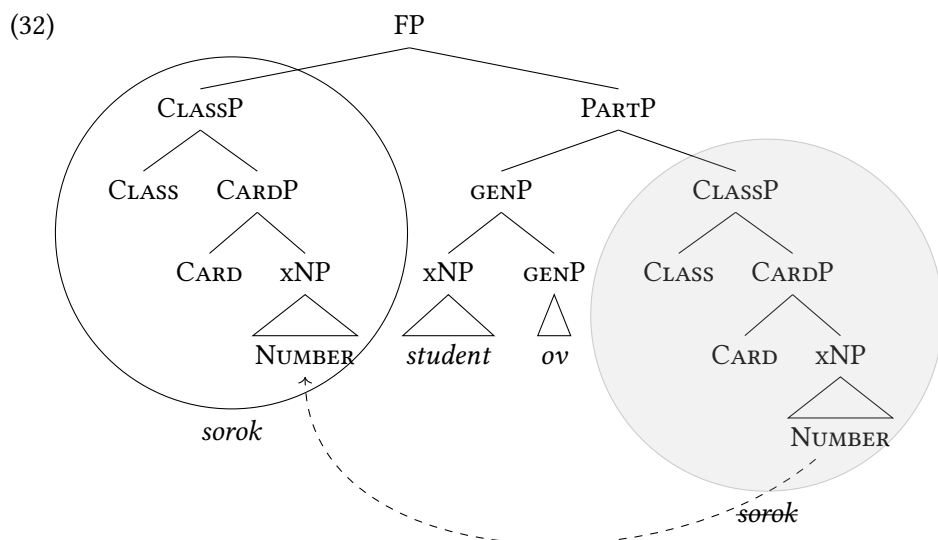
The higher CLASSP acts as a projecting Spec. It labels the whole projection line due to it possessing a feature (F) somewhere inside its projection line. I will be simplifying (32) into the format shown in (33). As we shall see, the structure in (33) yields the same surface results as the more accurate structure (32). Its advantage is that it conveys the essential features of the structure (32) in an abbreviated form, where by essential features I mean the fact that the cardinal is a projecting Spec, and that its complement contains the genitive of the counted noun.

(33)
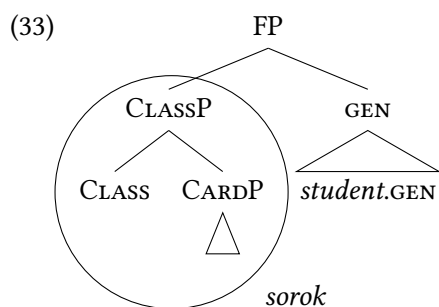
After predicate inversion applies, the regular number and case features are added. The next section presents this in detail.

8.5.3 Number undergoes co-spellout with the Spec

The first step is to merge #, as shown in (34). A structure like this is also present in Ossetic (both varieties), recall the discussion in Ch. 5 surrounding the tree (60).
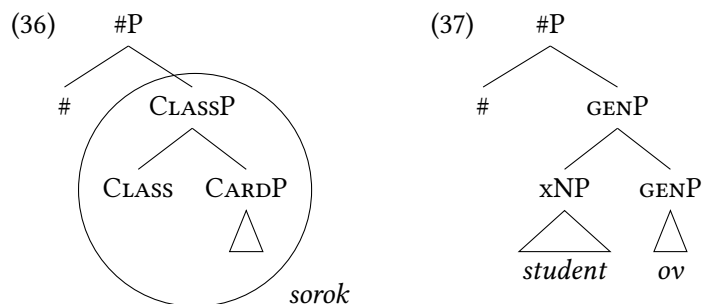
(34)
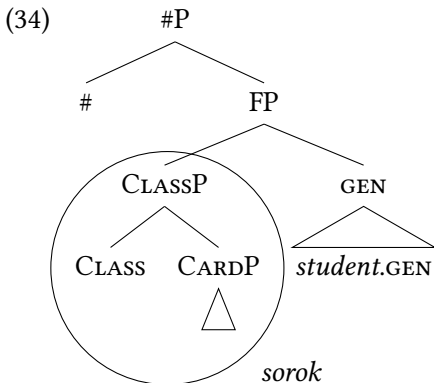
The tree (34) does not spell out without movement. As a consequence, spellout movements are activated. There is no movable Spec in the structure, so we skip this step. Complement movement yields (35). Here #P fails to spellout, since all our endings are portmanteaus that always include CLASS specifications, recall Table 8.13.
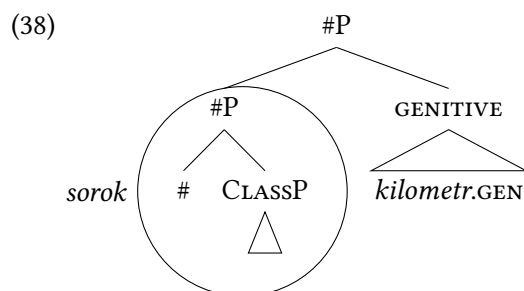
(35)
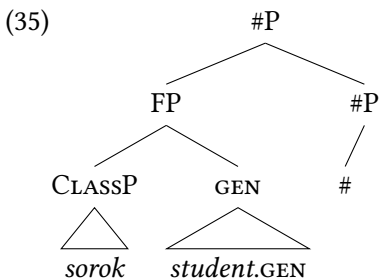
When (35) fails to spell out, the Russian derivation parts ways with Digor, where (35) does spell out. This is so because in Digor, there is the augment with # as its foot (recall Ch. 5, tree (61)).

What happens now in Russian is that backtracking is triggered. This is parallel to Iron, where (35) also fails to spell out. Given that backtracking applies to a structure with a projecting Spec (recall (33)), it leads to the detachment of the projecting Spec. The feature # is then merged both into the auxiliary workspace (containing the numeral), and also on top of the main spine (containing the noun
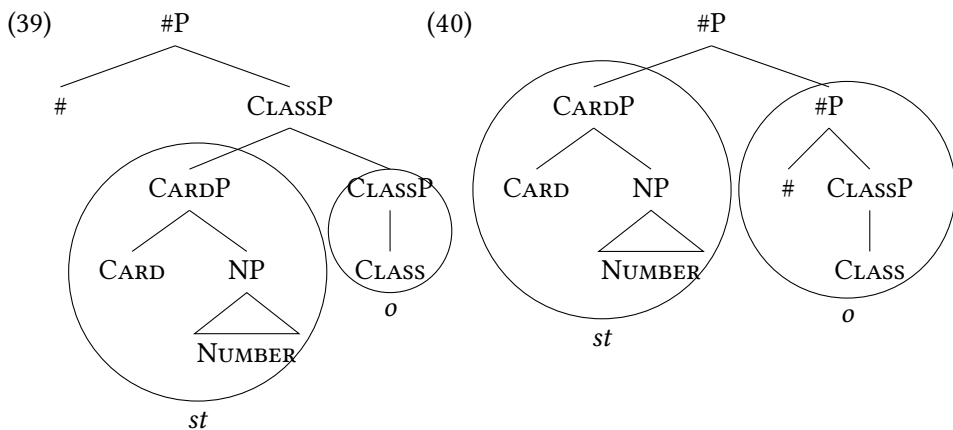
in the genitive). The two workspaces – including the newly merged # – are given in (36) and (37) respectively.

(36)

```
        #P
       /  \
      #   CLASSP
         /    \
     CLASS   CARDP
               △
              sorok
```

(37)

```
        #P
       /  \
      #   GENP
         /    \
       xNP   GENP
        △     △
     student  ov
```
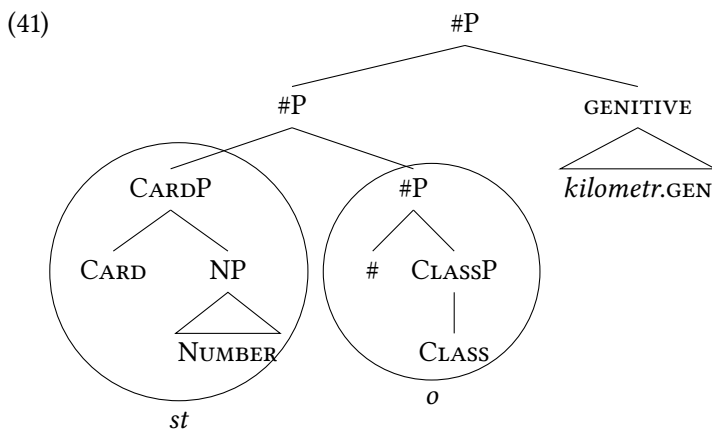
The # feature spells out on the numeral without movement, because the numeral *sorok* has a lexical entry that allows it to spell out features all the way to F2. This is precisely what happens also in Iron (see Ch. 6 tree (75)). However, # fails to spell out in the main spine, because its presence on top of GEN does not lead to co-spellout. There is no entry that includes # on top of F3 (the topmost feature of the genitive). Therefore, the Spec containing the numeral is merged back, labelling the whole projection line as #P, see (38). (A tree of exactly the same shape is also present in Iron, see Ch. 6, tree (76)).

(38)

```
                 #P
                /   \
             #P     GENITIVE
            /  \       △
    sorok  #  CLASSP  kilometr.GEN
              △
```

For completeness, let me mention that in case of the numeral *st-o*, the derivation works similarly, even though the numeral *st-o* is bi-morphemic. To see that, let me show the stage of the derivation when (following the failure in (35)) backtracking detaches the numeral from the main spine. The numeral *st-o* already has two morphemes at that point, and merging # on top of the cardinal therefore leads to the configuration in (39). Unlike in the case of the numeral *sórok*, (39) does not spell out without movement.

(39)

```
                #P
              /    \
            #      ClassP
                  /      \
            ( CardP )   ( ClassP )
              /   \          |
          Card    NP       Class
                  /\          |
              Number          o
                 |
                st
```

(40)

```
                    #P
                  /    \
          ( CardP )    ( #P )
            /   \       /   \
         Card   NP    #    ClassP
               /\            |
           Number          Class
             |               |
            st               o
```

As a consequence, spellout movements are activated. Spec movement is tried first. The Spec in (39) is a non-projecting Spec, its movement is therefore legal. When the Spec is moved, the configuration (40) arises as a result. Here lexicalisation succeeds, with *-o* co-spelling out the newly added number projection along with Class. The structure in (40) is then merged back to the genitive noun, yielding a structure parallel to (38). The only difference is the bi-morphemic nature of *st-o*, see (41).

(41)

```
                        #P
                     /      \
                   #P      genitive
                 /    \         /\
         ( CardP )   ( #P )  kilometr.gen
           /   \      /   \
        Card   NP    #    ClassP
              /\             |
          Number           Class
            |                |
           st                o
```

8.5.4 A side note on the main spine (skippable)

Before I go on with the derivation, let me be more precise here about what exactly happens in the main spine. In particular, under the more precise implementation via predicate inversion, the main spine is actually complex, and contains also a

copy of the numeral. Hence, when the numeral splits from the main spine, and #
is merged within each of the workspaces, the tree that most accurately represents
the main spine is as given in (42) (rather the as originally given in (37)).

(42)
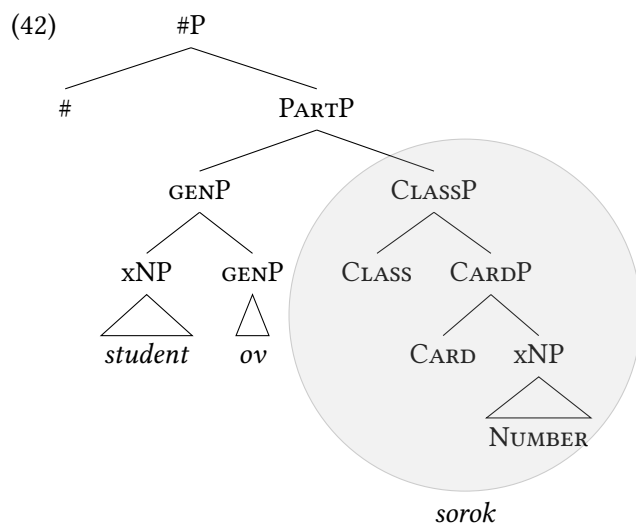
However, (42) fails to spell out, and the two derivational workspaces in (42) have
to split. One derivational workspace corresponds to the Spec (containing the
counted noun); I give it in (43).

(43)
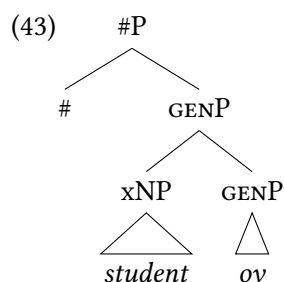
This tree corresponds precisely to our original representation in (37), and the
result is going to be the same as before: no co-spellout.

The second workspace corresponds to the 'trace' workspace. This workspace
will end up unpronounced, and so it is hard to say what is happening inside: is
is merged here or not? Suppose it is, in which case we merge # on top of the
numeral, which is what we have already done to the 'non-trace' version of the
numeral in (36). Therefore, the trace workspace will get spelled out the same as
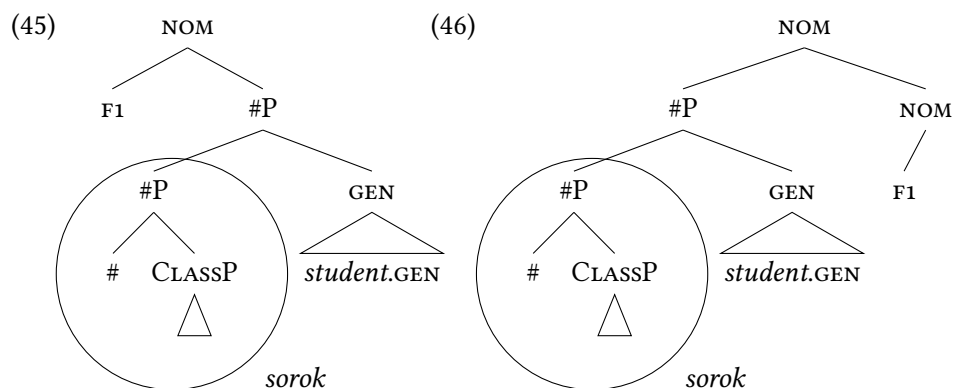
the "non-trace" workspace. Following up on this, all workspaces are reassembled in the complete tree (44), where both the higher and the lower numeral have been augmented by #. Therefore, they are still exact copies of one another, and they still behave as a trace (a silent copy) and an antecedent (a pronounced copy).

(44)
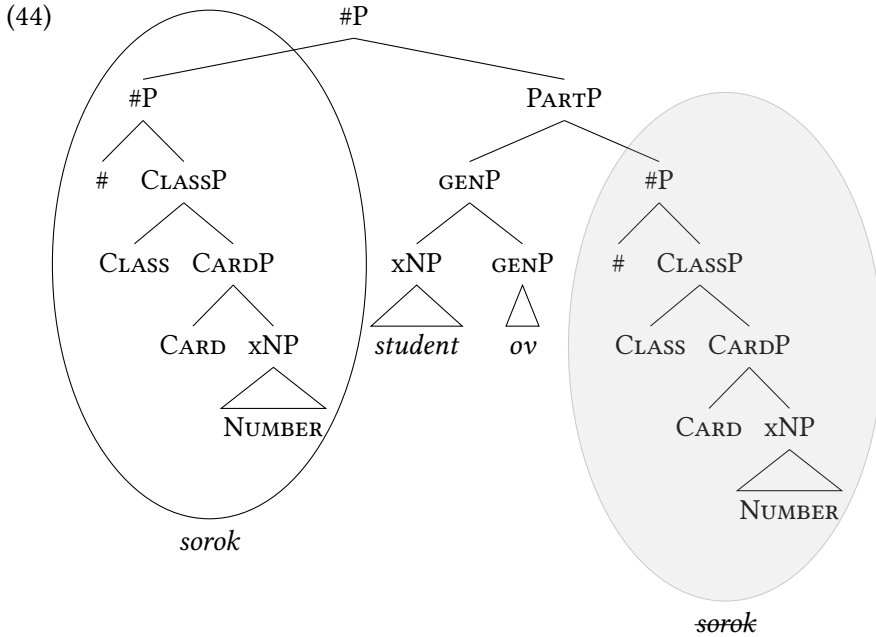
For this reason, I avoid discussing the spellout of the numeral twice; I shall always discuss the spellout of the head of the chain (the projecting Spec), and then see what happens to the genitive. These two pieces of information will be sufficient to correctly establish the surface shape of the construction. What happens to the trace is immaterial for the surface shape.

8.5.5 Lexical items as the source of parameteric variation

The derivation now continues by merging case features. The tree in (45) depicts the stage of the derivation where the nominative feature F1 is introduced. Spellout without movement fails in (45), and spellout movements are therefore activated. Since there is no movable Spec, complement movement is attempted, yielding (46).

(45) NOM
F1   #P
#P   GEN
ClassP   *student.*GEN
sorok

(46) NOM
#P   NOM
#P   GEN   F1
ClassP   *student.*GEN
sorok

The configuration in (46) spelled out successfully in Iron, recall the discussion in Ch. 6, tree (78). However, in Russian, spellout in (46) fails, because there is no agglutinative case marker with F1 as its bottom. This is the crucial point where the derivation of numerical phrases in the two languages diverges, and starts heading in a different direction in Russian.

In particular, the thing that must now happen in Russian is backtracking. What backtracking leads to is that the Russian derivation splits into two workspaces. We have the main spine – containing the GEN, see (47). Then there is the AUX branch – containing *sórok*, see (48). The case feature F1 is merged on top of each branch.

(47) NOM
F1   GEN
xNP   GEN
student   F3   …
…
ov

(48) NOM
F1   #P
ClassP
sorok
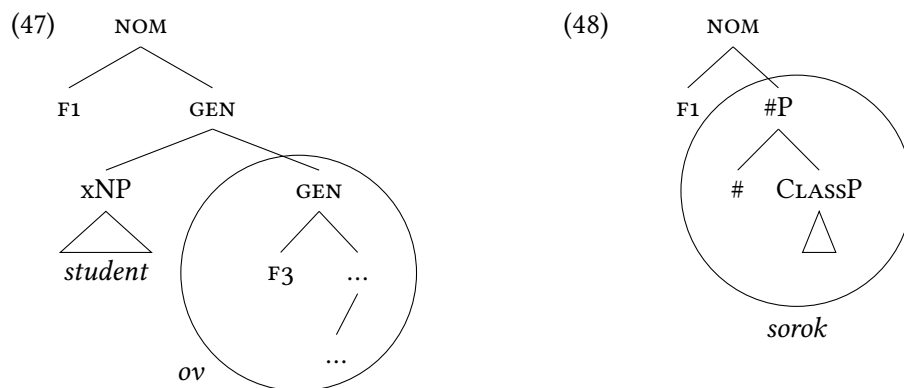
Ultimately, the fact that case features are merged into both workspaces is going to yield the consequence that the counted noun may change its genitive and take on the case characteristic for the particular environment (i.e., LOC, DAT, INS in Russian). It also gives us the possibility to merge case features into multiple workspaces, ultimately yielding concord. The interesting thing is that this is now

linked to the absence of a particular type of lexical item in Russian (which is present in both Ossetic varieties). The specific lexical item under discussion is an agglutinative case marker that does not fuse with number. Such case markers are present in Ossetic, but absent in Russian, yielding a bi-furcation between the two types of languages. In one type of language (Russian), case is merged in multiple workspaces. In another type of language (Ossetic), this is not so.

As usual, the spellout in each workspace proceeds under exactly the same rules that hold for a single workspace. (48) will therefore spell out without any movement as *sórok*. Note that successful spellout of F1 in the Spec conforms to the observation that for spellout in Spec to succeed after failing in the main spine, co-spellout is required.

(49)

sorok
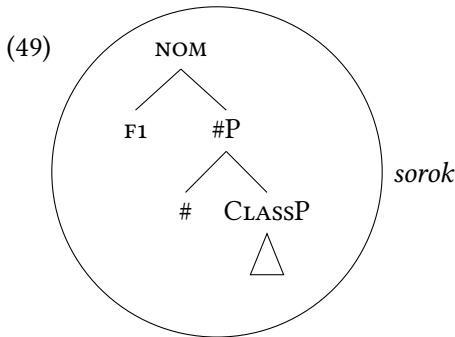
8.5.6 Types of genitive

No such co-spellout will turn out to be possible in the main spine. In particular, (47) will fail to spellout without movement. The movement of the Spec will be tried, yielding (50).

(50)

254
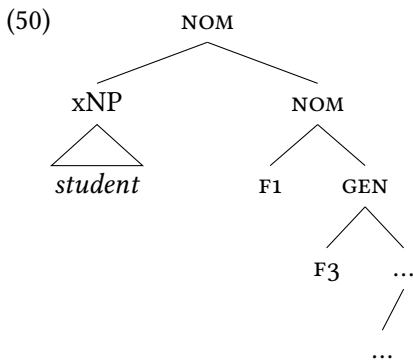
This gives us – at the first look – a strange constituent, containing a second stack of case features on top of the first one. In Russian, such a structure fails to spell out, because there is no relevant lexical entry. However, it is interesting to note that if such a constituent did spell out, it would correspond to a special type of a genitive case, namely one which is used when the full phrase containing the genitive is in the nominative. Such a genitive could, then, contrast potentially with a different type of genitive marker, which would appear in a phrase marked by, say, a dative case. The structure in (51) depicts the structure of such a "genitive dependent on a dative;" the original genitive is encircled. The case features above the circle are phrasal case features that were merged on top of the genitive because of Multiple Merge.

(51)
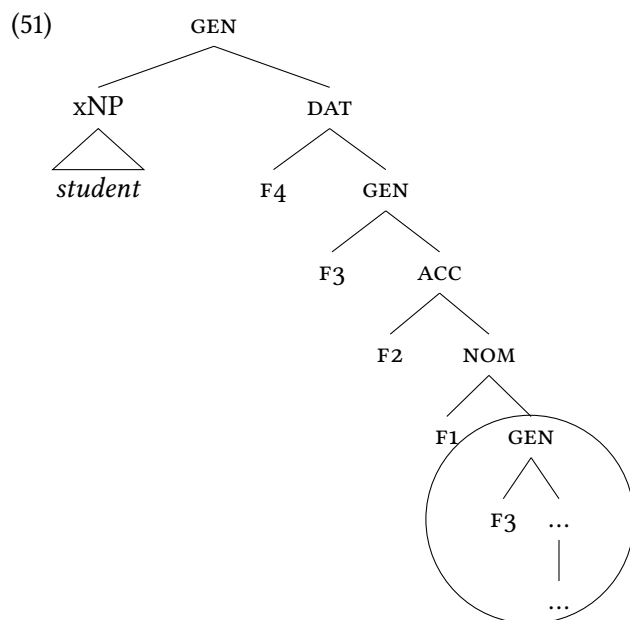
The reason why I am mentioning this thought experiment is because it gives us an idea of what kind of phenomena we can expect if a language had the lexical resources to spell out the genitive marking along with phrasal case marking. Interestingly, languages of this predicted type seem to exist. Consider, for instance, the data from the Caucasian language Bezhta given in (52).

(52)   Bezhta (Caucasian, Plank 1995: 71)

    a.   abo-s   is
         father-GEN1 brother

       'father's brother'

b.   abo-la   is-t'i-l
    father-GEN2 brother-obl-dat
    'to father's brother'

What we see here is that the language distinguishes between two types of genitive (GEN1 and GEN2). One type of genitive (GEN1) is used for genitives that modify nouns in direct cases, as in (52-a). The second type of genitive (GEN2) is used to modify nouns in oblique cases, see (52-b). So the idea that languages may in fact have different genitive markers – depending on the case of the full phrase – is, in fact, a good consequence of the idea that case features belonging to the full phrase may be merged on top of a genitive.

However, Russian is not Bezhta, and there is no evidence for the claim that Russian genitive markers ever spell out the additional case features. I will therefore take it for granted that the attempt to spell out (50) fails in Russian.

When (50) (an instance of Spec movement) fails, the derivation proceeds as usual, namely by trying complement movement. This yields (53):

(53)
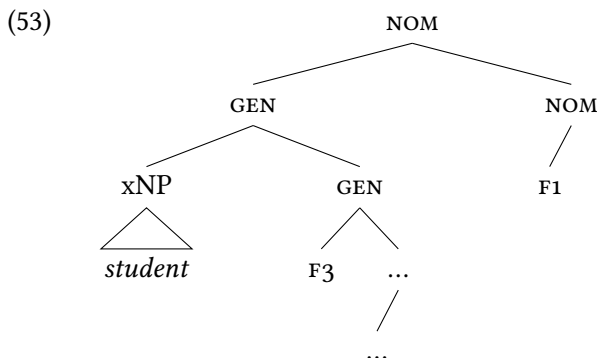
Here spellout fails as well, we know that Russian has no NOM case marker with F1 as its bottom element. Note though that if a language had such a lexical item, this derivational option would lead to an agreeing genitive (a genitive followed by an agreement marker). Note also that the two cases stacked one on top of the other may, in fact, have different bottoms, and so it is not clear that ellipsis would eliminate one in favor of the other, recall the discussion in Ch. 3 surrounding the tree (31).[6]

---

[6]In the following chapters, I will develop an account of allomorphic variation in Russian which heavily relies on the idea that different allomorphs of, say, the dative have different 'bottoms.' If such a claim translates to other languages, we can begin to understand why in Jiwarli, as

In Russian, backtracking is set in motion etc.; but ultimately, the main branch fails to incorporate the NOM feature F1. However, given that F1 was successfully spelled out in the AUX space, this is not a problem. The two branches therefore merge again, as required by early AUX closure.

(54)
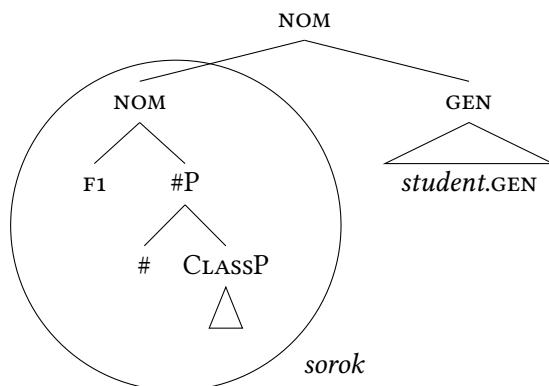
8.5.7 Towards a bracketing paradox

The accusative is derived in a similar manner. When F2 is added on top of (54), there is no way to spell it out because no suffix has F2 as its bottom. The two branches therefore split, and F2 is introduced in each one of the two branches. It fails to spell out on top of the genitive noun, but it is successfully incorporated into the Spec with the cardinal, as in (55):

---

discussed in Ch. 3, deletion of one dative by another happens only when the two datives are completely identical, but not when we are stacking different allomorphs.

(55)
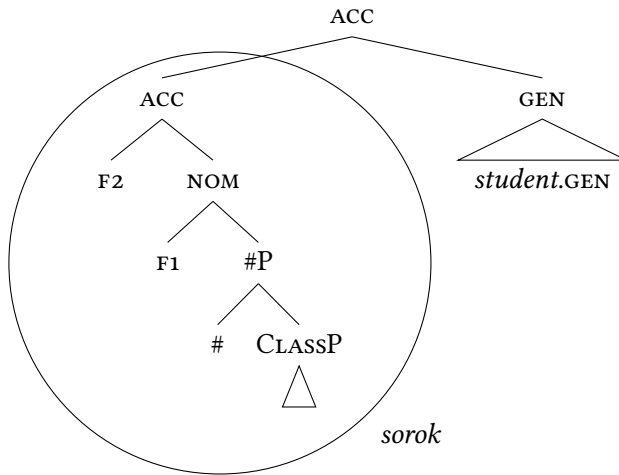
The very same sequence of steps must be repeated one more time, before the genitive is derived. We merge F3 to (55), but that fails to spellout. We backtrack, which reopens the two workspaces in (55). We merge F3 in each workspace. F3 will fail to spell out in the main spine. In the Spec, the configuration after merging F3 is as in (56).

(56)
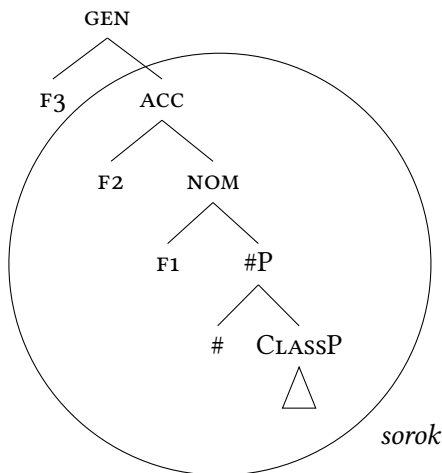
We know from Table 8.13 that in the genitive, the successful spellout of F3 requires backtracking, which makes *sórok* shrink to the CARDP, so that the genitive *-a* can find its foot. The result is as in (57):

(57)

```
            GEN
      _____|_____
     |               |
  CARDP            GEN
    △          _____|_____
              F3         ACC
  sorok           _____|_____
                 F2          NOM
                        _____|_____
                       F1          #P
                              _____|_____
                             #        CLASSP
                                         |
                                      CLASS
```
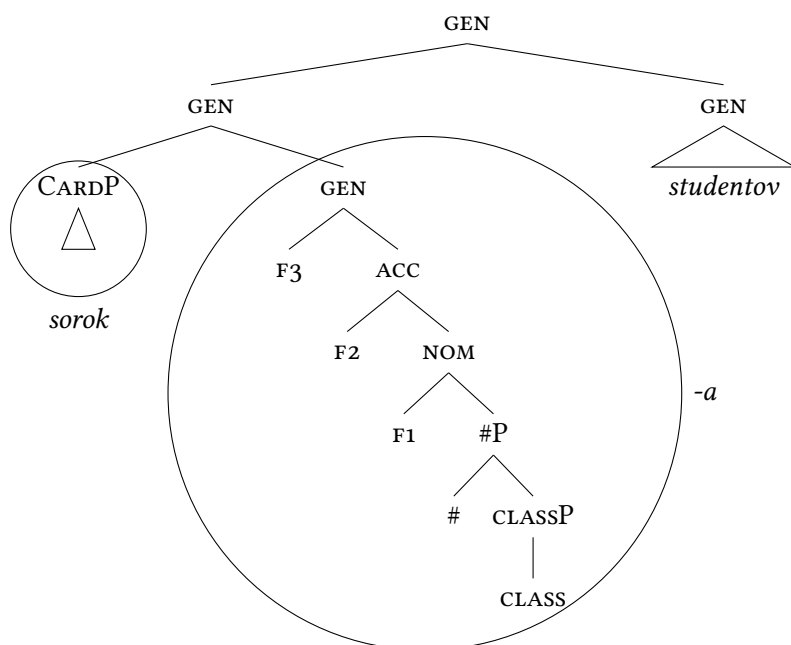
-a
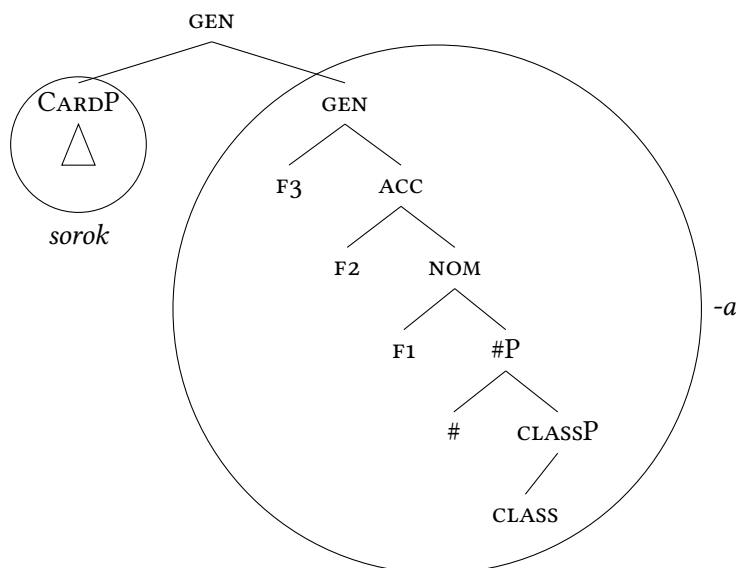
Once (57) spells out, the Spec is closed yielding the correct genitive form in (58):

(58)

```
                        GEN
         _____|_____
       GEN                               GEN
   _____|_____                            △
  CARDP      GEN                      studentov
    △     ____|____
         F3       ACC
  sorok       ____|____
             F2       NOM
                  _____|_____
                 F1         #P
                       _____|_____
                      #        CLASSP
                                  |
                               CLASS
```
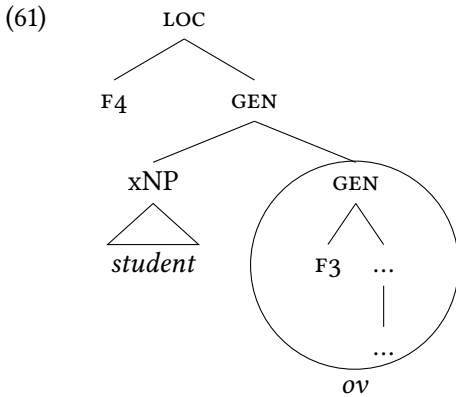
-a

Recall now that in Russian (as in Ossetic), the case above GEN is LOC. When the

locative feature is merged, the configuration in (59) arises:

(59)

```
          LOC
         /    \
       F4     GEN
             /    \
           GEN    GEN
            |      |
          sorok-a studentov
```

(60)

```
               LOC
              /    \
           GEN      LOC
          /    \      \
        GEN    GEN     F4
         |      |
       sorok-a studentov
```
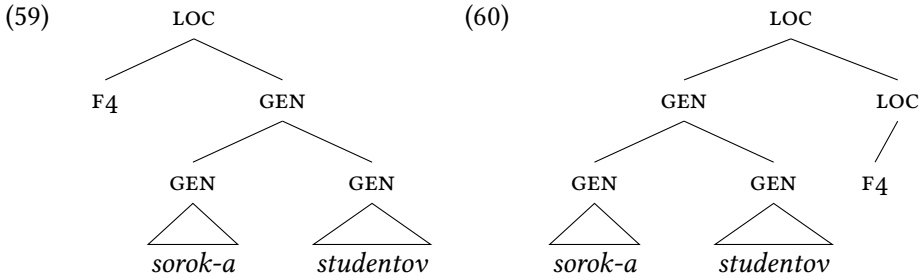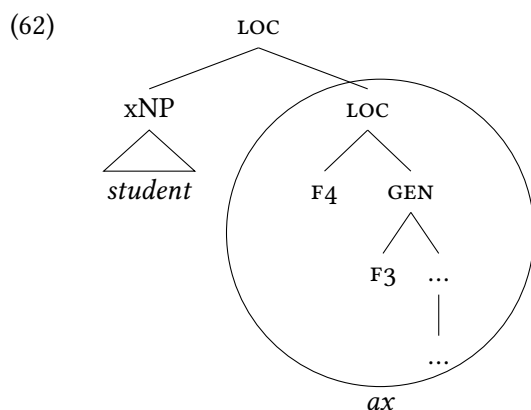
(59) cannot spell out; complement movement is therefore tried, see (60). But (60) does not spell out either, because there is no lexical entry with F4 as its bottom. Backtracking must therefore take place. This leads to the reopening of the two workspaces, and F4 is merged in each of the two workspaces.
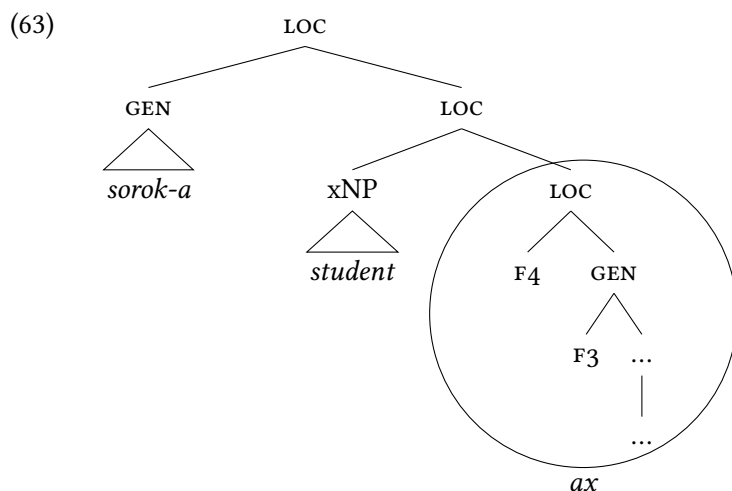
We know that the numeral does not have the expected 1st declesnion LOC form *sórok-e*. I have proposed that this is because the spellout of F4 fails (recall Table 8.13). For this reason, we need to look at what happens in the main spine. When F4 is introduced, the configuration (61) arises:

(61)

```
          LOC
         /    \
       F4     GEN
             /    \
           xNP    GEN
            |     / \
          student F3  ...
                   |
                  ...
                   ov
```

This configuration does not spell out without movement, and so the regular rescue operations apply. In particular, applying the Spec movement option will yield (62), where the feature F4 (introduced into the genitive complement due to its failed spellout higher up) forms a seamless constituent with the genitive feature F3 right below. This leads to the insertion of the LOC.PL marker, overriding the original GEN.PL in exactly the same way as if this was an ordinary LOC.PL:

(62)

```
                    LOC
                   /    \
              xNP        LOC
             /  \       /    \
         student    F4      GEN
                            /  \
                         F3    …
                               |
                               …
                            ax
```

Now given that F4 spells out successfully in the main spine, we can reintegrate the two branches, projecting the LOC feature F4 to the top:

(63)

```
                         LOC
                        /    \
                   GEN        LOC
                  /  \       /    \
             sorok-a     xNP       LOC
                        /  \      /    \
                    student    F4      GEN
                                       /  \
                                    F3    …
                                          |
                                          …
                                       ax
```

This derivation represents a bracketing paradox of sorts, because a feature (F4) that scopes over the whole phrase has (as if) skipped the hierarchically most prominent branch (the numeral) and it got realised on the non-projecting branch. Meanwhile in the process, the projecting Spec (the numeral) has turned into a non-projecting Spec.[7]

---

[7]Note that this is all really a consequence of the fact that the numeral fails to accommodate the locative case feature. This is in turn related to lexicalisation resources. We will see that in the feminine declensions, locative can be accommodated by the numeral and as a consequence, we get case concord.

The overall result is that initially, phrasal case features are getting incorporated in the numeral's workspace – all the way to GEN. But then when the GEN threshold is reached, the numeral stops inflecting – and the counted noun takes over. In morphological terms, this is a strange pattern for the following reason. Often, it is claimed that what undergoes inflection in a phrase is the head. Therefore, in NOM to GEN, it looks as if the numeral was the head of the construction. But then all of a sudden when the noun starts inflecting, it looks as if the head 'shifted,' and the counted noun becomes the head in LOC-INS.

There have been proposals in the literature (Giusti & Leko 2001: 145-6) which have tried to capture this behaviour by attributing to such numerals dual status. In Giusti's and Leko's account, the structural case forms of numerals are merged as Q heads, taking the counted noun as a complement. But in oblique cases, they are merged as specifiers (adjectives) inside the projection line of the noun. This directly expresses the intuition as to the 'mixed headedness' status of such constructions. In the current system, this type of behaviour is one of the many ways in which Multiple Merge is realised, as determined by the available lexical items.
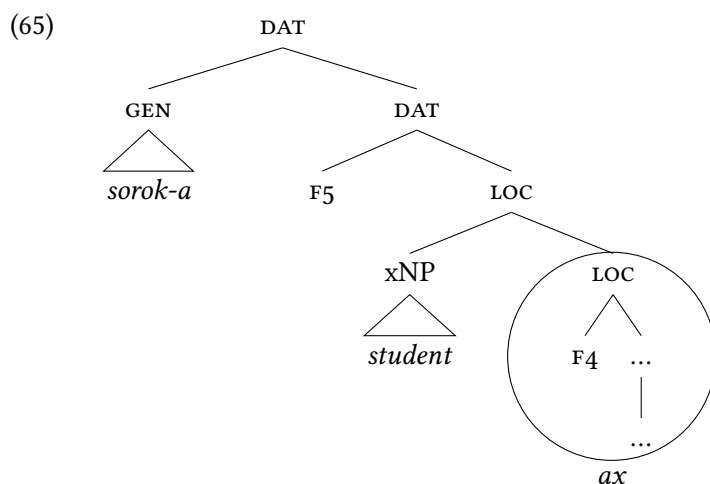
8.5.8 From the locative on

Note now that when the numeral is integrated as a non-projecting Spec, the derivation proceeds slightly differently. In particular, when the dative feature F5 is added on top of (63), we have a structure with a non-projecting Spec:
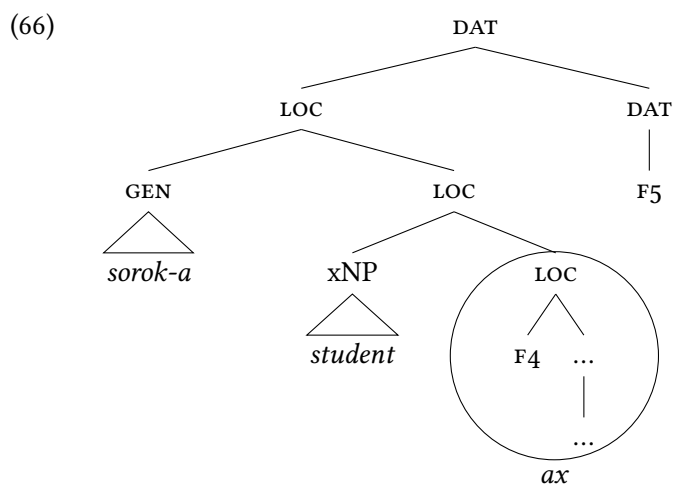
(64)
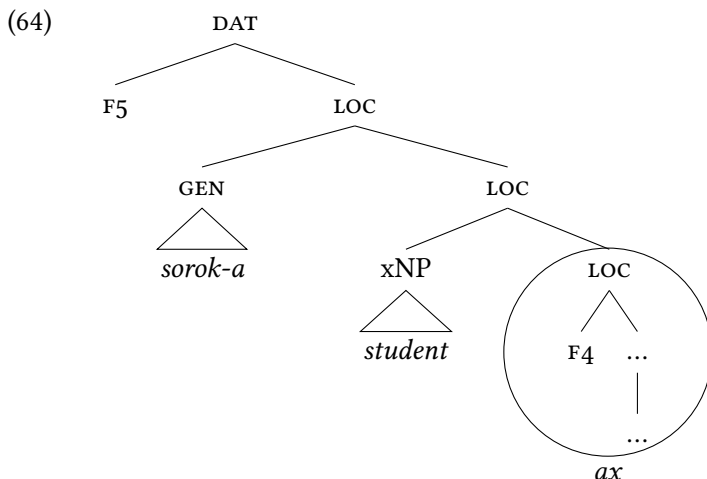
Non-projecting Specs must try to move out of the way, but this is not going to help, see (65). The problem here is that the xNP *student* is still sitting inside the

dative constituent:

(65)

```
                        DAT
              ┌──────────┴──────────┐
            GEN                     DAT
             △              ┌────────┴────────┐
          sorok-a          F5              LOC
                                   ┌────────┴────────┐
                                 xNP              LOC
                                  △            ┌────┴────┐
                               student       F4    ...
                                                    │
                                                   ...
                                                   ax
```

Therefore, complement movement must be tried, yielding (66); but this structure also fails to spell out.

(66)

```
                             DAT
                 ┌────────────┴────────────┐
               LOC                         DAT
          ┌──────┴──────┐                   │
        GEN            LOC                  F5
         △        ┌─────┴─────┐
      sorok-a   xNP         LOC
                 △      ┌────┴────┐
              student  F4    ...
                             │
                            ...
                            ax
```

Ultimately, the derivation of the dative then proceeds on analogy with the locative. In particular, we need to backtrack now into the previous stage. In the previous stage, we had two workspaces, and so the workspace of the numeral will detach from the counted noun. The feature F5 will be merged on top of each of them. We know that the dative will fail to spell out in the numeral's workspace, but it will succeed on the counted noun.

The way this happens is the following. The dative feature F5 is merged on top of the locative, yielding (67).

(67)
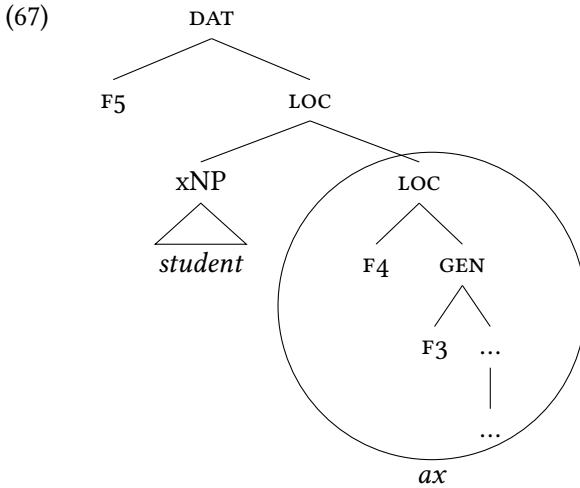
(67) fails to spellout without movement. As a result, spellout movements are triggered. The xNP first undergoes Spec movement, yielding (68).

(68)
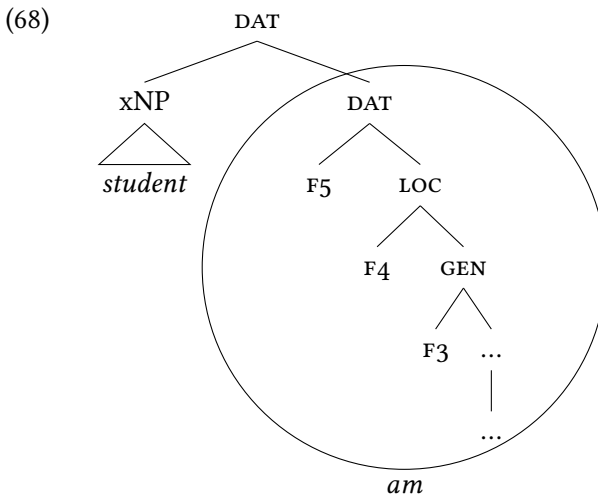
(68) spells out, and it is merged back with the numeral.

8.6 The consequences for competition

In this section, I would like to make explicit the consequences of the current account for case competition.

The crucial consequence is that the override account (just like the ellipsis account) derives the fact that override happens in accordance with the syncretism sequence. In particular, if things work in the way I have described above, there is no way how a nominative or accusative morphology (spelling out just F1 or F1+F2 respectively) may override the genitive on the counted noun. That would require such morphemes to spell out also F3, otherwise spellout would fail (recall the 'spell out every FP' requirement). But if a morpheme can spellout F3, it fails to be a NOM/ACC case marker by definition (it becomes a GEN case marker). All summed up, there is no way that a marker for a case smaller than GEN can override the GEN on the counted noun. Thus, in Russian, when F1/F2/F3 case features are merged on top of GEN, they are discarded.

However, when these features extend the genitive in a way as a 'regular' case feature would (adding e.g. the locative F4 on top of the genitive F3), such features co-spellout with GEN. This is due to the fact that any language will have *some* morphology for cases bigger than GEN, which override GEN completely independently of the numerical construction I am dealing with. As a consequence, these case markers will *also* override GEN in the current context.

8.7 Conclusions

It is interesting to note that even though the mechanism used to derive Russian (override) is different than the account of Ossetic (ellipsis), the tools are the same. Specifically, we are using exactly the same features as the one that we have been using for Ossetic, and we are also merging them in largely the same order (modulo the difference between the order of the dative and the instrumental, which may be superficial, recall the discussion surrounding Table 3.4). Further, the spellout of these identical features follows the same procedure.

The only substantial difference is what the lexical entries look like. In Ossetic – which is a language with agglutinative morphology – case markers spell out only case features. As a result, case features are expressed in the form of phrasal suffix at the very end of the phrase, which leads to suffix stacking and ultimately to ellipsis. In contrast, Russian has fusional morphemes spelling out number and case; therefore, it cannot spell out case features as phrasal suffixes. The spellout procedure triggers backtracking, which is an independently needed process,

found also in Ossetic (recall the discussion in Ch. 5). As a result of backtracking, Russian ends up merging the case features into individual branches of the extended noun phrase, leading to case overwriting (rather than case ellipsis). As I already suggested, this also allows for case concord in Russian, even though numerals such as *sórok* 'forty' do not show concord for independent reasons (spell out of cases above GEN fails).

I find this to be one of the most interesting consequences of this analysis: the differences between Russian and Ossetic are not derived as a result of the fact that the derivation starts with different features or different lexical items. The two languages also have exactly the same rules for how the derivation unfolds. For instance, nowhere in the grammar is there a rule saying that Russian has an extra rule of concord that is lacking in Ossetic. Nowhere in the grammar is there a special rule saying that in Russian, case features are co-spelled out, whereas they are not in Ossetic. Rather, the difference emerges as a consequence of how language-specific (and importantly post-syntactic) lexical items interact with an invariant spellout procedure.

9 Reaching concord

The current chapter provides a detailed account of Declension III numerals. The plan is to provide the lexical entries for this declension (these will be different from Declension I), and show how their interaction with the spellout procedure leads to different tree shapes. In particular, we will see how concord derivations arise (where both the numeral and the counted noun inflect for case).

I shall use this example to further illustrate the fact that in the theory built up to now, we can use individual lexical items to determine whether concord arises between the numeral and the noun – or not. Since the difference between "concord vs. no concord" can be seen as a parameter that distinguishes two kinds of languages, we have (by the same token) a case where a parameter is governed by the (in)availability of a particular lexical entry. A theory of this kind has been set out as an ideal theory of parametric variation in Borer's (1984) book. The relevant paragraph is cited below in full.

Borer (1984: 2-3): *"It is a desirable step forward to try and restrict the class of possible parameters. The strongest claim in this respect would be that there are no language-particular choices with respect to the realization of universal processes and principles. Rather, interlanguage variation would be restricted to the idiosyncratic properties of lexical items. These idiosyncrasies, which are clearly learned, would then interact with general principles of UG in a particular way. This interaction would result in vastly different systems.'*

While many different theories along the lines described by Borer have been proposed, the one I am exploring here may be the first one of a kind. In particular, the way Borer's ideal theory has usually been implemented is by manipulating the content of functional heads in the pre-syntactic lexicon (different (uninterpretable) feature specifications, and hence, different features *entering* the syntactic derivation). In the current account, the variation in lexical entries is confined solely to a post-syntactic lexicon, while the pre-syntactic building blocks of structures are invariant across languages (Starke 2014).

The discussion is organised as follows. I first introduce the nominal patterns in

Declension III and provide lexical entries for all the endings. I then turn to how these lexical entries are employed with numerals. Finally, I provide complete derivations for the combinations of numerals and nouns.

9.1 The paradigms

Let me start by introducing the paradigms belonging in Declension III. In Timberlake (2004), this declension contains nouns of all three genders. An example of a feminine noun is given in the leftmost colum of Table 9.1 (*tetráď* 'notebook'). In the middle, there is the masculine noun *puť* 'journey.' On the right, we see the neuter noun 'time.'

Table 9.1: The three genders of the 3rd decl. (Timberlake 2004)

	notebook FEM.SG	journey MASC.SG	time NEUT.SG
NOM	tetráď-Ø	púť-Ø	vrém- **ja**
ACC	tetráď-Ø	púť-Ø	vrém- **ja**
GEN	tetráď-i	puť-í	vrém-en-i
LOC	tetráď-i	puť-í	vrém-en-i
DAT	tetráď-i	puť-í	vrém-en-i
INS	tetráď-ju	puť-óm	vrém-en-em

As we can see, the overlap between the various paradigms is only partial, the main feature that these nouns have in common is the presence of *-i* in GEN, LOC and DAT.

The core of this declension are the feminine nouns. As Timberlake (2004: 131) summarises it: "Declension<III> is feminine except for the masculine singleton *puť* 'route' and the near-dozen neuters."

The numerals of this declension follow the majority feminine pattern, see Table 9.2. What identifies the declension of the numerals as 'feminine' is the presence of *-ju* in the instrumental. The masculine/neuter nouns have *-om*.

Table 9.2: Numerals in declension III (Timberlake 2004)

	notebook III, FEM.SG	five III
NOM	tetráď-Ø	pjať-Ø
ACC	tetráď-Ø	pjať-Ø
GEN	tetráď-i	pjať-í
LOC	tetráď-i	pjať-í
DAT	tetráď-i	pjať-í
INS	tetráď-ju	pjať-jú

I will follow here a line of analysis where the endings of this declension spell out a FEM feature (present in the *fseq* of feminine nouns). The actual work the FEM feature is going to do for me is that it will allow me to hard-code the set of endings in Table 9.2 to the 3rd declension. Specifically, once the relevant endings are specified for the FEM feature, they will be unusable in the masculine/neuter declension I (because they won't match). Conversely, the endings of the 1st declension (which in general spell out CLASS, # and K) will be unusable in Declension III. This separation of markers into 1st declension markers vs. 3rd declension markers is the main reason why I shall need FEM in the *fseq* of the 3rd declension.

Now in order to achieve such a pairing, I do not have to use specifically the feature FEM. I can use any feature as long as it distinguishes Declension I from Declension III. I could have, for instance, called the feature X with a promissory note that I shall look into this in future researech. The reason why I chose the label FEM to do this job is that the absolute majority of nouns in Declension III are actually feminine, while the nouns in the declension I are non-feminine. Recall again that (in the words of Timberlake 2004: 131) "Declension I$_B$ is exclusively neuters, except for some isolated nouns [like *gorodíško*, 'city-DIM.'] Declension I$_A$ consists of masculine nouns [except nouns like *vrač* 'doctor.' ...] Declension<III> is feminine except for the masculine singleton *puť* 'route' and the near-dozen neuters." So by calling the 3rd declension feature FEMININE is anchored in the pairing between the declensions and gender.[1]

Given this analysis, I must first say something about the masculine and neuter nouns which (according to Timberlake) occupy Declension III.

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[1]Such a feature is not (directly) related to reference to females.

9.2 Masculine and neuter nouns in the 3rd declension

I will begin by setting aside the noun *puť* 'journey.' Since this is just a single noun, I find it questionable that we need an analysis with a special single-member class for it. The alternative is to simply treat it as a highly suppletive masculine noun, with two of the singular forms stored as non-analysable items (*puť*, *puťi*).[2] *Puť-om* is a productive masculine instrumental, so this form does not need to be stored, but it will be composed of *puť* shrinking (due to backtracking) under the regular instrumental *-om*, exactly as *zavód-om* 'factory-INS' discussed in Ch. 8 Table 8.12. Under this proposal, the noun *puť* does not contain any actual 3rd declension ending, and I will therefore not consider it in setting up my analysis of these endings.

However, the neuters are somewhat more systematic in that there is 'a near dozen' nouns that pattern alike, and so I will now look at them in more detail. The conclusion I shall move towards is that these nouns do not contain the relevant endings either. The first fact that points in this direction is that the extent to which these nouns pattern like the noun *tetráď* is rather limited. This is most apparent in the plural. Here the neuter nouns decline like 1st declension nouns and unlike 3rd declension nouns. I highlight this in Table 9.3 by dark shading. The shading shows that in the three top cases (where declensions are still differentiated), the noun *vremja* 'time' inflects like the I$_B$ neuter 'place.'[3]

Table 9.3: The plural of Declension III (Timberlake 2004)

	notebook III, FEM. PL	journey MASC.PL	time NEUT.PL	place I$_B$ (NEUT.PL)
NOM	tetráď-i	puť-í	vrém-en-á	mest-á
ACC	tetráď-i	puť-í	vrém-en-á	mest-á
GEN	tetráď-ej	puť-éj	vrém-en-Ø	mest-Ø
LOC	tetráď-ach	puť-áx	vrém-en-áx	mest-áx
DAT	tetráď-am	puť-ám	vrém-en-ám	mest-ám
INS	tetráď-ami	puť-ámi	vrém-en-ámi	mest-ámi

All summed up, the neuter nouns of the 'time' paradigm really look like 1st

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[2]I have proposed an analogous analysis for the Iron pronouns, recall Ch. 5, tree (28).

[3]The noun *puť* 'journey' obviously inflects like a 3rd declension noun. However, recall that I am ignoring this noun and treat it as a frozen non-decomposable item. I list it in the table for the purpose of completeness.

declension nouns with a single exception: they apparently share with the 3rd declension the singular -*i*.

Let me now turn to the analysis. Given the affinity between the noun 'time' and the I_B Declension, I will treat the neuters as nouns of the 1st declension – with no FEM feature. This makes the analysis of the plural straightforward: we have the augment -*en* followed by the relevant case marker (the same one as in the I_B declension).

Under this analysis, if the noun 'time' was fully regular, it would show such a structure also in the singular. It would always have the augment -*en* followed by the case marker of the I_B Declension. If that was the case, its declension would look as in the middle column of the table 9.4. The middle column has been constructed by combining the base *vrem-en* and the endings of the I_B declension (see the column on the left).

Table 9.4: The noun 'time:' expectations and reality

	place, SG I_B	time, SG analytic ideal	time, SG reality
NOM	mest-o	vrem-en-o	vrém- ja
ACC	mest-o	vrem-en-o	vrém- ja
GEN	mest-a	vrem-en-a	vrém- eni
LOC	mest-e	vrem-en-e	vrém- eni
DAT	mest-u	vrem-en-u	vrém- eni
INS	mest-om	vrem-en-em	vrém-en-em

In Russian, the ideal paradigm does not coincide with reality. The actual paradigm is given in the final column, and it deviates from the analytic ideal in the shaded cells (which is what makes Timberlake 2004 classify it as a 3rd declension noun). Now the way in which the nominative and accusative forms diverge from the analytic ideal is highly reminiscent of the situation with Digor numerical phrases. Recall from Chapter 5 Table 5.2 that the oblique cases of Digor numerals have an invariant augment followed by the regular case marker, very much like in the plural of *vrem-ja* 'time.' However, in the structural cases, the augment -*e(m)* is absent. I have shown detailed derivations which explained its absence due to the proposal that there is a NOM/ACC portmanteu that spells out the augment along with case. In the Russian paradigm, the relevant marker (which is completely analogous to the Digor portmanteu Ø) is -*ja*. In other words, in NOM and ACC, the expected combination of *en-o* is blocked by the existence of -*ja*.

The new idea I suggest here is that the same analysis be extended in Russian to GEN/LOC/DAT SG. In particular, I suggest that the paradigm 'time' features a portmenteau *-eni* that is specified for the features of the augment plus the features of the dative. This portmenteau blocks the expected combinations of *-en* and the endings of the I$_B$ declension in DAT and all cases contained in it. Under this analysis, there is again no ending *-i* in GEN/LOC/DAT. Therefore, we do not need to consider the neuter nouns in our analysis of the 3rd declension. (They are first declension nouns with an augment. The augment undergoes joint spellout with case in NOM-DAT.SG.)

9.3 More on the 3rd declension neuters (skippable)

The analysis proposed above gains some support from the way grammars of related Slavic languages treat the special class of '3rd-declension' neuters. For instance, cognate nouns in Czech actually started following the pattern referred to as the 'analytic' ideal in Table 9.4. To see that, consider the data in Table 9.5.

Table 9.5: The noun 'name' in Czech and Russian

	city, SG Czech	name, SG Czech	name, SG Russian
NOM	měst-o	jm-én-o	im- ja
ACC	měst-o	jm-én-o	im- ja
GEN	měst-a	jm-én-a	im- eni
LOC	měst-ě	jm-én-ě	im- eni
DAT	měst-u	jm-én-u	im- eni
INS	měst-em	jm-én-em	im-en-em

What we see here in the first column is a Czech noun related to the Russian I$_B$ paradigm *mest-o* 'place.' The purpose of showing this noun is to illustrate the fact that the I$_B$ declension is virtually non-distinct from Russian. In the second column, we see the declension of the noun 'name' in Czech. This noun is a cognate of one of those few neuters that in Russian belong in the 'time' paradigm. In Czech, it has an invariant *-én-* augment throughout, and this augment is followed by the regular endings of the I$_B$ declension – exactly as expected of the 'analytic ideal' in Table 9.4.

In Czech, the noun 'name' is therefore synchronically a well-behaved member

of the *měst-o* paradigm, and it is in fact doubtful whether any segmentation into a root and an augment is in fact relevant for contemporary Czech. The only reason to indicate such segmentation is to bring out a parallel to the Russian cognate, which belongs to the class of nouns with the augment *-en*, as shown in the last column of the table.

The point of the comparison is to show that when a language (Czech) loses the special nominative portmanteau *-ja*, the expected analytic combination *-en-o* appears. On analogy, we can understand the difference between the GEN/LOC/DAT forms by saying that when the portmanteau *-eni* is lost, the regular combinations emerge. It is not clear that such a straightforward explanation for the change could be provided if we segmented the Russian endings into *-en-* and *-i*.

I therefore conclude the discussion of the '3rd declension' neuters by proposing that they are not 3rd declension nouns. They belong in the I$_B$ declension. As a consequence, they do not contain the same *-i* as the feminine declensions.

9.4 The analysis of Declension-III nouns

With the neuters out of the way, I shall propose an analysis based on the idea that the nouns of the 3rd declension differ from the nouns of the 1st declension in containing the FEM head in their *fseq*. (I will later propose that nouns of the second declension also contain FEM. Nouns of the 1st declension lack it.) This feature is right above the CLASS feature, as in (1) (repeated from Ch. 8, tree (1)).

(1)
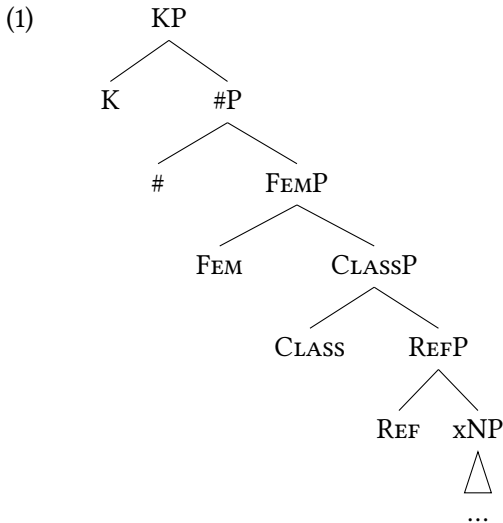
Recall now that roots belonging to the 3rd declension have no overt ending in NOM. On analogy to nouns like *zavód* 'factory,' I propose that this is because they spell out the full set of projections including case projections, as in (2). In Ch. 10, I shall propose that 2nd declension roots spell out just REFP.

(2)
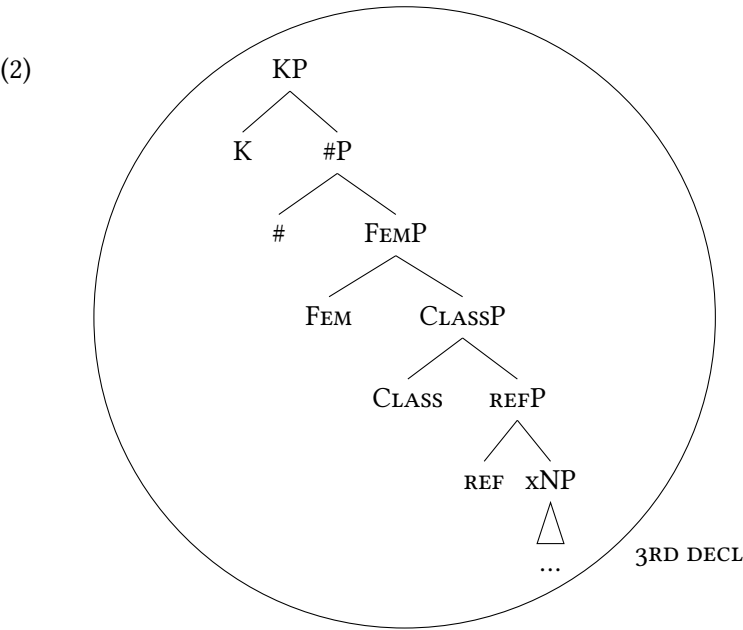
3RD DECL

Like the analogous 1st declension nouns, the 3rd declension nouns spellout only NOM and ACC on their own. From the genitive on, they need case endings. What I propose is that these endings start at the FEM feature and go up all the way to the case projections, as the lexicalisation table 9.6 shows. This entails that the root needs to backtrack under the foot of these endings.

Table 9.6: The lexicalisation tables of the 3rd declension (final)

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	tetráď										
ACC	tetráď										
GEN	tetráď			i							
LOC	tetráď			i							
DAT	tetráď			i							
INS	tetráď			ju							

The reason why I specify these endings for FEM is to make these endings are unusable in the non-feminine declensions. This is important for the following reason. Specifically, in analysing the 1st declension, I heavily relied on the existence of backtracking; see 9.7 repeated from 8.12.

Table 9.7: The lexicalisation tables of *zavód* and *mést-o* (final)

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM			zavód							
ACC			zavód							
GEN	zavód				a					
LOC	zavód				e					
DAT	zavód					u				
INS	zavód						om			

	xNP	REF	CLASS	#	F1	F2	F3	F4	F5	F6
NOM	mést			o						
ACC	mést				o					
GEN	mést				a					
LOC	mést				e					
DAT	mést					u				
INS	mést						om			

In this table, a noun like *zavód* starts spelling out all the heads, and gradually shrinks all the way down to xNP. Recall that shrinking is in part motivated by the fact that the last three endings (LOC, DAT, INS) are unavailable for numerals. Their foot must therefore be at REF, which is below CARD.

Now we know that numerals of the 3rd declension do combine with the 3rd declension markers *-i/-ju*, recall 9.2. Therefore, the foot of *-i/-ju* must be above CARD, and therefore above REF. Given this observation, and given that backtracking is a last resort operation, the question arises why the nouns of the 1st declension backtrack so deep: why can't they use *-i/-ju* in LOC/DAT/INS?

The answer must be that the 3rd declension endings are simply incompatible with the 1st declension. This is achieved by the proposal that (i) the 3rd declension nouns/numerals have the feature FEM, which is lacking in 1st declension, and (ii) the feature FEM is a part of the lexical specification for *-i/-ju*. This makes sure that a DAT form like **zavód-i* is not generated. Crucially, to rule out such forms, the points (i) and (ii) must be observed. If, for instance, *-i* had # as its foot, a form

like **zavod-i* would have been generated.

This, in effect, is my motivation for setting up the analysis the way I did.[4]

9.5 The analysis of numerals

Let me now remind ourselves of the fact that the numerals of the 3rd declension inflect like the corresponding nouns. A couple of relevant examples are given in 9.8, extended from 9.2.

Table 9.8: Numerals of Declension III (Timberlake 2004)

	notebook, sg	five	ten	eight
NOM	tetráď-Ø	pjáť-Ø	desjáť-Ø	vósem-Ø
ACC	tetráď-Ø	pjáť-Ø	desjáť-Ø	vósem-Ø
GEN	tetráď-i	pjať-í	desjať-í	vos'm-í
LOC	tetráď-i	pjať-í	desjať-í	vos'm-í
DAT	tetráď-i	pjať-í	desjať-í	vos'm-í
INS	tetráď-ju	pjať-jú	desjať-jú	vósem-ju

What the table clearly shows is that the numerals take on all the relevant endings of the 3rd declension. They do so despite the fact that their genitive complement undergoes overriding in the oblique cases. I illustrate this in (3) (repeated from Ch. 7, example (1)).

(3)   Russaian, Pesetsky (2013: 2)

    a.   pjať   stol-ov
            five.NOM tables-GEN
            'five tables' (SUBJ/OBJ)

    b.   pjať-i   stol-am
            five-DAT tables-DAT
            'to five tables'

We know that the combination of these two properties (regular nominal declension and overriding) is not something obvious; for the numerals of the 1st declension, these properties are incompatible. Specifically, 1st declension numerals

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[4]The constraints I laid out are compatible with *-i/-ju* having CLASS at their bottom. The reason why this cannot be so will become clear in Ch. 10.

must either give up their regular oblique inflection (like *sórok* 'forty,' recall ex. (23) in Ch. 8), or, if they inflect regularly, they cannot override their genitive (like *milion* 'million,' recall ex. (20) in Ch. 8).

I proposed to capture this correlation using the feature Card. The idea is that genitives that undergo overriding must be introduced at a specific low point in the structure, and that their ability to appear in this position is dependent on the presence of the feature Card. I have then demonstrated that the position of this feature (in between ref and class) causes a disruption in the spellout of the obliques.

Intentionally, the way I have set up the 3rd declension endings allows for the presence of card (leading to overriding of the genitive) without interference in spellout. I show this in Table 9.9.

Table 9.9: The lexicalisation tables of the 3rd declension (final)

	xNP	REF		CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM				tetráď								
ACC				tetráď								
GEN			tetráď					i					
LOC			tetráď						i				
DAT			tetráď							i			
INS			tetráď							ju			

	xNP	REF	CARD	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM				pjať								
ACC				pjať								
GEN			pjať					i					
LOC			pjať						i				
DAT			pjať							i			
INS			pjať							ju			

In this table, I have placed Card at exactly the same spot, which it occupies in the 1st declension, namely in between ref and Class. However, in the 3rd declension, this feature has no effect on the spellout of the numeral. The reason is that the foot of the 3rd declension endings is safely above Card. The endings have fem as their foot and there is therefore no need to backtrack all the way below Card. The feature Card therefore remains buried deep inside the numeral's root, and it does not influence spellout in any way.

9.6 Deriving the concord pattern

With the lexical entries in place, let me turn to how examples such as (4) (repeated from Ch. 7, example (1)) are derived in this system.

(4)   Russaian, Pesetsky (2013: 2)

  a. pjať   stol-ov
      five.NOM tables-GEN
      'five tables' (SUBJ/OBJ)

  b. pjať-i   stol-am
      five-DAT tables-DAT
      'to five tables'

I will run briefly through the initial steps of the full derivation, because the logic has been presented already in Ch. 8. I will slow down in my presentation when differences between the derivations emerge. These have to do with the fact that in the 3rd declension, the numeral is able to accommodate all the relevant case features, as we have seen in 9.9.

9.6.1 The initial steps

The base position of the counted noun is as shown (5). Here the counted noun is merged as a Spec inside the projection line of the numeral. The numeral serves as a cardinality predicate.
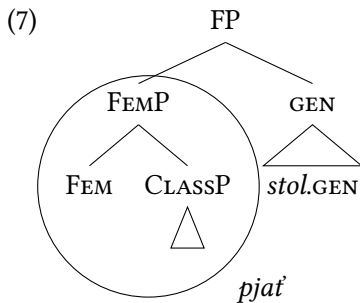
(5)
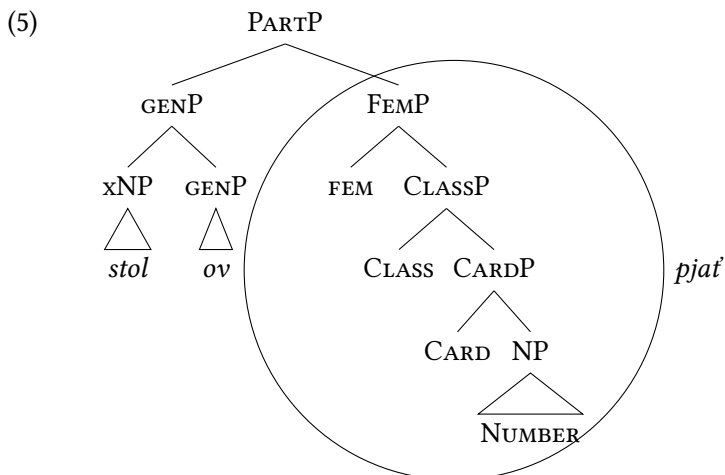
Compared to numerals like *sórok* 'forty,' there is an extra FEM feature. This feature

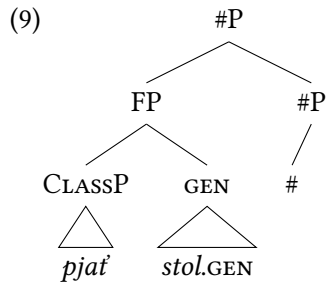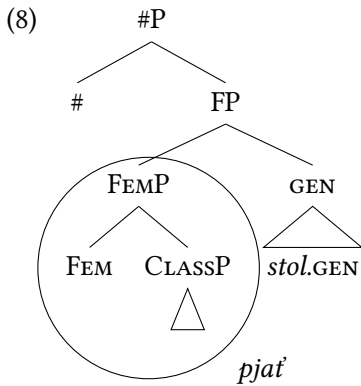resides below the point where the argument is introduced (just like CLASS).

The next step is predicate inversion shown in (6). Here the numeral moves across the subject in order to project the feature F.
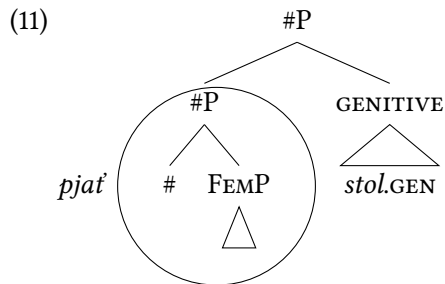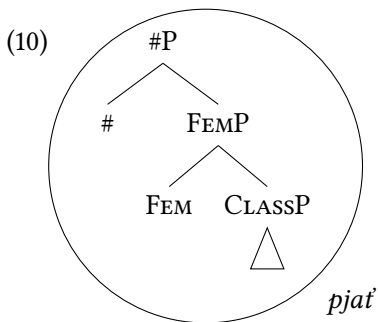
(6)
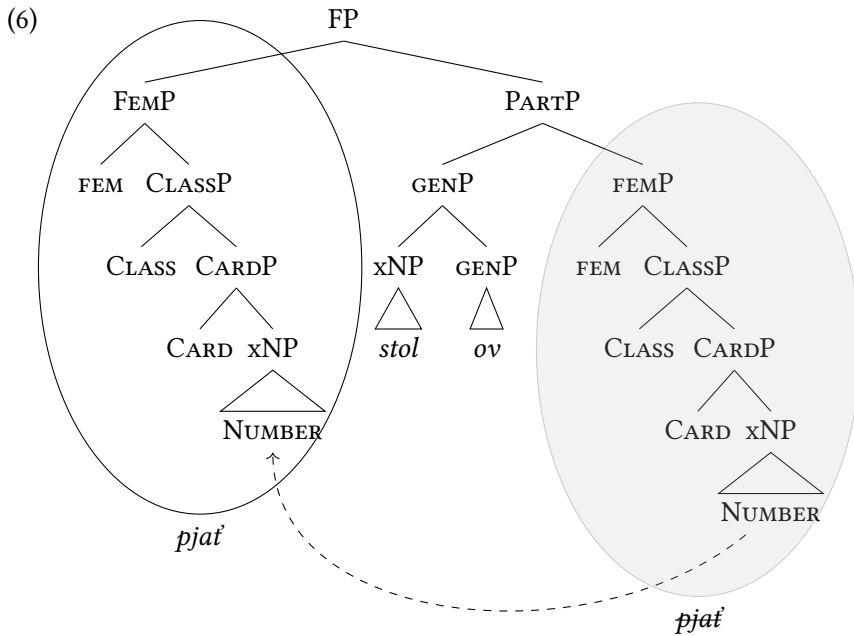
The bottom part of the derivation will be simplified into (7) from now on.

(7)

After predicate inversion applies, # is added, as shown in (8). This structure won't spell out, leading to an attempt at complement movement, see (9).

(8)

```
              #P
           ╱     ╲
          #       FP
               ╱      ╲
           FemP        GEN
          ╱    ╲       ╱╲
       Fem   ClassP  stol.GEN
               △
             pjat'
```

(9)

```
                #P
             ╱      ╲
           FP        #P
         ╱    ╲       ╱
     ClassP   GEN    #
       △      ╱╲
     pjat'  stol.GEN
```

(9) fails to spell out as well (even with the 3rd-declension entries in place), and backtracking is triggered. Backtracking reopens the AUX workspace. The attempt to introduce # in the two workspaces is going to be successfully spelled out only in the AUX workspace, as in (10). After # spells out, the AUX is merged to the main spine, projecting # to the top node, see (11).

(10)

```
          #P
        ╱    ╲
       #     FemP
            ╱    ╲
         Fem   ClassP
                  △
                pjat'
```

(11)

```
                    #P
                 ╱      ╲
               #P       GENITIVE
              ╱  ╲         △
   pjat'     #   FemP    stol.GEN
                  △
```

The derivation now continues by merging case features. The tree in (12) depicts the stage of the derivation where the nominative feature F1 is introduced. Spellout with no movement fails in (12), and spellout movements are therefore activated. Since there is no movable Spec, complement movement is attempted, yielding (13).

(12) NOM
F1 #P
#P GEN
FemP *stol*.GEN
pjat'

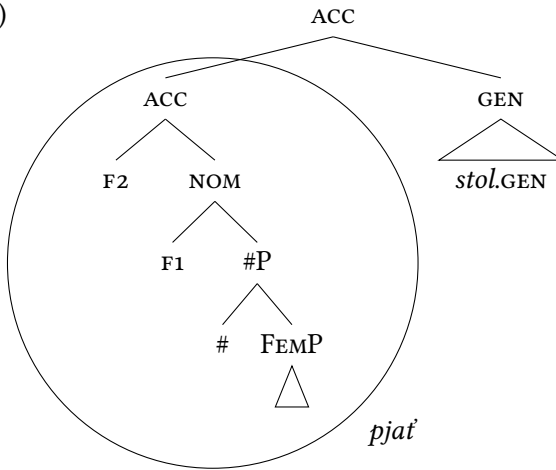(13) NOM
#P NOM
#P GEN F1
FemP *stol*.GEN
pjat'
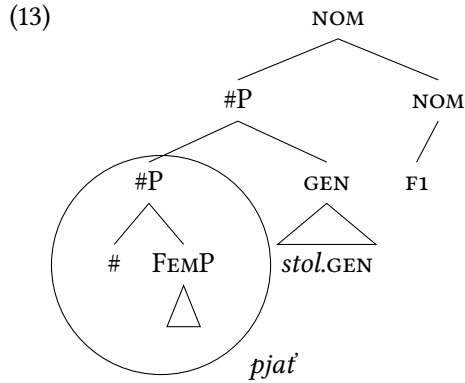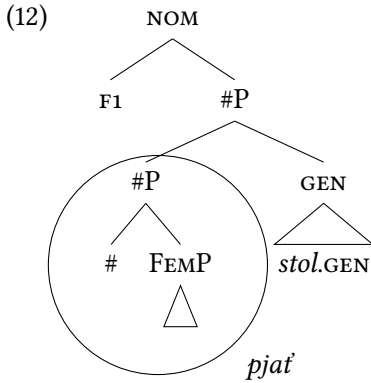
The configuration in (13) fails to spell out, leading to backtracking. Under backtracking, the derivation splits into two workspaces. We have the main spine – containing the GEN. Then there is the AUX branch – containing *pjat'*. The case feature F1 is merged on top of each branch, but spells out successfully only in AUX, see (14). When spelled out, the AUX branch is merged to the main spine.

(14) NOM
F1 #P
FemP
pjat'

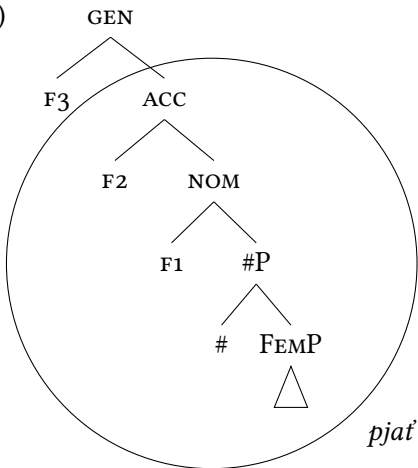(15) NOM
NOM GEN
F1 #P *stol*.GEN
FemP
pjat'
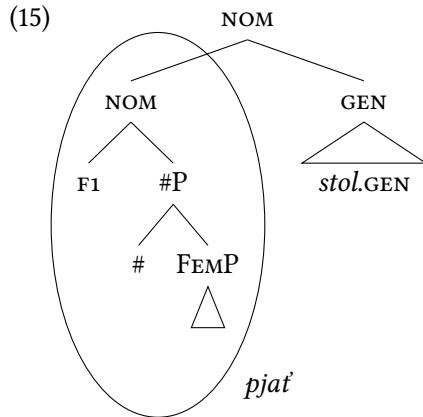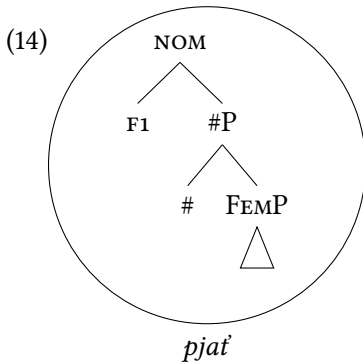
The accusative is derived in a similar manner. When F2 is added on top of (15), there is no way to spell it out because no suffix has F2 as its bottom. The two branches therefore split, and F2 is introduced in each one of the two branches. It fails to spell out on top of the genitive noun, but it is successfully incorporated into the Spec with the cardinal, as in (16):

(16)

```
                        ACC
            ┌────────────────────────┐
           ACC                      GEN
         ┌──────┐                  ╱──────╲
        F2     NOM              stol.GEN
              ┌──────┐
             F1     #P
                  ┌──────┐
                 #    FemP
                       △
                              pjať
```

The very same sequence of steps must be repeated one more time, before the genitive is derived. We merge F3 to (16), but that fails to spellout. We backtrack, which reopens the two workspaces in (16). We merge F3 in each workspace. F3 will fail to spell out in the main spine. In the Spec, the configuration after merging F3 is as in (17).

(17)

```
           GEN
         ╱──────╲
        F3     ACC
             ┌──────┐
            F2     NOM
                 ┌──────┐
                F1     #P
                      ┌──────┐
                     #    FemP
                           △
                                  pjať
```
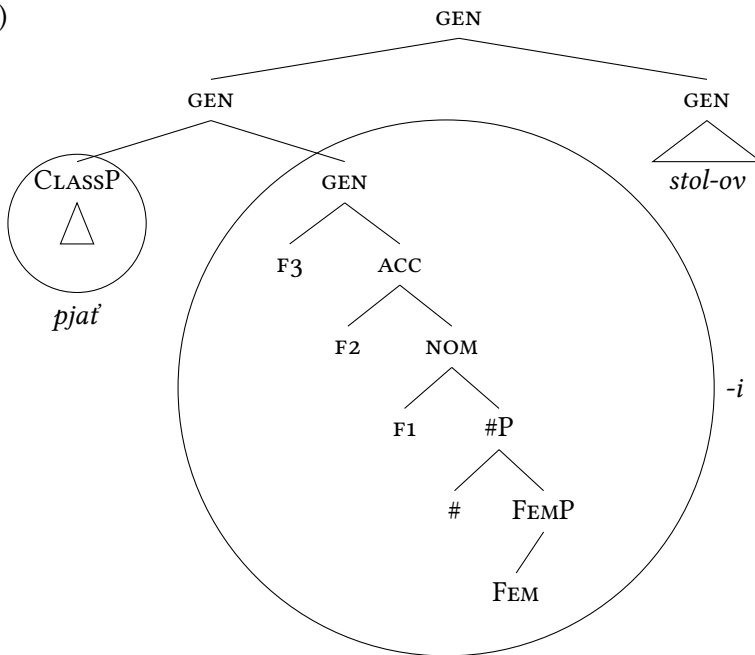
We know from Table 9.9 that in the genitive, the successful spellout of F3 requires backtracking, which makes *pjať* shrink down to the ClassP, so that the genitive *-i* can find its foot. The result is as in (18):
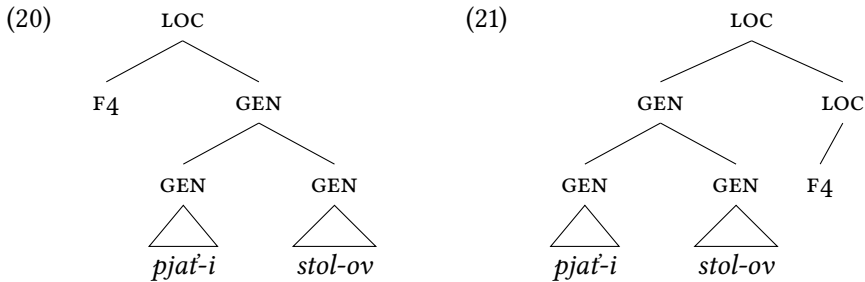
(18)
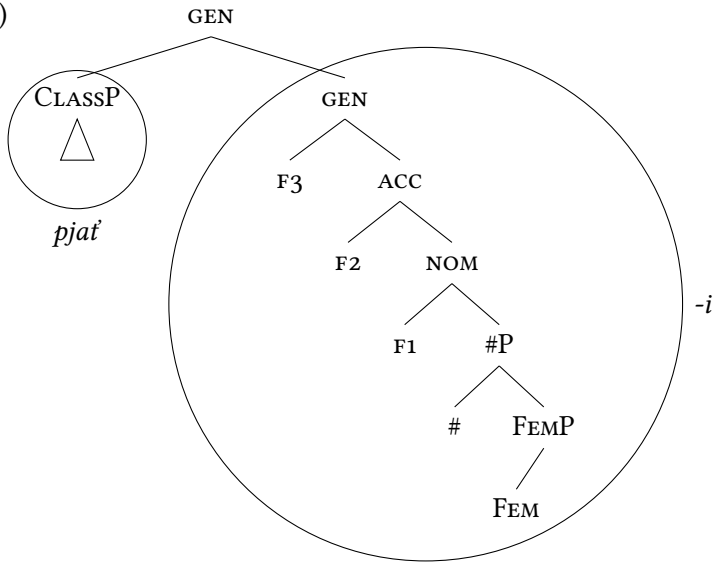
Once (18) spells out, the Spec is closed yielding the correct genitive form in (19):
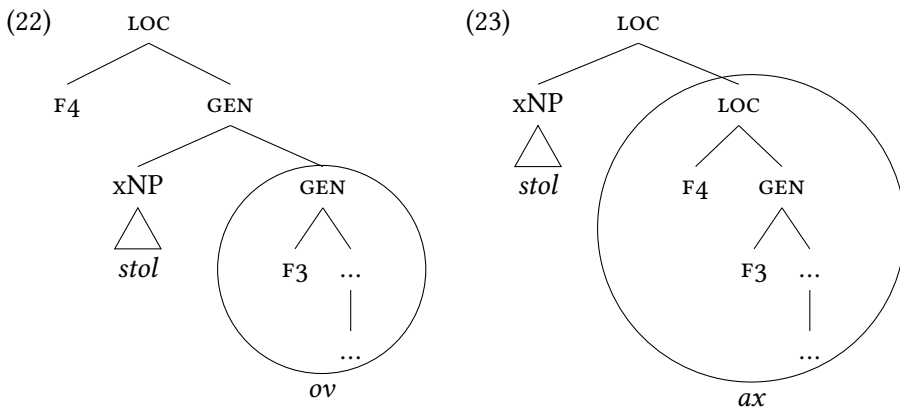
(19)

9.6.2 Concord

Recall now that in Russian (as in Ossetic), the case above GEN is LOC. When the locative feature is merged, the configuration in (20) arises:

(20)
```
            LOC
           /   \
         F4     GEN
               /   \
            GEN     GEN
             △       △
          pjaťˊ-i   stol-ov
```

(21)
```
              LOC
             /   \
          GEN     LOC
         /   \      \
      GEN    GEN    F4
       △      △
    pjaťˊ-i  stol-ov
```

(20) cannot spell out; complement movement is therefore tried, see (21). But (21) does not spell out either, because there is no lexical entry with F4 as its bottom. Backtracking must therefore take place. This leads to the reopening of the two workspaces, and F4 is merged in each of the two workspaces.

We know that the main spine can incorporate F4. The original merge configuration in (22) does not spell out as is. It is therefore is transformed by Spec movement to (23), where the F4 feature undergoes successful co-spellout with the original genitive, replacing it by override, as the morpheme labels at the circles make clear.

(22)
```
            LOC
           /   \
         F4     GEN
               /    \
            xNP      GEN
             △      /   \
           stol   F3    …
                   |
                   …
                   ov
```

(23)
```
            LOC
           /   \
        xNP     LOC
         △     /   \
        stol  F4    GEN
                    /   \
                  F3    …
                   |
                   …
                   ax
```

What is new compared to the derivation of *sórok* is that the AUX can incorporate F4 too. (24) is the structure where F4 is introduced in AUX. This structure does not spell out without movement. Spec-to-Spec movement of the CLASSP *pjaťˊ* is tried, yielding (25). This structure can be successfully spelled out.

(24)

(25)
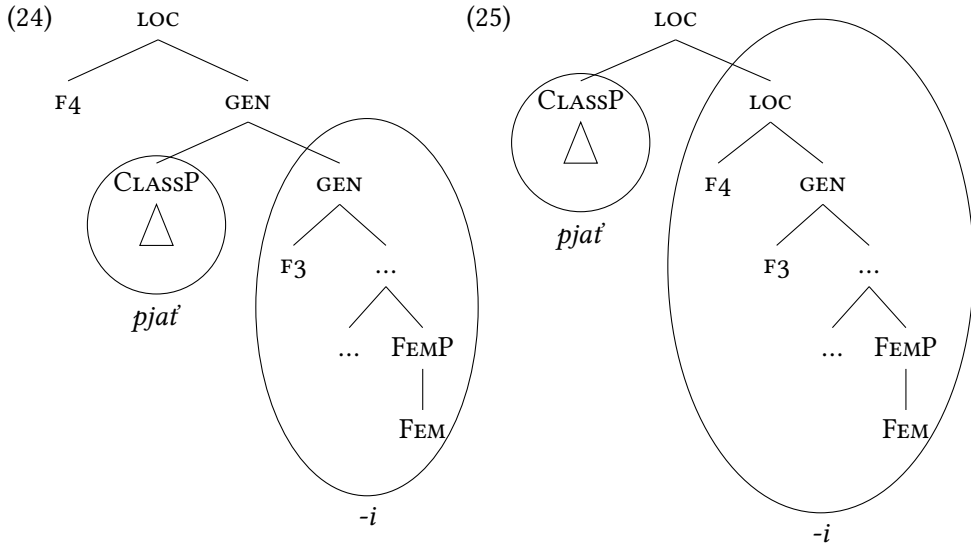
As a result, what we get is a situation where F4 spells out successfully in both workspaces. We can reintegrate the two branches, projecting the LOC feature F4 to the top:

(26)
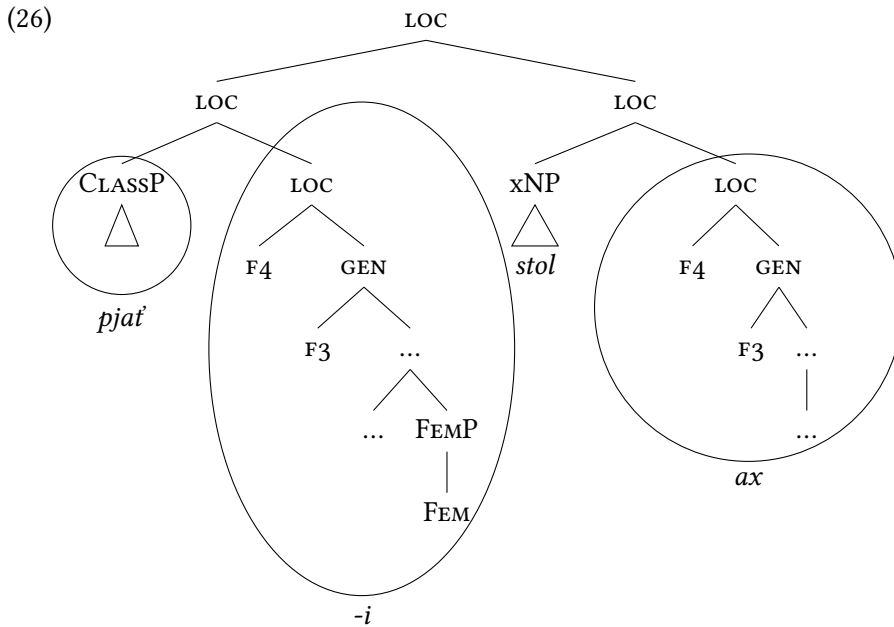
The dative case is derived by a series of similar operations. First we merge the

dative feature F5 on top of the locative. The feature will fail to spell out in situ, triggering complement movement. Since there is no suffix with F5 as the bottom, spellout fails in such a structure. Backtracking takes place, separating the two workspaces. F5 is merged in each. Spec movement succeeds in both cases to provide structures where a successful co-spellout between F5 and the relevant workspace takes place. The final structure is in (27).

(27)
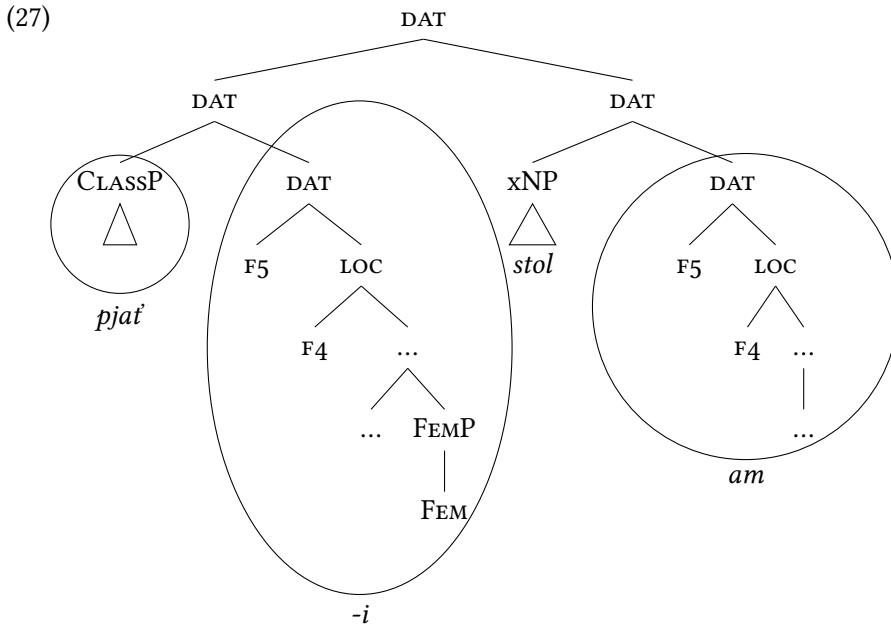
The way the feature F5 spreads through the DP is exactly as described in Sec. 7.3; first introduced as a phrasal feature and later realized on both subconstituents within the extended NP.

9.7 Conclusions

This is where the derivation of the concord pattern found in Declension III ends. The chapter did not introduce any new assumptions. The point was to show first of all how we can model allomorphic variation by linking endings to the features they spell out. As a consequence, the allomorphs of a particular case (say dative) are identical in their top part (they are dative markers), but they differ in their lower part (one spells out FEM, the other does not; one spells out REF, the other does not, etc.)

As a result of having distinct bottoms, these different allomorphs interact with the derivation slightly differently. In Declension III, they give rise to concord pattern, in Declension I, this is not the case. The interesting point is that each declension patterns a bit as if constituting its own 'language,' yielding slightly different structures. This runs counter to the standard practice of assigning exactly the same structures to items of different declensions. The added value is that by finding different patterns within a single language, we have to make sure that they can peacefully coexist. For instance, the analysis must make sure that Declension-I endings will not show up in Declension III, and this ties our hands and guides the analytical decisions.

In the next chapter, I shall continue in this goal and complete my analysis of Russian by looking at Declension II. What we will see is that this declension provides a meeting place for some of the endings that we had already seen, thereby providing an independent confirmation of the lexical specifications proposed so far.

10 The thousand mysteries

The current chapter sets out to explore the mysteries surrounding the numeral 'thousand.' In the grammars, it is usually portrayed as a 2nd declension numeral (with a little quirk in the instrumental). My goal will be to understand this quirk within the general morphological properties of the Russian 2nd declension. This will complete our account of Russian in that we will have established lexical entries for all the declensions and all the relevant numerals.

The chapter is organised as follows. I will first look at the 2nd declension and motivate a particular analysis of its endings. Then I turn to the numeral thousand and explain its behaviour within the set of assumptions about the endings and about what its lexical entry looks like.

10.1 Declension II and *tysjač-a* 'thousand'

Let me start by introducing the paradigms belonging in Declension II. I show two of them in Table 10.1.

Table 10.1: Declension II (Timberlake 2004)

	woman II, FEM.SG	week II, FEM.SG
NOM	žen-á	nedél'-a
ACC	žen-ú	nedél'-u
GEN	žen-ý	nedél'-i
LOC	žen-é	nedél'-e
DAT	žen-é	nedél'-e
INS	žen-ój	nedél'-ej

The table contains two 2nd declension nouns, each belonging to a particular phonological class (hard stem, soft stem respectively). Where different, the allomorphs of the case endings are phonologically conditioned and, in fact, phono-

logically related. The alternations between *o/e* (in the instrumental) as well as that between *y/i* are commonly attested also in the 1st declension.

Let me now introduce the numeral 'thousand.' Its forms are listed in Table 10.2. We can see that its inflection is largely identical to that of a 2nd declension noun, as the dark shading indicates. The single little quirk arises in the instrumental, where the numeral also allows for the form *týsjač-ju*, a 3rd declension ending (as the light shading indicates). Apparently, the instrumental is the only form that allows for the 3rd declension ending (more on this later), and so the rest of the column is left blank (for now). My goal will be to understand what is going on here, and whether this intriguing fact can be somehow made to fall out from the lexical entry of the numeral interacting with the invariant spellout procedure.

Table 10.2: The numeral 'thousand' (Timberlake 2004)

	notebook III, FEM.SG	thousand III	thousand II	week, II, FEM.SG
NOM	tetráď-Ø	—	týsjač-a	nedél'-a
ACC	tetráď-Ø	—	týsjač-u	nedél'-u
GEN	tetráď-i	—	týsjač-i	nedél'-i
LOC	tetráď-i	—	týsjač-e	nedél'-e
DAT	tetráď-i	—	týsjač-e	nedél'-e
INS	tetráď-ju	týsjač-ju	týsjač-ej	nedél'-ej

The facts surrounding the numeral *tysjač-a* 'thousand' are complex. To understand them better, it will be advantageous to place them against the wider context of the Russian declension, so this is what I turn to first.

Very much like Declension III, Declension II mainly contains feminine nouns, and I will be therefore grouping the two together under the label 'the feminine declensions.' The analysis will be reflected by postulating the feature FEM in the *fseq* of Declension-II nouns. This commonality between Declension II and III (an identical *fseq*) will also be a prerequisite for capturing the interesting fact that the numeral 'thousand' alternates between Declensions II and III in the instrumental. It would be a completely different matter if it showed an alternation between Declension II and I, since that would require different *fseq*s.

The analytical decision to place FEM in the *fseq* of the second declension is anchored in the description offered by Timberlake (2004: 131) to the effect that "Declension II is feminine, with two large classes of exceptions." Before the analysis unfolds, let me address the two exceptional classes, both limited to human

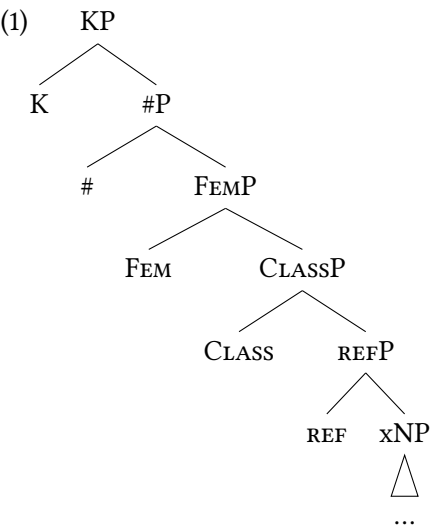denoting nouns. (Inanimates ending in -*a* are all feminine.)

The first class of exceptions consists of nouns that have an -*a* in the nominative, and they may refer either to a male or a female referent. When such nouns refer to a female referent, they trigger feminine agreement. When they refer to males, they trigger masculine agreement. The nouns Timberlake gives are cases like *neposed-a* 'fidgety person' or *neved-a* 'ignoramus.' It is interesting to note that such nouns are preceded with a NEG prefix *ne-* and tend to have an evaluative meaning. The second type of exceptions are hypocoristics (e.g., *Tolj-a*) and certain isolated nouns (*djadj-a* 'uncle'), which refer to males only and trigger masculine agreement.

I analyse both classes as a special case of nouns which actually have the FEM feature. When their referent is male, this yields a special pragmatic effect; endearing in the second class (hypocoristics), derogatory in the first one ('ignoramus'). The fact that these nouns trigger masculine agreement will be treated by proposing that with male-denoting nouns, concord always tracks the actual reference and not the features. This is similar to what I proposed for nouns like *vrač* 'doctor' in Ch. 8, example (8).

In sum, I shall proceed under the assumption that all nouns ending in -*a* have the feature FEM. I stress, however, that even though I believe the label of the feature to be correct, the label itself is not crucial. The crucial thing is that there is some feature that is present in nouns of 2nd and 3rd declension, and absent in the nouns of the 1st declension.

10.2 The endings

In this section, I am going to provide an analysis of the second declension endings. As discussed in the preceding section, I will be drawing the lexical entries assuming a structure where the nouns of the 2nd and 3rd declension have the same *fseq*, i.e., the same set of features ordered in the same hierarchy. This *fseq* differs from the one assigned to nouns of the 1st declension in that it contains the FEM head. The FEM feature, recall, is right above the CLASS feature, as in (1) (repeated from Ch. 9, tree (1)).

(1)

```
                KP
              /    \
            K       #P
                  /    \
                 #      FₑₘP
                       /    \
                    Fₑₘ     CₗₐₛₛP
                           /    \
                      Cₗₐₛₛ     ʀᴇꜰP
                                /   \
                            ʀᴇꜰ     xNP
                                     △
                                     …
```

The roots of the third declension (like *tetráď* 'notebook') have no ending in ɴᴏᴍ, and I have therefore proposed that they pronounce the full tree. Nouns of the second declension (e.g. *žen-a* 'woman') have an overt ending in ɴᴏᴍ. This means that these roots cannot spell out all the features. As to how many features they spell out is the question I turn to now.

To answer the question, recall first that the 3rd declension oblique endings *-i* and *-ju* start at Fᴇᴍ and go all the way to the top. With this in mind, suppose that the roots of the second declension would spell out CʟᴀssP. If that was so, they would be 'big enough' to reach all the way to the 3rd declension endings, and the two would thus combine. The table 10.3 illustrates this.

Table 10.3: The predicted behaviour of a CʟᴀssP root

|	xNP	ʀᴇꜰ	ᴄʟᴀss	ꜰᴇᴍ	#	ꜰ1	ꜰ2	ꜰ3	ꜰ4	ꜰ5	ꜰ6
ɢᴇɴ		žen			i						
ʟᴏᴄ		žen				i					
ᴅᴀᴛ		žen					i				
ɪɴs		žen					ju				

As a consequence, we expect that nouns with a CʟᴀssP root would have a declension-specific ending in ɴᴏᴍ/ᴀᴄᴄ, but from ɢᴇɴ onwards, they would inflect like a 3rd declension noun. This is something we saw in Declension I. Here

nouns with small roots (and overt nominative) like *gorod-išk-o* 'city-DIM' unite in GEN with nouns that have a big root in NOM/ACC, see Table 10.4.

Table 10.4: Declension I, fragment (Timberlake 2004)

	factory I_A (MASC)	house-DIM, I_B (MASC)
NOM	zavód-Ø	dom-íšk-o
ACC	zavód-Ø	dom-íšk-o
GEN	zavód-a	dom-íšk-a
…	…	…

However, this is clearly not the case with the feminine declensions, and the relationship between Declensions II and III is (on the surface) different than the one between Declension I_A and I_B. Therefore, the conclusion to be drawn here is that the 2nd declension roots must be smaller than CLASSP. The projection immediately below is REFP and I will therefore confine the 2nd declension roots to this size, as shown in (2).

(2)
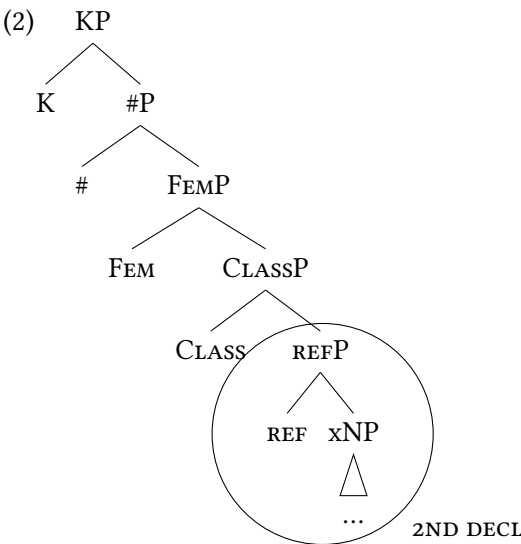
The lexicalisation table 10.5 shows that under this proposal, we reach the desired goal. Specifically, we derive the fact that the 2nd declension roots (which only spell out REFP) cannot directly combine the 3rd declension endings, because this

leaves Class unexpressed. In the table 10.5, I am putting an asterisk in the 'unexpressed' class column.[1]

Table 10.5: 2nd declension roots and 2nd declension endings

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	žen		*		i						
ACC	žen		*			i					
GEN	žen		*				i				
LOC	žen		*					i			
DAT	žen		*						i		
INS	žen		*							ju	

However, it is important to realise that the reason why the 3rd declension endings cannot directly combine with 2nd declension roots is different from why they can't appear in the 1st declension. In the masculine/neuter 1st declension, the 3rd declension endings simply cannot match any constituent, because they have FEM as their lowest feature. In the 2nd declension, they match all the features from FEM up; the reason why lexicalisation fails in 10.5 is just that class goes unpronounced. This is going to be important when we look at demonstratives and the numeral 'thousand.'

The actual endings that we observe in the 2nd declension will then be analysed as portmanteau markers for class plus the 3rd declension endings. The Table 10.6 shows how this works.

Table 10.6: 2nd declension roots and 3rd declension endings

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	žen			a							
ACC	žen				u						
GEN	žen					y					
LOC	žen						e				
DAT	žen							e			
INS	žen								oj		

---

[1] Previewing: the special Declension III form of the numeral 'thousand' will be able to spell out Class in the instrumental.

I add that I shall change the analysis of the instrumental ending *-oj* shortly, and the entries for *-a* and *-u* will also be updated. The reasons for this are discussed in the following section.
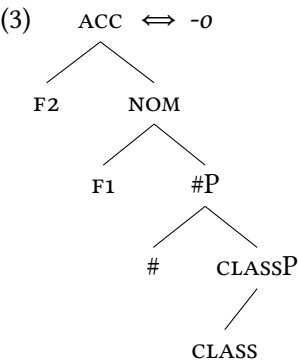
10.3 Demonstratives

The considerations presented in the previous section are – in an interesting way – supported by the shape of feminine demonstratives in Russian. To see where in the system the demonstrative data are going to fit, let me first come back to the table 10.5, repeated below in 10.7 for convenience. The table shows why 2nd declension roots cannot combine with 3rd declension endings.

Table 10.7: 2nd declension roots and 3rd declension endings

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	žen		*	i							
ACC	žen		*		i						
GEN	žen		*			i					
LOC	žen		*				i				
DAT	žen		*					i			
INS	žen		*					ju			

The reason for repeating the table is that the asterisk that I have placed in the CLASS column deserves a closer look. The closer look will reveal that we in fact already possess in our lexicon multiple entries that can spell out CLASS, i.e., the slot where the asterisk resides. One of them is the 1st declension NOM/ACC marker *-o*, repeated in (3) from Ch. 8, tree (14).

(3)   ACC ⟺ *-o*

```
          ACC
         /    \
       F2     NOM
             /    \
           F1     #P
                 /   \
                #    CLASSP
                       /
                    CLASS
```

As we can see, this entry has CLASS as its foot, and it can therefore be (in principle) used to spell out the unlexicalised CLASS node in Table 10.7. In addition, it happens to be an entry that has (from the entries I have introduced so far) the smallest amount of unused features. As a consequence of having an entry like (3) in our lexicon, the combination of a root like *žen* and the 3rd declension endings is not predicted to be ungrammatical right away; rather, what is predicted is that if there were no portmanteau markers like *-a* and its kin, an *-o* shall appear in between the root and the ending, as in Table 10.8. In the table, inserting *o* under CLASS allows us to bridge the gap between the 2nd declension root and the 3rd declension endings.

Table 10.8: Bridging 2nd declension roots and 3rd declension endings

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	žen		o		i						
ACC	žen		o			i					
GEN	žen		o				i				
LOC	žen		o					i			
DAT	žen		o						i		
INS	žen		o							ju	

The forms that are generated this way are not expected to be necessarily the attested forms. Specifically, these forms would only arise in case the portmanteau markers of the second declension were (for some reason) unavailable.

The forms that would arise in the absence of portmenteaus are then as given in the middle column of the table 10.9. In the table, I have suffixed them on the famous root *wug* used in nonce-word testing. In writing the suffixes, I treat the

vowel *-i* of Table 10.8 as a marker that gets realised as *-j* after vowels. No other changes are made.

Table 10.9: Declension II and a feminine DEM (Timberlake 2004)

	woman DECL II	wug hypothetical	this FEM.SG
NOM	žen-a	wug-o-j	et-a
ACC	žen-u	wug-o-j	et-u
GEN	žen-y	wug-o-j	et-o-j
LOC	žen-e	wug-o-j	et-o-j
DAT	žen-e	wug-o-j	et-o-j
INS	žen-o-j	wug-o-ju	et-o-j(u)

The interesting observation is that the forms of the hypothetical paradigm turn out to be rather similar to the actual forms of the feminine demonstrative (on the right); later, the comparison will extend also to the actual 2nd declension endings (on the left). My starting point is the observation that the hypothetical paradigm generated by a lexicon without the 2nd declension portmanteaus corresponds to the actual oblique endings of the demonstrative paradigm. This is highlighted by the light shading.

Let me now focus in more detail on the instrumental form of the demonstrative. The expected analytic instrumental ending is *-o-ju* (which is what one gets by juxtaposing the CLASS marker *-o-* and the 3rd declension *-ju*). As noted by Timberlake (2004: 118), such a form is attested: "demonstratives […] allow an archaic variant [*étoju*] with an extra syllable in the instrumental feminine singular." In the currently used forms, however, the final *-u* is dropped, and we get the form *ét-o-j*. I will treat this as an instance of an apocope, where the final vocalic segment drops if the instrumental *-ju* is preceded by a vowel, see (4-a). When it is preceded by a consonant, *-u* cannot drop, see (4-b).[2]

---

[2] The rules in (4) are on purpose purely descriptive. A potential rationale for them can be certainly provided in a number of frameworks. Within the CVCV approach to phonology that I am familiar with (Scheer 2004), consonant final nouns (like *tetrád'* 'notebook') end in an empty V position. Each such position must be governed. If the *-u* of the final *-ju* would be dropped, the empty V position to the left of the suffix would be ungoverned. But if the base ends in a vowel (as when there is the class marker *-o*), the final *u* can drop, because the V to the left of the suffix is filled and therefore does not need to be governed.

(4)   The fate of the instrumental *-ju*

    a.   V-*ju* → V-*j*   (apocope after a vowel)

    b.   C-*ju* → C-*ju* (no apocope after a consonant)

Once this proposal is in place, the instrumental form of the 2nd declension noun *žen-oj* can be treated as derived via the same apocope rule that truncates the archaic *ét-o-ju* into *ét-o-j*. In other words, I will treat the instrumental *žen-o-j* as an analytic form composed of the CLASS marker *-o-* and the 3rd declension *-ju*. This completes our discussion of the light gray cells in Table 10.9.

    Let me now turn to the dark-shadded cells of the demonstrative paradigm. Here, we do not see the expected combinations of the CLASS augment *-o-* followed by a case marker; we find *-a* and *-u* instead. This is clearly a part of a general tendency where in structural cases, we find a portmanteau marker for the expected analytic combination comprising the AUGMENT+CASE. (Recall here the analysis of the Digor augment in Ch. 5 and the NOM/ACC forms of the paradigm *vrem-ja* 'time' in Ch. 9.) Now the interesting fact is that the portmanteaus we find here match the 2nd declension endings in the left-most column of Table 10.9. This supports our conclusion from Table 10.6 to analyse *-a* and *-u* as exactly such portmanteaus for CLASS *-o* and a 3rd declension marker.

    The difference between the demonstrative paradigm and the nominal paradigm is that in nouns, portmanteau markers are also present in GEN (*-y*) and LOC/DAT (*-e*). The reason for the difference must be that these two portmanteau endings (i.e., *-y* and *-e*) are unavailable for the demonstrative paradigm. Once these portmanteaus are unavailable, the analytic combinations appear automatically.

    I shall now provide a detailed derivation of a 2nd declension noun.

10.4 The derivation of nouns

I start by providing the lexical entries. (5-a) is the entry for the Declension II root *žen-* 'woman.' As already explained, it is associated to a constituent of the size REFP. (5-b) is the marker *-o*, whose entry we have already seen in (3): it functions as the CLASS marker in the analytic forms. The remaining entries are the relevant nominal case endings ordered in terms of increasing complexity (from NOM to INS).

(5)   a.   *žen* ⟺ [REF [xNP]]

    b.   *-o* ⟺ [F2 [F1 [# [CLASS]]]]

    c.   *-a* ⟺ [$_{\text{NOM}}$ F1 [# [FEM [(5-b)]]]]

d. $-u \Longleftrightarrow [_{\text{ACC}} \text{F2} [\text{(5-c)}]]$
e. $-y \Longleftrightarrow [_{\text{GEN}} \text{F3} [\text{F2} [\text{F1} [\# [\text{FEM} [\text{CLASS}]]]]]]$
f. $-e \Longleftrightarrow [_{\text{DAT}} \text{F5} [\text{F4} [\text{F3} [\text{F2} [\text{F1} [\# [\text{CLASS} [\text{FEM}]]]]]]]]$
g. $-ju \Longleftrightarrow [_{\text{INS}} \text{F6} [\text{F5} [\text{F4} [\text{F3} [\text{F2} [\text{F1} [\# [\text{FEM}]]]]]]]]$

Note that the entry for the NOM -*a* and the ACC -*u* are stored as pointer-containing entries. The nominative in (5-c) has a pointer to the class marker (5-b). The accusative -*u* in (5-d) has a pointer to the nominative (5-c). The purpose of introducing a pointer here is twofold. First, if the entry for the nominative -*a* had the CLASS feature instead of the pointer, there would be the danger that the ending -*a* could outcompete -*o* in spelling out CLASS. The danger arises because -*o*, an accusative ending, has more case features than -*a*, a nominative ending. In order to avoid the need to compute how the two would compete for CLASS (i.e., who has more unused features), the entry for -*a* simply has a pointer to -*o*, and it can only be inserted at the level of FEMP. It can never spell out CLASSP.

The second reason why -*a* has a pointer has to do with the fact that it appears in demonstratives. The idea here is that demonstratives and nouns will have two slightly different (decomposed) CLASS structures, and -*o* will be able to spell out both. The first kind of CLASS structure would have just a single feature, [CLASS1], and it will be characteristic for demonstratives. The second CLASS structure will contain two features, [CLASS2 [CLASS1]]. This structure will be present in nouns. This is summarised in (6).

(6) Decomposed CLASS structure[3]
    a. CLASS structure nouns: [CLASS2 [CLASS1]]
    b. CLASS structure demonstratives: [CLASS1]

The un-numbered feature CLASS in the lexical entry of -*o* (5-b) is a stand in for the more complex one of these structures (i.e., for (6-a)). As a consequence, -*o* can therefore spell out both of these structures.

Because of this, the lexical entry of -*a* will also be able to apply to both kinds of class structures in (6); thanks to the pointer, it is a portmanteau for whatever -*o* spells out (i.e., whichever of the two CLASS structures) plus the feature FEM. The insertion of -*a* is therefore not dependent on the precise CLASS structure below FEM: as long as -*o* spells it out, so will -*a*. As a consequence, -*a* will be available both for demonstratives (which have just CLASS1) and nouns (which have the more complex structure [CLASS2 [CLASS1]]).

---

[3]Note again that demonstratives are impoverished compared to nouns, a proposal reminiscent of the fact that demonstratives lack -*e* in Digor and the class prefix in Bantu.

On the other hand, endings with no pointer will be sensitive to such structural differences. Therefore, pointers are omitted from the genitive *-y* (5-e) and from the LOC/DAT *-e* (5-f). As a consequence, these entries will be sensitive to the structural differences between demonstratives and nouns: they will only appear with nouns. Specifically, when FEM attaches directly on top of CLASS1 (as it does in demonstratives), the entries *-y* and *-e* cannot apply. The reason is that they do not contain such a structure in their entry; recall that the un-indexed CLASS feature in their specification is a stand-in for the more complex structure, as with the entry for *-o*.

Finally, given that the accusative *-u* in (5-d) also combines with both demonstratives and nouns, it has a pointer too. Its entry says that it is an accusative version of *-a*). In sum, by distinguishing entries with pointers and without pointers allows us to understand why some portmanteaus are available for both nouns and demonstratives, while other portmanteaus are available only for nouns. Where portmanteaus are unavailable, analytic marking (*o* followed by 3rd declension case) is found.
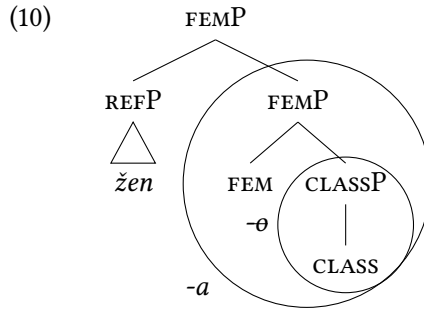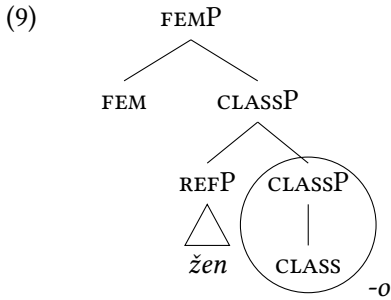
Let me now run through the derivation of the paradigm 'woman.' It unfolds like this.

The first relevant step is when REFP (spelled out by the root *žen*) is merged with CLASS, as in (7). There is no match for the full structure, and complement movement takes place. The result is in (8), and the remnant CLASSP is successfully lexicalised by *-o*.[4]

(7)

CLASSP
├── CLASS
└── REFP
    └── *žen*

(8)

CLASSP
├── REFP
│   └── *žen*
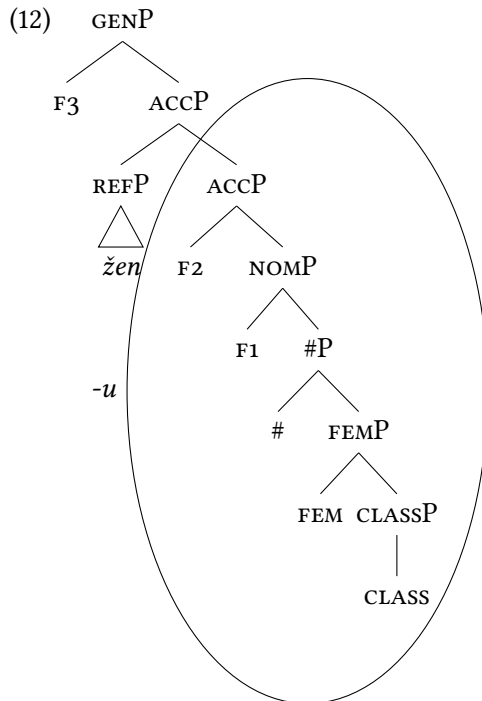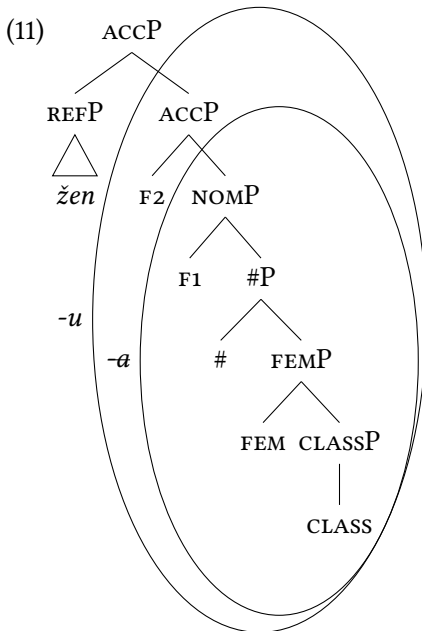└── CLASSP
    └── CLASS
        -o
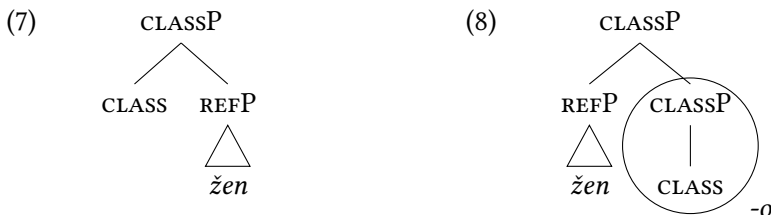
The derivation now continues by adding the FEM feature, yielding (9). This structure fails to spell out, so movements must take place again. Since the structure (9) has a non-projecting Spec, its movement is tried first, yielding (10).

---

[4] If I would be concerned here with making a distinction with the demonstratives, I would have to add both CLASS1 and CLASS2, since we have a noun here. Recall that CLASS is used as a stand in for both CLASS features.

(9)

```
            FEMP
           /    \
        FEM    CLASSP
               /    \
           REFP    CLASSP
            /\       |
           žen    CLASS
                        -o
```

(10)

```
              FEMP
             /    \
         REFP    FEMP
          /\     /    \
         žen  FEM    CLASSP
              -o       |
                     CLASS
                 -a
```

The remnant FEMP in (10) is matched by the entry for *-a*, see (5-c), because such a FEMP is contained in its lexical entry. The ending *-a* is therefore inserted and overrides *-o*.

The derivation continues by cyclically moving the root *žen-*, spelling out REFP, out of the growing structure, ultimately yielding (11) as the structure of the accusative. As indicated in the tree, this is the place where the accusative *-u* overrides the nominative *-a*, to which it has a pointer (recall (5-d)). This is followed by the merger of the genitive case feature in (12).

(11)

```
              ACCP
             /    \
         REFP    ACCP
          /\     /    \
         žen   F2    NOMP
    -u              /    \
         -a       F1    #P
                       /    \
                      #    FEMP
                          /    \
                      FEM   CLASSP
                              |
                            CLASS
```

(12)

```
              GENP
             /    \
           F3    ACCP
                /    \
            REFP    ACCP
             /\     /    \
            žen   F2    NOMP
       -u              /    \
                     F1    #P
                          /    \
                         #    FEMP
                             /    \
                         FEM   CLASSP
                                 |
                               CLASS
```

(12) cannot be spelled out as is; the first rescue operation (which is Spec movement) yields (13). Here no entry with a pointer is available, and so the lexical entries have to be carefully inspected if they precisely match the lower GENP in (12). The lexical entry for *-y* in (5-e) matches this structure, and it can be inserted.

(13)
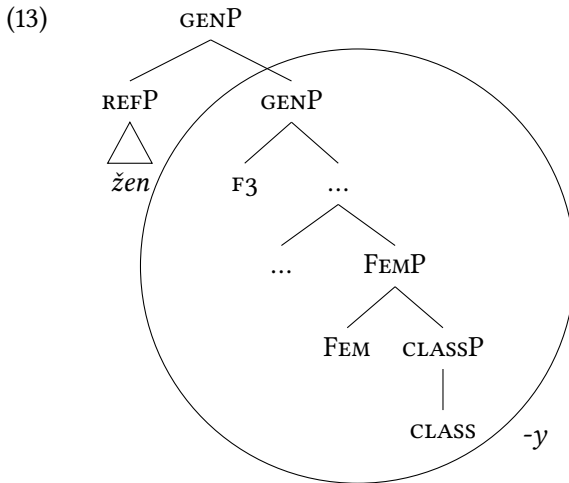
However, demonstratives have a different CLASSP structure below FEM, and so *-y* would not apply at this point. The derivation of the demonstrative will have to backtrack, and move its (impoverished) CLASS1P from below FEM, yielding analytic marking from GEN onwards.

However, the nominal derivation proceeds undisturbed all the way to the dative, the structure of which is in (14).

(14)

(15)
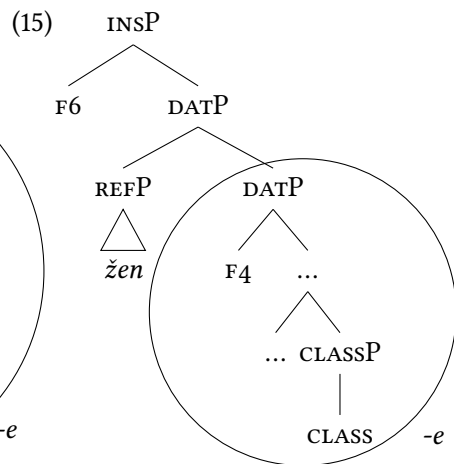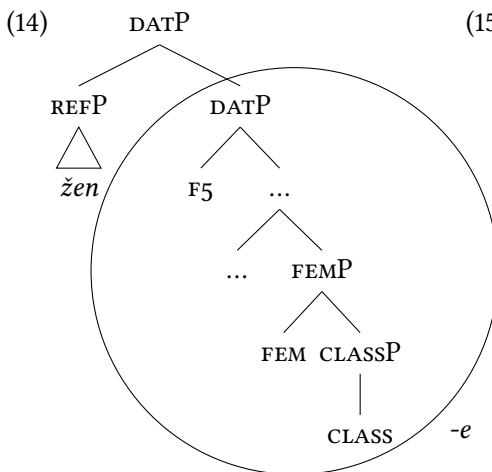
When the instrumental head F6 is added, yielding (15), problems begin. Neither Spec movement nor complement movement will lead to a successful lexicalisation. The trees are not shown for reasons of space.

What has to happen now is that the derivation starts backtracking. It is undoing the Spec movements and at every step, it is trying to make complement movement to succeed. Complement movement will succeed at the point when it crosses a feature that corresponds to the foot of some ending. The first such ending will be the 3rd declension instrumental case ending *-ju*, which has FEM as its foot. The resulting structure looks as in (16). Recall that *-ju* is realised as *-j* after a vowel.

(16)
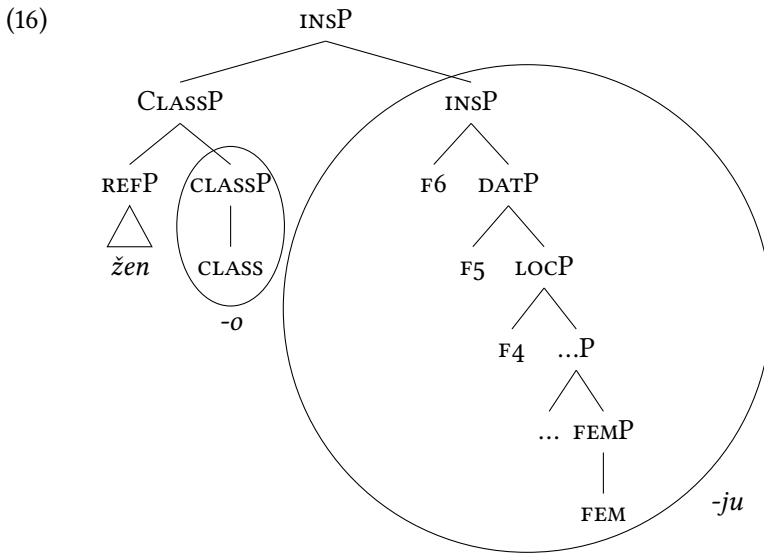
All summed up, I am proposing that the correct take on the relationship between the 2nd and 3rd declension is as shown in 10.10. Here the second declension endings are portmanteau markers for the CLASS marker *-o* and the 3rd declension endings. The instrumental is an exception, and shows analytic marking. This will be crucial for capturing the intricate behaviour of the numeral 'thousand.'

Table 10.10: 2nd declension (final)

	xNP	REF	CLASS	FEM	#	F1	F2	F3	F4	F5	F6
NOM	žen			a							
ACC	žen			u							
GEN	žen			y							
LOC	žen				e						
DAT	žen				e						
INS	žen		o				ju				
NOM	tetráď										
ACC	tetráď										
GEN	tetráď				i						
LOC	tetráď				i						
DAT	tetráď				i						
INS	tetráď						ju				

10.5 Three 'thousand'

With the analysis in place, let me turn back to the numeral 'thousand.' Recall that it inflects like a 2nd declension noun, except for the fact that in the instrumental, it also allows for a 3rd declension form *tysjač-ju*.

Table 10.11: *Tysjač-a* 'thousand' (Timberlake 2004)

	notebook III, FEM.SG	thousand III	thousand II	week, II, FEM.SG
NOM	tetráď-Ø	—	týsjač-a	nedél'-a
ACC	tetráď-Ø	—	týsjač-u	nedél'-u
GEN	tetráď-i	—	týsjač-i	nedél'-i
LOC	tetráď-i	—	týsjač-e	nedél'-e
DAT	tetráď-i	—	týsjač-e	nedél'-e
INS	tetráď-ju	týsjač-ju	týsjač-ej	nedél'-ej

I shall now probe into the facts a bit deeper with the goal to determine what forms – if any – should be filled into the gaps above the instrumental form *tysjač-ju*.

10.5.1 Two types of nominal 'thousand'

The first thing to note that there is a connection between the morphology of the numeral 'thousand' and its ability to take part in case overriding. To see this, consider first the data in (17).

(17)   Russian (Ionin & Matushansky 2018: 174)

    a.   Ja ušël   s   raboty s   tysjač-ej   bumažek.
        I leave.past from work with thousand.INS.2ND paper.DIM-GEN
        'I left work with a thousand pieces of paper.'

    b.   *Ja ušël   s   raboty s   tysjač-ej   bumažk-ami.
        I leave.past from work with thousand.INS.2ND paper.DIM-INS
        'I left work with a thousand pieces of paper.'

In this example, the numeral 'thousand' has a regular second declension ending in the instrumental. When it has this ending, the counted noun must be in the genitive, as in (17-a), and it cannot be in the instrumental, as in (17-b). This shows that the 2nd declension numeral is incompatible with case overriding.

In order to capture this, I will postulate the lexical entry in (18) for the numeral 'thousand' seen in (17). This is the same kind of entry that is characteristic for 2nd declension nouns. As a consequence, I expect that the numeral will behave exactly like a second declension noun: it will take the regular 2nd declension endings, and due to the lack of CARD, it would be unable to combine with overridable genitives. This is what the data in (17) tell me.

(18)   *tysjač* ⟺   REFP   ⟺ 1000

               REF   xNP

                       NUMBER
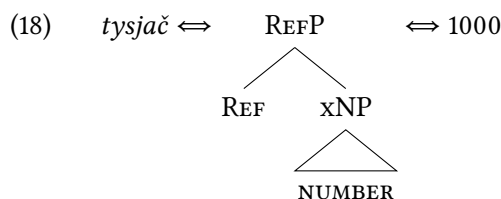
Since the insertion model is deterministic, the existence of an entry like (18) will always lead onto the type of pattern seen in (17). Any variation in form or complement marking properties will have to be captured by adding root-like lexical entries that are going to be in free variation with (18).

Let me then turn to investigating the additional pattern. This pattern is introduced in (19), where the numeral 'thousand' takes on the 3rd declension ending *-ju*, as in (19). When it does so, the overriding pattern becomes possible, see (19-b). Overriding is dispreferred compared to the plain-genitive pattern in (19-a), but

nevertheless possible.

(19)   Russian (Ionin & Matushansky 2018: 174)

    a.   Ja ušël   s   raboty s   tysjač-**ju**   bumažek.
           I   leave.past from work   with thousand.INS.3RD paper.DIM-GEN
           'I left work with a thousand pieces of paper.'

    b.   ?Ja ušël   s   raboty s   tysjač-**ju**   bumažk-ami.
           I   leave.past from work   with thousand.INS.3RD paper.DIM-INS
           'I left work with a thousand pieces of paper.'

How shall we interpret this? The first thing I will conclude is that the numeral *tysjač-a* (no matter its declension) shows a strong preference to behave as a noun and combine with an invariable genitive. Therefore, its shift to the 3rd declension in the instrumental cannot be causally linked to the presence or absence of CARD in the *fseq*: in (19-a), CARD is absent (as diagnosed by the plain genitive). Yet the numeral allows for 3rd declension forms. Therefore, CARD cannot be the cause of this behaviour. This is very different from the 1st declension, where the special numerical declension was perfectly correlated with the overriding of the genitive.

As a result, I will need to postulate an additional nominal lexical entry for the numeral 'thousand.' This lexical entry will be in free distribution with the entry (18), and exactly as (18), it will lack CARD. The difference with (18) will be that the alternative entry will yield a different inflectional pattern. In order to desambiguate the two different nominal entries, I will be calling them the '2nd declension' *tysjač-a* (this is the one in (18)) and the 'mixed declension' *tysjač-a* (this is the one we are about to investigate).

By approaching the issue like this (two different entries for 'thousand'), I need to determine what the inflection of this second entry is beyond the instrumental. The reason for this is that once I have an alternative entry for the numeral 'thousand,' I do not expect that this entry will only be used in the instrumental case. In order to see how the alternative numeral inflects, let me focus on the data point in (19-b).

What we see here is yet another type of pattern, where the numeral 'thousand' inflects like our alternative numeral, and allows overriding (revealing the presence of CARD). I will be calling this use the CARD *tysjač-a*. The CARD use is marginal, yet possible. Its main interest for me is that by looking at how the CARD *tysjač-a* inflects, I can also set up the inflection of the mixed-declension *tysjač-a*. The guiding assumption is that since the CARD *tysjač-a* and the mixed-declension one coincide the instrumental, they will coincide elsewhere.

10.5.2 'Thousand' beyond the instrumental

Let me then have a look at what happens in the locative case. The examples in (20) show the relevant data. Specifically, (20-b) gives an example where the numeral 'thousand' combines with a counted noun in the locative. There is a question mark preceding the example, which indicates that the example (20-b) is worse than (20-a) (which lacks overriding), but acceptable nevertheless. The degraded status of (20-b) just confirms that the overriding pattern with 'thousand' is marked, which is something that we could already see in (19).

(20)   Russian (informant data)

    a.   Volgograd naxoditsja v tysjač-e   kilometr-ov ot   Moskvy.
        Volgograd lies   in thousand-LOC km-GEN   from Moscow

    b.   ?Volgograd naxoditsja v tysjač-e   kilometr-ax ot   Moskvy.
        Volgograd lies   in thousand-LOC km-LOC   from Moscow
        'Volgograd is a thousand kilometers away from Moscow.'

Crucially, this example shows that the overriding numeral has the regular 2nd declension locative (*tysjač-e*). This leads us to conclude that the 'mixed declension' numeral also has the form *tysjač-e*. And this in turn is the same form as the 2nd declension numeral has.

In other words, under the hypothesis that the mixed-declension *tysjač-a* inflects like the CARD *tysjač-a*, they both converge with the 2nd declension *tysjač-a* in the locative, namely *tysjač-e*. Therefore, both the mixed-declension *tysjač-a* and the 2nd declension one lead onto the example (20-a).

Under this hypothesis, we should now extend our table as in 10.12. What is new in this table is that I have placed the locative form of the mixed-declension numeral into the table, and I have indicated the fact that it overlaps with the second, rather than the 3rd declension. If also the rest of the paradigm would be occupied by the 2nd declension forms, this would explain why the only reported exception to the 2nd declension behaviour of *tysjač-a* is the instrumental case. In all other cases, the forms of the mixed declension *tysjač-a* (just like the forms of the CARD) *tysjač-a* simply overlap with the 2nd declension.

10.5.3 Hypothesis 1, Hypothesis 2

However, the situation is not so clear as one would like. The reason for this is that the 2nd declension locative *týsjač-e* is pronounced exactly as a potential 3rd declension form *týsjač-i*. This is a consequence of the fact that *e* and *i* are

Table 10.12: The numerals declensions II and III (Timberlake 2004)

	notebook III, FEM.SG	thousand MIXED	thousand II	week, II, FEM.SG
NOM	tetráď-Ø	—	týsjač-**a**	nedél'-a
ACC	tetráď-Ø	—	týsjač-**u**	nedél'-u
GEN	tetráď-i	—	týsjač-**i**	nedél'-i
LOC	tetráď-i	týsjač-e	týsjač-e	nedél'-e
DAT	tetráď-i	—	týsjač-**e**	nedél'-**e**
INS	tetráď-ju	týsjač-ju	týsjač-ej	nedél'-ej

pronounced the same in unstressed positions. Now since *týsjač-a* 'thousand' has stress on the first syllable, it is impossible to know whether the ending in (20-b) is a locative of the 2nd declension or of the 3rd declension. So there is an empirical question as to what exactly it is that we want to derive. This question is, as far as I can tell, impossible to decide.

What we, however, know for sure is that in the nominative and in the accusative, the numeral only has 2nd declension forms (*tysjač-a/u* vs. *tysjač). What we also know for sure is that in the instrumental, we have clear evidence for both types of declension (both *tysjač-ej* and *tysjač-ju*) exist. So the pattern of inflection will be 'mixed': INS has a 3rd declension form, NOM/ACC have a 2nd declension form.

The only uncertain thing is the precise extent where the unexpected 3rd declension forms exist: do they exist also in GEN/LOC/DAT? This is impossible to decide, as far as I know.

The hypothesis space concerning the inflection of the mixed-declension *tysjač-a* (and the CARD *tysjač-a*) is thus delimited by the two extremes depicted in the table 10.13 as Hypothesis 1 and HYPOTHESIS 2 in the second and third column respectively. These two hypotheses are the two extremes on the scale as to how many cases of individual declensions are attributed to the mixed type. Hypothesis 1 tries to pull the string as much as possible in favor of 3rd declension forms, and acknowledges the existence of 2nd declension forms only where necessary (in NOM, ACC). Note that this hypothesis does not coincide with orthography in LOC, DAT. Hypothesis 2 in the third column tries to attribute as many 2nd declension forms to the mixed declension as possible, and it acknowledges the 3rd declension forms only where it has to (in INS). This hypothesis coincides with the orthography.

Table 10.13: Hypothesis 1, Hypothesis 2 (Timberlake 2004)

	notebook III, FEM.SG	thousand MIXED , hyp. 1	thousand MIXED, hyp. 2	week, II, FEM.SG
NOM	tetráď-Ø	týsjač-a	týsjač-a	nedél'-a
ACC	tetráď-Ø	týsjač-u	týsjač-u	nedél'-u
GEN	tetráď-i	týsjač-i	týsjač-i	nedél'-i
LOC	tetráď-i	týsjač-i	týsjač-e	nedél'-e
DAT	tetráď-i	týsjač-i	týsjač-e	nedél'-e
INS	tetráď-ju	týsjač-ju	týsjač-ju	nedél'-ej

Both hypotheses make sense morphologically. Under Hypothesis 1, the mixed declension resembles the inflection of the feminine demonstrative, just with the class marker *-o* silent. I show this in Table 10.14. What I show here is that if all the CLASS markers *-o-* found in the feminine demonstrative are replaced by Ø, the mixed inflection (as seen through the prism of Hypothesis 1) arises.

Table 10.14: Making sense of Hypothesis 1 (Timberlake 2004)

	this FEM.SG	thousand MIXED, hyp. 1
NOM	ét-a	týsjač-a
ACC	ét-u	týsjač-u
GEN	ét-o-i	týsjač-ø-i
LOC	ét-o-i	týsjač-ø-i
DAT	ét-o-i	týsjač-ø-i
INS	ét-o-j̶u̶	týsjač-ø-ju

Under Hypothesis 2, the mixed declension is just like the nominal declension, just with the class marker *-o* silent. I show this in table 10.15. What I do here is that I replace by zero all the instances of the CLASS marker *-o* in the declension of the noun *nedelja* 'week,' and we get the mixed declension as per the hypothesis 2. (Recall that *-o* is rendered as *-e* after soft consonants.)

Both of these hypotheses therefore share a constant: we have to make sure that *-o* is silent where it appears. Then there is a variable: we have to make a decision as to whether the numeral should have an *fseq* like a noun (with nominal

Table 10.15: Hypothesis 1, Hypothesis 2 (Timberlake 2004)

	thousand MIXED, hyp. 2	week, II, FEM.SG
NOM	týsjač-a	nedél'-a
ACC	týsjač-u	nedél'-u
GEN	týsjač-i	nedél'-i
LOC	týsjač-e	nedél'-e
DAT	týsjač-e	nedél'-e
INS	týsjač-ø-ju	nedél'-e-ju

CLASS structure) or whether it should have an *fseq* like a demonstrative (with impoverished CLASS structure). Given all the evidence in favor of the proposal that numerals are more like nouns (rather than like demonstratives), I shall side here with Hypothesis 2 as depicted in Table 10.15. In the next section, I show in detail how we can make sure that *-o* remains silent where it would normally appear.

10.6 Analysis

Let me now begin by exploring the options of how to make the CLASS marker *-o* disappear as a function of one specific root – namely *tysjač-a* – appearing next to it.

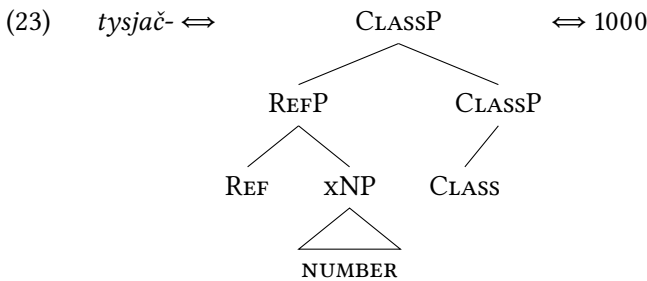The first obvious option would be to propose a lexical entry like (21):

(21) *tysjač* ⟺ CLASSP ⟺ 1000

CLASS   REFP

REF   xNP

NUMBER
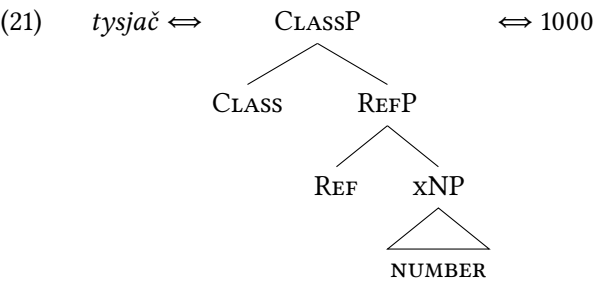
However, this entry would be predicted to spell out CLASS always. The expected nominative form using this entry would be **tysjač-i*. The tree in (22) shows this. The idea here is that spellout would succeed without movement all the way to

CₗₐₛₛP, and then the system predicts a cyclic evacuation of this CₗₐₛₛP from below ғᴇᴍ. Such an evacuation is predicted to be possible because *-i* has the right shape to spell out the remnant constituent.

(22)

CₗₐₛₛP, NᴏᴍP tree:
- NᴏᴍP
  - CₗₐₛₛP
    - *tysjač*
  - NᴏᴍP
    - ғ1
    - #P
      - #
      - ғᴇᴍP
        - ғᴇᴍ
    - *-i*
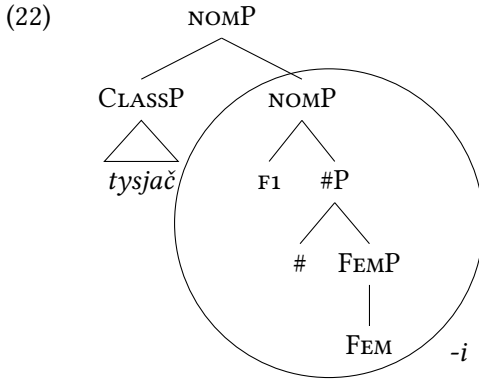
In fact, we have already rejected a CₗₐₛₛP entry for second declension items based on considerations like these, recall 10.3. In sum, (21) cannot be the right entry.

The alternative I suggest here is that the entry for the mixed *tysjača* looks as in (23). The numeral includes the Cₗₐₛₛ node, but it has a different geometry.
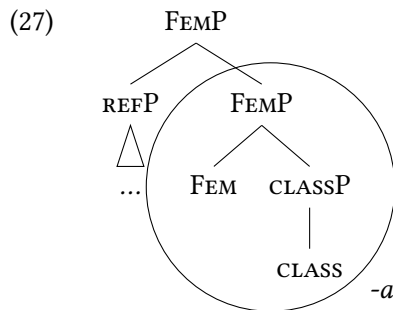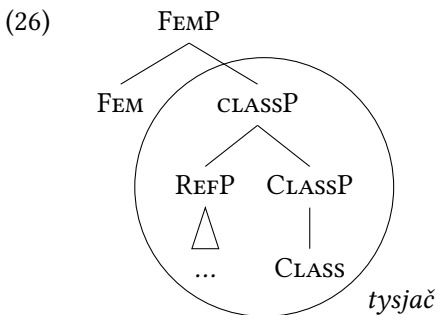
(23)   *tysjač-* ⟺   CₗₐₛₛP   ⟺ 1000

Tree:
- CₗₐₛₛP
  - RᴇғP
    - Rᴇғ
    - xNP
      - ɴᴜᴍʙᴇʀ
  - CₗₐₛₛP
    - Cₗₐₛₛ

This entry will allow the mixed-declension *tysjača* to spell out the CₗₐₛₛP just in case the embedded ʀᴇғP crosses it first. This entry will have the desired effect that it will eliminate the Cₗₐₛₛ marker *-o* only in case it would happen to be overt. How does this work?

The derivation starts by constructing RᴇғP and spelling it out by the mixed *tysjač-*. This is possible, because RᴇғP is contained in the lexical entry (23). The next step is to merge Cₗₐₛₛ, see (24). CₗₐₛₛP cannot spell out without any movement. Spec movement is unavailable, so complement movement applies, yielding (25). Interestingly, this structure perfectly matches the geometry of the lexical

tree associated to the mixed-declension *tysjač* in (23). The lexical item is therefore inserted.

(24)

CLASSP

CLASS   REFP

tysjač

(25)

CLASSP

REFP   CLASSP

...   CLASS

tysjač
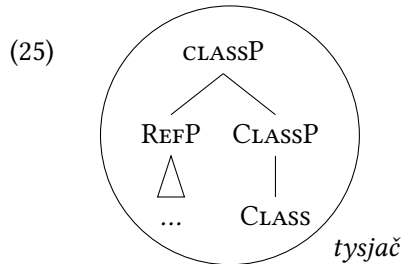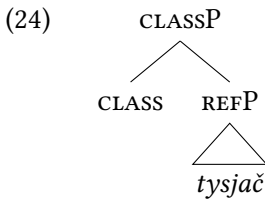
The next step (after successful spellout) is to add the FEM feature. The relevant tree is in (26). This structure fails to spell out without movement. The next operation to be tried is Spec movement. Spec movement yields (27), moving the Spec REFP across FEM. The output successfully lexicalizes as *tysjač-a*.
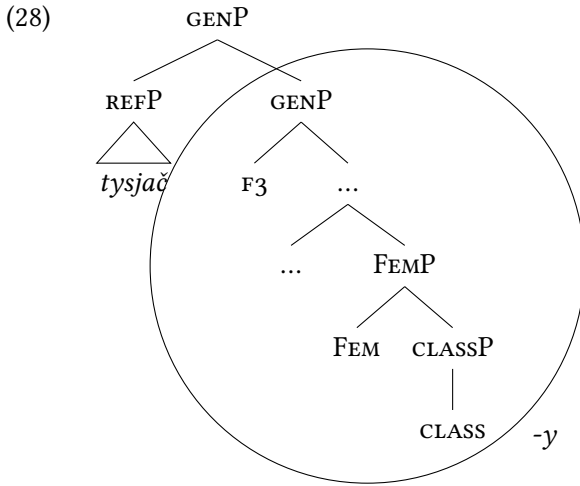
(26)

FEMP

FEM   CLASSP

REFP   CLASSP

...   CLASS

tysjač

(27)

FEMP

REFP   FEMP

...   FEM   CLASSP

CLASS

-a

It is of course curious to note that the movement of the Spec destroys the 'lexical integrity' of the constituent that is spelled out as *tysjač*. However, in a modular system, syntactic movements follow an algorithm that is not sensitive to such constraints. Specifically, when spellout fails in (26), the structure is rejected at the interface and sent into syntax for repair. The first operation to be tried is Spec movement, and this operation applies blindly without taking lexical items into consideration.
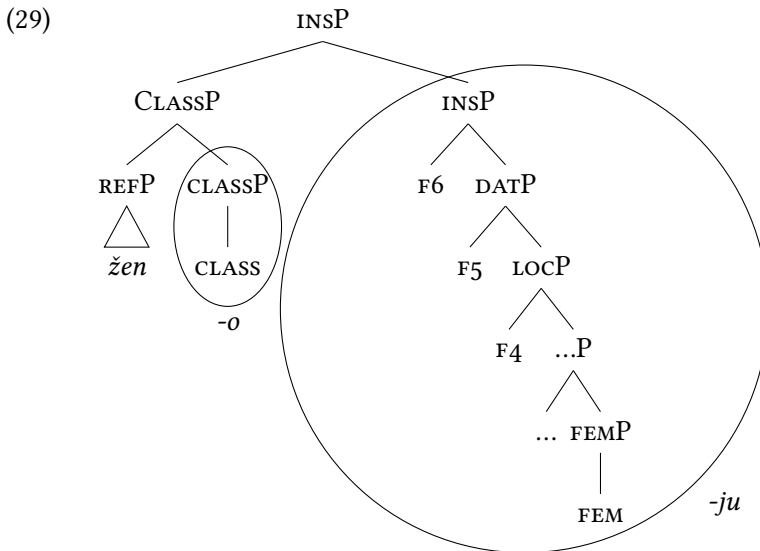
As a result of the movement, we reach a configuration that is identical to the one that 2nd declension nouns go through; in particular, the tree (27) is (in relevant respects) identical to (10), a stage in the derivation of the noun *žen-a*.

The steps that the derivation follows – starting from (27)– are now identical to the steps that the derivation takes for nouns, as discussed in Sec. 10.4.

For instance, the structure of the genitive is as in (28), repeated from (13).

(28)

```
              GENP
            /      \
        REFP        GENP
         /\        /     \
        /__\     F3       ...
       tysjač           /      \
                      ...      FEMP
                             /      \
                          FEM      CLASSP
                                     |
                                   CLASS    -y
```
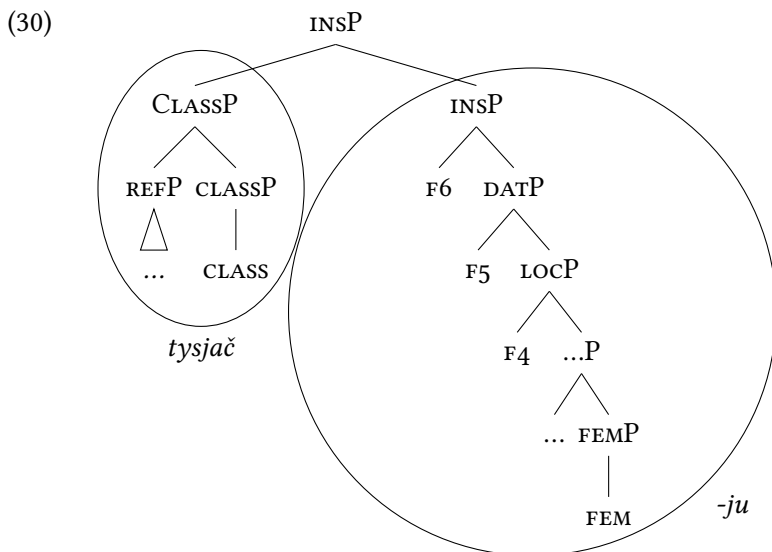
Now recall from the section 10.4, that when the instrumental feature is merged, the derivation must start backtracking. It backtracks all the way below FEM, and then cyclically evacuate the complement of FEM – corresponding to the CLASSP – all the way above the instrumental. The tree in (29) shows this, repeated from (16).
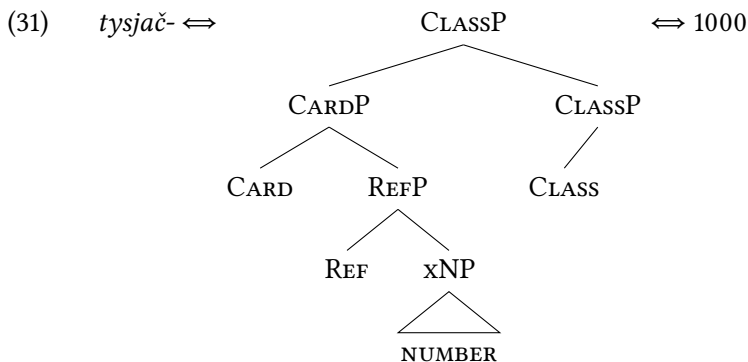
(29)

```
                    INSP
                  /      \
            CLASSP         INSP
           /     \        /     \
       REFP    CLASSP   F6      DATP
        /\        |            /     \
       /__\     CLASS        F5      LOCP
       žen                          /     \
                -o                F4      ...P
                                        /     \
                                     ...      FEMP
                                                |
                                              FEM     -ju
```

Now we know that with the mixed numeral 'thousand,' a CLASSP of exactly the same shape that is residing in Spec,INS is spelled out as *tysjač*. Therefore, the very same sequence of steps is realised as *tysjač-ju* for the mixed declension entry. The

tree in (30) shows this.

(30)

```
                              insP
            ╱─────────────────────────╲
      ClassP                        insP
       ╱╲                            ╱╲
   refP  classP                 f6    datP
    ╱△      │                         ╱╲
   …      class                   f5    locP
                                        ╱╲
        tysjač                      f4    …P
                                         ╱╲
                                      …    femP
                                             │
                                           fem      -ju
```

Now that we know how the mixed declension is derived for the mixed-declension *tysjač-a*, we can use the same trick to account for the Card *tysjač-a*. Its entry will be in relevant respects identical to the mixed *tysjač-a*, but it will, in addition, have the Card feature in between Ref and Class:

(31)   *tysjač-* ⟺   ClassP   ⟺ 1000

```
                    ╱─────────────────────────╲
               CardP                        ClassP
               ╱╲                            ╱
          Card    RefP                   Class
                  ╱╲
              Ref    xNP
                     ╱△╲
                   number
```

This entry will allow both for the syntax of a cardinal (with case overriding of its genitive) and for the mixed declension behaviour. I trust the reader is by now able to see how the derivation would run.

10.7 Conclusions

At this point, our account of Russian is complete. I have shown how to derive the correct pairing between nouns and their endings using an approach where different roots have different sizes. As a result, they combine with different endings. Specifically, the correct allomorph is chosen based on what the lower part of its entry looks like, i.e., based on whether it can "pick up" where the root ends. For instance, Declension II roots cannot reach all the way to Declension III endings, so they do not combine (unless the gap between them is bridged by an additional morpheme).

I have divided the Russian declensions into two basic types, feminine vs. non-feminine, and I have attributed a different *fseq* to each type. The types of features I have used are fairly standard and represent a subset of the features proposed by Harley & Ritter (2002) for a related type of referential expressions, namely pronouns. In sum, I have proposed a theory of the Russian declension without using declension information as a part of either the root or the suffix. This result is a part of a larger goal to avoid representing language particular information in the computation, which contains only a universal set of atomic features.

Some of the specific facts captured by this model include (i) the correlation between declension type and gender (except for animates) (ii) the fact that the feminine demonstrative is built by combining the class marker *-o* and the endings of the 3rd declension (iii) the fact that declensions I_A and I_B share their oblique endings and (iv) the mixed-declension pattern *tysjač-a.*

When I introduced the feature CARD into the system, we could further capture the fact that the CARD-containing numerals of the 1st declension have a defective paradigm, but 3rd declension numerals don't.

These independently motivated lexical entries then served as the main determinants of complex derivations where the numeral and the noun combine. We have seen what it takes to derive the 1st declension numerical structures, where in the genitive, the numeral stops inflecting. The lack of inflection on the numeral is compensated for by the noun, which is capable of spelling out the phrasal case features signaling the role of the full noun-phrase. I have shown how such a kind of overriding respects the syncretism sequence, where only cases that contain the genitive represent its natural continuation and do, in fact, override it.

The way this was achieved is by introducing the idea of Multiple Merge, where if the main spine and the auxiliary workspace are separated during backtracking, the feature F is merged in both workspaces. The same type of derivations (with different lexical entries) provided us with an account of the concord pattern seen

in the 3rd declension.

Importantly, all the structural ingredients as well as all the principles of spell-out were the same in Russian as in Ossetic. The only difference was how these principles interact with language particular lexical entries. Interacting with the cyclic spellout procedure, language particular lexical entries determine how derivations unfold, and lead to a theory where the only locus of parametric variation is squarely placed within the post-syntactic lexicon.

Moreover, recall that the lexicon is restricted in the sense that it may only contain well-formed syntactic structures. In such a model, variation cannot be expressed by arbitrary diacritics (uninterpretable features, EPP features, ordering features, declension features, strong features, …). All we have at our disposal is to associate phonology to well-formed syntactic trees of different sizes and shapes. The current part has shown that a theory of this kind is definitely possible, and hopefully superior to alternative accounts.

Part IV

Conclusions

11 Conclusions

This book is an attempt to do two things. The first thing is to introduce a hypothe-sis – a reasonable guess on the basis of the data available – that case competition and case syncretism follow one and the same scale. The second thing is to ex-plain why this correlation holds. The answer suggested in this book is that the correlation holds because both scales are nothing but surface reflexes of a single underlying 'scale,' namely the functional sequence (Cinque & Rizzi 2008).

Then there is the further question about mechanisms. Specifically, assuming that the correlation holds, and assuming that the functional sequence encodes the containment relations among cases, the question is this: what are the exact mechanisms that we need to postulate in order for the correlation to follow from the particular shape of the *fseq*. The first part of this book is built around the idea that we need nothing more than ellipsis, which deletes the smaller case when c-commanded by the bigger case (because the bigger case contains the smaller case). I have argued that this idea is not only vaguely plausible, but offers a neat explanation for various details of Ossetic morphology.

Once a theory like this is in place, we realise that its applicability very much depends on what the exact shape of the syntactic tree is. It is not enough to say that the dative wins over the genitive, because the dative has more features. The precise structure of the particular dative allomorph matter, because it must contain a precise copy of the relevant genitive. This is the lesson that we have learned from looking at Jiwarli (recall Ch. 3, example (4)). In this language, only identical allomorphs of the dative compete, non-identical allomorphs coexist. The general idea as to how such examples should be approached is that non-identical allomorphs spell out constituents with a different bottom, and cannot therefore eliminate one another due to ellipsis.

The final two parts of the book represent an attempt to take this conclusion se-riously, and investigate a language that has both case competition, but it lacks (as I have argued at length) the required identity between the allomorphs. If both of these statements are correct, ellipsis cannot be the only mechanism responsible for competition.

The second and the third part of the book were therefore spent investigating

an alternative mechanism, namely the spellout algorithm used in Nanosyntax (in large parts due to Starke 2018). I have introduced a specific version of this algorithm (based on the idea of Multiple Merge under backtracking), and showed that it give us another way of deriving the correlation between case syncretism and case strength (assuming the *fseq* part of the explanation in addition). The specific idea is that through cyclic spellout, phrasal case features are merged on top of an embedded noun that is already case marked. These phrasal case features mostly fail to spell out on the case marked noun, unless they happen to extend the relevant case in accordance with the *fseq*. Because of this, such an override can only change a smaller case to an immediately larger case. When such overrides multiply, the case can cyclically grow. But it can never shed the features it has already had, so overriding respects the *fseq*, which is what we wanted to derive.

This summarises the main plot; the rest is also important, but it's just details.

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