1 Theoretical Background


- in DM, the syntax manipulates nodes which consist solely of feature bundles
- phonological material is inserted late, following Spell-Out

This defines three distinct stages, each with special restrictions on movement (movement operations in italics):

Figure 1: A model of the grammar

```
  Syntactic Derivation  Raising
    \            /   \\
     \          /     \\
      \        /      \\
      Spell-Out/       LF
                    \  \\
                     \ \\
                      \ \\
                     \ \\
                      \ \\
                      PF
                      |
                      VI (linearization)
                      |
                      Lowering
```

1. Movement before Spell-Out is Raising.

2. Following Spell-Out, movement can occur on the PF branch to resolve phonological dependencies etc., without effect on the semantics. PF movement before VI is called Lowering, defined as adjunction of a head to the head of its complement.

3. Movement after VI is called Local Dislocation (LD), and is defined like Lowering, but on a linear, rather than hierarchical structure.¹

A grammar with Raising alone would be simpler, so the need for Lowering must be demonstrated. (See Appendix A for discussion of LD.) Thus we must distinguish the effects of Lowering from those of Raising, and then look for evidence of such effects.

- semantic considerations will not be sufficient to do this
- instead we must consider the structural properties of the movements

The following trees represent head Raising and Lowering, respectively:²
Both are structurally constrained such that intervening heads cannot be skipped:

In (1)a., Z could not skip Y and Raise to X

So also in (1)b. X could not Lower directly to Z, due to the intervention of Y

They differ in their direction, which has important consequences. According to cyclicity, operations apply first to nodes lower in the tree.

* so a given head will Raise before any movement process can apply to the target of its Raising

* therefore nothing but minimality can block a Raising operation that would otherwise occur

But with Lowering, the target node is lower than the moving node. Thus Lowering can be blocked by movement of the target node as in (2):

(2) Y-to-Z blocked

X-to-Y

by cyclicity, Y will move before X

so if Y lowers, subsequent lowering of X to Y will be blocked

Now consider what happens in an analogous situation with raising:

(3) Z-to-Y

Y-to-X

Finally, we can consider the case where Z raises to an intermediate position.
• again by cyclicity, Z will move before Y
• but here Raising of Z to Y does not block subsequent raising of Y to X
• instead we get the successive raising familiar from verb movement through exploded Infl

This gives us a diagnostic for distinguishing Lowering from Raising:

(4) Lowering of X can be blocked by processes affecting nodes below X. Raising of X cannot.

Therefore, if we find instances in language where the movement of a node is blocked by a process lower in the structure, we must analyze that movement as Lowering. I will argue that this pattern exists in the placement of Case markers in two Finno-Ugric languages, Mordvin and Mari.

2 Mordvin

Mordvin nouns can be marked for Case, number, definiteness and possession. Curiously, the Case markers fall into two positionally-defined groups:

K1: Ablative, inessive, elative and illative markers precede Px and def. markers.

K2: genitive and allative markers follow Px and def. markers.

Consider: 7

(5) a. aťaša-do-n
   horse-abl-1sg.Px
   ‘from my horse(s)’
b. aťaša-n-ti-di
   horse-1sg.Px-all.
   ‘to my horses’(Č=palatalized C, Px=possessive affix)

Consider the structure of the extended nominal projection, which I assume to be the following (based on Ritter (1991) with the addition of KP):

(6)

\[ \text{KP} \]

\[ \begin{array}{c}
\text{K} \\
\text{DP} \\
\text{D} \\
\#P \\
\# \text{NP}
\end{array} \]

I assume that Case markers are inserted into K, which takes DP as its complement, because Case takes scope over everything in DP. 8

I also assume that Pxs in Mordvin and Mari are in D (possibly agreeing with possessors located in Spec DP). This is supported by the following facts:
1. Pxes are in complementary distribution with, and occupy the same position as definite-
ness markers in Mordvin

2. in Mari, definiteness is expressed by default Pxes\(^9\)

We need, then, to explain how K1 gets inside Px and definiteness markers in D. Further
data make it clear that it must be Lowering:\(^10\)

<table>
<thead>
<tr>
<th>Table 2: Mordvin Definite Declension (Erža dialect)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom. kudo-š</td>
</tr>
<tr>
<td>Gen. kudo-ű</td>
</tr>
<tr>
<td>All. kudo-űie-ű</td>
</tr>
<tr>
<td>Abl. kudo-do-ű</td>
</tr>
<tr>
<td>Iness. kudo-so-ű</td>
</tr>
</tbody>
</table>

A few comments will help make sense of this paradigm:

- the definiteness marker has two allomorphs in the singular, one for the nominative, another for the remaining Cases.

- In the plural, there is a fusional marker for number and definiteness.\(^11\)

- A phonological rule deletes an \# in the genitive and allative singular.\(^12\)

- The variation in the ablative and inessive endings is due to vowel harmony.

We see the expected order variation in the singular. K1 ablative and inessive precede D, and
K2 allative follows it, but in the plural, both K1 and K2 follow the fus ed def. pl. marker. Thus the movement that inverts D and K1 is blocked by the association of plural \# with D, a head lower in the structure.

Therefore, by the diagnostic in (4), K1 must lower to D.

Consider derivation (7):

(7) Base Structure \[ \text{Ablative singular definite, kudo-šie ‘from the house’ (Erža dialect)} \] \[ \begin{array}{c}
\text{KP} \\
\text{DP} \\
\text{K} \\
#P \\
\text{D} \\
\text{ABL} \\
\text{NP} \\
\text{N} \\
\text{SG} \\
\text{DEF} \\
\end{array} \rightarrow \text{Lowering} \rightarrow \text{Vocab. Ins.} \]

If we then say that def. D Lowers to Pl, creating the environment for the insertion of the
fusional marker, subsequent Lowering of K1 to D is properly blocked, as in derivation (8).
3 Mari

I will discuss three dialects of Mari: the Hill (or Western) literary dialect and the Meadow and Eastern spoken dialects.\(^{14}\) As in Mordvin, the Cases are divided into two groups based on their order relative to Px.\(^{15}\)

K1: Lative, illative, inessive and comitative precede Px.

K2: Accusative and genitive follow Px\(^{16}\)

The dative varies between K1 and K2,\(^{17}\) but the interesting variation comes when a plural marker is present.\(^{18}\) This is demonstrated in Table 3:

<table>
<thead>
<tr>
<th>Table 3: Affix ordering in the Mari dialects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hill Mari</strong></td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>K1 Px</td>
</tr>
<tr>
<td>Pl Px K1</td>
</tr>
<tr>
<td>Pl Px K2</td>
</tr>
</tbody>
</table>

The dialects agree on the Px-K and Pl-K orders, but disagree on the order of Pl and Px.

- Hill Mari places Pl before Px, leaving Case free to pattern with Px in the three suffix forms as it would in the absence of Pl.
- Eastern Mari places Px before Pl, which blocks K1 from getting inside Px when all three suffixes are present.
- Meadow Mari will be discussed below

For my analysis, the key dialect is Eastern Mari. It has exactly the same pattern as Mordvin (but Px+Pl stay separate), thus the same analysis is called for:
K1 lowers to D, but D lowers to Pl, blocking the Lowering of K1 when Pl is present.

This is demonstrated in two derivations. (9) shows the Lowering of K1 in the singular:

Eastern Mari, Inessive singular, 1st singular possessor, olmaštem 'in my apple'

(9) Base Structure → Lowering → Vocab. Ins.

The blocking in the plural is shown in (10):

Eastern Mari, Inessive plural, 1st singular possessor, olmamblakšt 'in my apples'

(10) Base Structure → Lowering → Vocab. Ins.

In Hill Mari, the surface order shows that Lowering of D to Pl does not occur. As expected, Lowering of K1 is never blocked:

Hill Mari, Inessive plural, 1st singular possessor, olmablakštem 'in my apples'

(11) Base Structure → Lowering → Vocab. Ins.
In Meadow Mari either ordering of Pl and Px is admissible. This can be analyzed as grammar competition (see Kroch 2000), between a grammar that has Lowering of D to Pl and one that does not.

Crucially, which variant is chosen determines the order with three suffixes:

K1 will lower to D if and only if D does not lower to Pl

This predicts two orders to be impossible: Pl-Px-K1 (neither head lowers), and K1-Px-Pl, (both heads lower).

- Luutonen’s (1997) acceptability tests indeed show Pl-Px-K1 to be clearly ungrammatical. He does not test for K1-Px-Pl.

A grammar competition account fits in well with the fact that the Mari plural markers are in the process of grammaticalization. Under such an analysis, the pattern of dialect variation also fits the geographical facts, Meadow Mari being spoken in the area between Hill and Eastern Mari.

So the evidence from Mordvin and Mari implies, in agreement with Embick and Noyer (2001) among others, that a grammar with Raising alone, though simpler, is inadequate. As a concluding note, consider the possible implications of such an analysis of Case marking:

- Mordvin and Mari Case markers are not involved in Raising (This may well apply to Finnish too. See Appendix C.)

- Thus they are demonstrably active only on the PF branch.

This leaves open the possibility, argued for in Marantz (1991)20, that Case markers are not present in the syntax, being inserted only at Spell-Out for morphological reasons

**Appendix A: Local Dislocation**

Two examples suffice here to demonstrate Embick & Noyer’s (2001) distinction of Lowering and LF. T gets onto V in English by Lowering, because it is not blocked by adverbial adjuncts (John often eats apples) but it is blocked by an intervening negative head, triggering do-support (John does not eat apples). That V does not Raise to T is seen from the word order with adverbs. The superlative suffix, on the other hand, adjoins to the adjective head by LD. This can be seen because such adjunction is sensitive to the phonological properties of the adjective (*minuscules*!), thus it must occur after VI. Furthermore, it is blocked by adverbial adjuncts (*the amazingly smallest elephant*). If the adjunction fails for either reason, the stem mo- is inserted to host the affix left in situ (most minuscule, the most amazingly small elephant).

We can tell that K1 does not get inside D by LD in Mordvin based on the following:

<table>
<thead>
<tr>
<th>Case</th>
<th>‘my horse’</th>
<th>‘my horses’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom.</td>
<td>alaša-zá</td>
<td>alaša-ná</td>
</tr>
<tr>
<td>Gen.</td>
<td>alaša-zá-ú</td>
<td>alaša-ná-ú</td>
</tr>
<tr>
<td>All.</td>
<td>alaša-zá-ńí</td>
<td>alaša-ná-ńí</td>
</tr>
<tr>
<td>Abl.</td>
<td>alaša-zá-ńí</td>
<td>alaša-ná-ńí</td>
</tr>
<tr>
<td>Ines.</td>
<td></td>
<td>alaša-so-n</td>
</tr>
</tbody>
</table>
In the nominative and K2 Cases, the number of the head noun is marked by allomorphy in the Px, but when a K1 marker intervenes between the stem and Px, the Px surfaces in a default form, and the number of the head noun is ambiguous. This blocking of allomorphy is easily understood given the base order of heads assumed in (6). Since # and D are adjacent, # can condition allomorphy in D, but if K comes to intervene between the two, their adjacency is disrupted and the allomorphy blocked. Since allomorphy involves the insertion of phonological material, this intervention must happen before Vi. This rules out LD, which would occur too late. This is demonstrated in the following structures, where angled arrows indicate movement and curved arrows indicate the conditioning of allomorphy:

Genitive singular, 1st singular possessor, *alašāni* ‘of my horse’ (Mok'sa dialect)

(12)  
Base Structure  \[\longrightarrow\]  Vocab. Ins.

\[
\begin{array}{c}
\text{NP} \\
\text{KP} \\
\text{DP} \\
\text{\#P} \\
\text{N} \\
\text{SG} \\
\text{\#} \\
\text{D} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
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\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\end{array}
\]

Ablative singular, 1st singular possessor, *alašadon* ‘from my horse’ (Mok'sa dialect)

(13)  
Base Structure  \[\longrightarrow\]  Movement  \[\longrightarrow\]  Vocab. Ins.

\[
\begin{array}{c}
\text{NP} \\
\text{KP} \\
\text{DP} \\
\text{\#P} \\
\text{N} \\
\text{SG} \\
\text{\#} \\
\text{D} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
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\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\text{\#} \\
\end{array}
\]

\[
\begin{array}{c}
\text{NP} \\
\text{KP} \\
\text{DP} \\
\text{\#P} \\
\text{N} \\
\text{SG} \\
\text{\#} \\
\text{D} \\
\text{\#} \\
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\end{array}
\]

\[
\begin{array}{c}
\text{NP} \\
\text{KP} \\
\text{DP} \\
\text{\#P} \\
\text{N} \\
\text{SG} \\
\text{\#} \\
\text{D} \\
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\end{array}
\]

\[
\begin{array}{c}
\text{NP} \\
\text{KP} \\
\text{DP} \\
\text{\#P} \\
\text{N} \\
\text{SG} \\
\text{\#} \\
\text{D} \\
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\end{array}
\]

Appendix B: Northwest and Meadow-Eastern Mari

Relevant data for two more Mari dialects have been reported in the literature, but have not been discussed above because they are less reliable. These are Northwestern Mari, as reported by Comrie (1988) and Meadow-Eastern Literary Mari (aka Eastern Literary Mari) as reported by Alhoniemi (1988), as in Table 5 below:

<table>
<thead>
<tr>
<th>Northwest Mari</th>
<th>ME Lit. Mari</th>
</tr>
</thead>
<tbody>
<tr>
<td>K1 Px Pl</td>
<td>Pl Px K1 Pt</td>
</tr>
<tr>
<td>K2 Pl Pl</td>
<td>Pl Pl K2 K2</td>
</tr>
<tr>
<td>K1 Px Pl Pl</td>
<td>Pl K1 Pl K2</td>
</tr>
<tr>
<td>Px K2 Pl Pl</td>
<td>Pl Pl Pl K2</td>
</tr>
</tbody>
</table>

8
As described above, Luutonen (1997) presents data which are reliable because they are based on actual corpus studies and native speaker intuition tests, all of which are described in detail. Such reliability cannot be claimed by all other sources, which generally recognize the ordering variation but do not describe it in sufficient detail for the crucial patterns to be clear. What is relevant here is that Luutonen gives no information on NW Mari, so that the somewhat surprising pattern given by Conrie cannot be confirmed, and that what he reports for MELit. Mari contradicts Alkonen-Mari (1988) in some forms, and gives further detail that allows us to better understand the other forms.

If the data given for NW Mari are correct, and the PI marker follows everything, then we are forced to suppose that it is actually not generated in the # head. If it were, it would be possible to move past both the D and the K head without disrupting their order (e.g., if we were looking at successive head Raising). Instead we might suggest that this plural marker is actually a modifier, generated in some adjunct position on DP. As an adjunct, it would not block the Lowering of K. Since the plural markers in all the Mari dialects have recently been grammaticalized from what were previously independent nouns or adjectives, they could have gone through a phase where they were structurally modifiers, only later becoming true # heads. NW Mari would then be a hold-over of that earlier phase.

The data given for MELit Mari would be problematic for any analysis, but in fact they seem to be incorrect. According to Luutonen (1997), while PI Pk is a possible variant (in most dialects), Pk PI is the order actually found 89% of the time in his corpus. Furthermore, the variation given in the three affix orders is not as simple as the chart suggests. EMLit Mari is a written language based on a disparate group of spoken dialects. It has adopted two different plural markers from two different dialects, each with its own ordering pattern: βkak, which follows Pk, and ωk, which precedes the Pk. As it happens, ωk tends to occur with K1, meaning that we get the pattern ωk K1 Pk, but Pk βkak K2. Rendering this as PI K1 Pk versus Pk PI K2 is actually a misleading oversimplification. Thus the strange pattern we find here is attributable to an odd sort of grammar competition particular to an artificial literary language.

Appendix C: What can we say about Finnish?

Finnish has the stable ordering of affixes: N-PI-K-Px. To what degree will the Finnish facts allow us to extend our Case-Lowering analysis from Mari and Mordvin? The data are consistent with Lowering of K to D, but it is not possible to rule out Raising, because there is no monkey business between # and D to block the movement. However, as in Mordvin, it is possible to rule out LD. Kanerva (1987) details a number of instances of allomorphy, as well as co-occurrence restrictions, operating between between markers in # and K, and between those in K and Px, but not between those in # and Px. This implies that K must be between # and D by VI, which excludes an LD analysis.

So we can say that either K lowers to D as in Mordvin and Mari, or D raises to K. Pending the discovery of data that would allow us to distinguish the two in Finnish, the Lowering analysis seems more attractive at this point. Assuming it for Finnish will allow us a unified account of the placement of Case markers. In other words, until we find concrete evidence that K-D order in some language is derived by Raising, it is simpler to assume, in ambiguous cases, that only Lowering can create such a structure.

Notes

1. Why it is that movement before Spell-out (Raising) should be upward and that after it (Lowering and LD) downward is unclear. At this stage, it remains essentially a stipulation, but one that seems to agree with the facts.

2. I will restrict my discussion of Raising here to head Raising, since there is no Lowering counterpart of XP raising.
Perhaps X could lower to the trace of Y in such a situation, but the movement would be string vacuous if no specifiers or adjuncts intervened. 

The analysis of Mordvin here is based on the one in Noyer (1998), but the presentation of data and arguments here is original, especially the arguments made against Raising. Thus, credit for the central insights of the section is due in large part to Noyer, while blame for any errors is due exclusively to me.

The genitive also serves as an accusative. Apparently this is the result of the same sort of phonological merger that happened in Finnish, where Proto-Finno-Ugric gen. *-n and ace. *-m merged by regular sound change as -n.

This Case also serves the function of the dative and is sometimes referred to as such.

The forms here are taken from Fedotstov (1966), which is in the Cyrillic-based standard orthography. I use Raun’s (1988) transliteration.

See McFadden (2001) for more arguments supporting this position for K. Whether K is present as a syntactic (i.e. pre-Spell-Out) node when realizing structural Case, or only comes in for morphological reasons at Spell-Out is an interesting question (see Marantz 1991), but would take us too far afield here.

See the papers in Alexiadou and Wilder (1998) for discussion of where Poss belong within DP. While there may be a Poss(essive) head in addition to D in languages like Hungarian, where determiners co-occur with Poss, the languages here behave differently, and are more easily analyzed with a single D node. Alternatively, we could say that Pk appears in PossP, but that in these languages D and Poss are in complementary distribution, and D is not projected when empty, since it is clear that there is no empty D head present next to the Pk heads. If such a head were present, we would expect it to block movement.

These forms are taken from Raun (1988) and Zalcz (1998), using Raun’s transliteration.

The singular definiteness marker and the definite plural marker may both be segmentable diachronically. However, there is no segmentation for either that can be defended on synchronic grounds, and thus each is analyzed here as a single marker.

Since the # of the definiteness marker is probably diachronically a reflex of the genitive suffix, one could also argue that the genitive has no additional Case ending. However, the proposed rule is clearly unavoidable for the allative.

I assume a right-headed structure for KP in Mordvin and Mari, which is justified by their generally head-final nature. It is not clear that a viable analysis would be possible on the assumption of a bar on right-headed configurations. It may be that the # head is not projected at all in the singular, in which case we could say that D simply lowers to # without having to specify plural.

The Northwestern dialect and the Eastern literary dialect present special difficulties regarding the reliability of data. They are discussed in Appendix E.

The affix ordering patterns in the various Mari dialects are from Luntosen (1997), a thorough investigation of the patterns based on both corpus studies and extensive native-speaker judgements. The forms cited are taken from Kangasmäki-Minn (1998).

In both Mordvin and Mari the distinction between K and K2 corresponds to a local/semantic vs. grammatical distinction. One might suppose then that the affix orders differ because semantic and grammatical Case are located in different heads in the structure. However, we would expect grammatical Case to be located inside semantic Case, i.e. closer to the nominal head, which is clearly contradicted. It is better to assume that both types of Case are located in the same position (at least after Spell-Out), and to attribute the variation to movement behavior determined by the features proper to semantic vs. grammatical Case. For discussion of the complex historical developments that seem to have led to this situation, see Taulli (1953), Nichols (1973), Connic (1980) and Korhonen (1991).

This could be an instance of grammar competition (see Kroch 2000), or it could result from the fact that the K1 Cases are local, while the K2 Cases are grammatical. Since the dative serves both the grammatical dative function and the local allative function, it could belong to either category.

Mari has lost the Fino-Ugric plural markers and is in the process of recruiting and grammaticalizing new ones from various sources. This is recent, proceeding independently in the different dialects, causing the variation discussed here.

In fact both Hill and Eastern Mari show variation as well. The difference is that in Hill Pl Pk is clearly preferred and in Eastern Pk Pl is clearly preferred, while in Meadow neither is clearly preferred. See Luntosen (1997) for data and discussion.

See also and McFadden (2001) for discussion and further argumentation.
References


