RESEARCH

Deceptive datives: Prepositional case in Latvian

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In this paper, I look at the distribution of case forms in Latvian prepositional constructions. Latvian prepositions assign either the genitive or the accusative case to their complements, primarily in an idiosyncratic manner. This pattern is disrupted in the plural, where all complements of prepositions show up invariably in the dative case. I investigate the nature of this unusual pattern and provide a post-syntactic account of the data, in which I claim that the observed asymmetry is the result of a cumulative effect in Latvian grammar: case may surface unfaithfully in configurations where marked combinations of case and number features occur in positions where certain case feature values are dispreferred to begin with. This effect arose diachronically as a repair mechanism after the language had lost one of its grammatical cases, the instrumental. This cumulative effect is captured using the framework of Harmonic Grammar. I also argue extensively against a purely syntactic account of the data.

1 Core data

I will begin by introducing the basic facts regarding the behavior of Latvian nominals in prepositional phrases. The language has a system of five grammatical cases (nominative, genitive, dative, accusative and locative) and two grammatical numbers (singular and plural) distinguished on DPs (determiner phrases). This can be seen in Table 1. The language also has a number of adpositions used to express fine-grained local and temporal relations, as well as other relations which cannot be adequately rendered using the limited case inventory.

A preposition in Latvian requires its complement to be in one of the following grammatical cases: *genitive* or *accusative*. Two examples of prepositional case assignment can be seen in (1) below.[1]

Table 1: A sample paradigm: *aukstais sniegs* 'the cold snow'.

	SG	PL
N	aukst-ais snieg-s	aukst-ie snieg-i
G	aukst-ā snieg-a	aukst-o snieg-u
D	aukst-ajam snieg-am	aukst-ajiem snieg-iem
A	aukst-o snieg-u	aukst-os snieg-us
L	aukst-ajā snieg-ā	aukst-ajos snieg-os

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[1] All the examples in this paper have been either provided by my consultants, both native speakers of Latvian living in Latvia, or adapted from Prauliņš (2012).

(1)   *Case assignment in Latvian PPs:*
a.   Andr-is   staigā   pa   mež-u.
A-NOM.SG walk.PRS.3 around forest-ACC.SG
'Andris is walking around the forest.'

b.   Andr-is   dzīvo   aiz   mež-a.
A-NOM.SG live.PRS.3 behind forest-GEN.SG
'Andris lives on the other side of the forest.'

Only two prepositions assign the dative case:

(2)   *Prepositions with the dative case:*
a.   Zēn-s   skrien   līdz   kok-am.
boy-NOM.SG run.PRS.3 toward tree-DAT.SG
'The boy is running towards the tree.'

b.   Kaķ-i   nāk   pa vien-am.
cat-NOM.PL com.PRS.3 by one-DAT.SG
'The cats are coming one by one.'

In one instance, a pair of homophonous prepositions assign two different cases to their complements. Both are spatial prepositions, one having a superessive reading (i.e. 'on/onto'), the other a generic directional one (cf. Eng. 'to').

(3)   *Superessive 'uz (on)' + GEN:*
a.   Ziv-s   ir   uz gald-a.
fish-NOM.SG be.3.PRS on table-GEN.SG
'The fish is on the table.'

b.   Liek-u   ziv-i   uz gald-a.
put.PRS-1SG fish-ACC.SG on table-GEN.SG
'I am putting the fish onto the table.'

Example (3) also shows that the difference in case attributable to static and dynamic readings does not exist in Modern Latvian (even though it did exist in the language previously, see Endzelīns 1906).[2]

(4)   *Generic directional 'uz (to)' + ACC:*
a.   Brauc-u   uz Rīg-u.
drive.PRS-1SG to R-ACC.SG
'I am driving to Riga.'

b.   Ej-u   uz skol-u.
go.PRS-1SG to school-ACC.SG
'I am going to school.'

Generally, the semantics of a given preposition cannot be used to straightforwardly determine whether it will assign the accusative or the genitive case. For example, the spatial preposition *starp* 'between' assigns the accusative case, while *pie* 'near/at' assigns the genitive:

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[2] Cf. *auf dem Tisch* 'on the.DAT table' and *auf den Tisch* 'onto the.ACC table' in Standard German (own data), or *na stol-Ø/na stol-e* 'onto table-ACC/on table-LOC' in Russian (own data).

(5)   *Accusative and genitive with spatial prepositions:*
   a.   Grib-u   sēdē-t starp   tēv-u   un māt-i.
        want.PRS-1SG sit-INF between father-ACC.SG and mother-ACC.SG
        'I want to sit between [my] father and mother.'

   b.   Grib-u   sēdē-t pie gald-a.
        want.PRS-1SG sit-INF at   table-GEN.SG
        'I want to sit at the table.'

1.1 Prepositions with plural DPs

We have just seen that there is variation concerning the cases Latvian prepositions assign to their complements (genitive *vs* accusative in all but two cases where the dative is assigned, see (2)). There is not much evidence in favor of this variation being grounded in the semantics of particular prepositions, with the existing semantic factors being rather vague.

  The facts listed above apply, however, only to singular DPs following prepositions. In case the DP complement is in the plural, only the dative case is possible after all prepositions without exceptions (Endzelīns 1906; 1923; Prauliņš 2012). Compare, for instance, the examples in (1) with those in (6):

(6)   a.   Andr-is   staigā   pa   mež-iem.
             A-NOM.SG walk.PRS.3 around forest-DAT.PL
             'Andris is walking around the forests.'

        b.   Andr-is   dzīvo   aiz   mež-iem.
             A-NOM.SG live.PRS.3 behind forest-DAT.PL
             'Andris lives on the other side of the forests.'

The difference in case after the two prepositions with the accidentally shared surface form [uz] (as seen in (3) and (4) above) is effectively lost in the plural, with both prepositions showing up with dative complements. In other words, information regarding which one of the two prepositions is being used can no longer be recovered from the form of the complement DP:

(7)   a.   Ziv-is   ir   uz gald-iem.
             fish-NOM.PL be.PRS.3 on table-DAT.PL
             'The fish are on the tables.'   [Superessive]

        b.   Brauc-u   uz Cēs-īm.
             go.PRS-1SG to C(PL)-DAT.PL
             'I am going to Cēsis.'[3]   [Generic directional]

Crucially, the forms ending in /-iem/ are specifically dative forms that are not syncretic with any other forms in the paradigm. Outside of PPs (prepositional phrases), plural DPs behave absolutely normally showing a full paradigm of cases. This can be seen in the example below where all the five plural cases are featured.

(8)   a.   Mež-i   zied.
             forest-NOM.PL blossom.PRS.3
             'The forests are blossoming.'

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[3] Cēsis is the name of a town in Latvia.

   b.   Mež-u   kok-i.
          forest-GEN.PL tree-NOM.PL
          'The trees of the forests.'

   c.   Palīdz-iet   mež-iem!
          help-IMP.2PL forest-DAT.PL
          'Help the forests!'

   d.   Es   redz-u   mež-us.
          1SG.NOM see.PRS-1SG forest-ACC.PL
          'I see the forests.'

   e.   Mēs   spēlē-j-am-ies   mež-os.
          1PL.NOM play-EP-1PL.PRS-RFL forest-LOC.PL
          'We play in the forests.'

1.2 Section summary and road map

So far, we have seen some basic facts about Latvian prepositions and their main case-assigning properties. I have also shown that plural DPs are invariably in the dative case after all prepositions, with other case forms being generally available in the language, but ungrammatical in this narrowly defined context. This asymmetry will be the main focus of the remaining part of the paper. In Section 3, I will present an analysis of the data presented in this section. The analysis will crucially rely on the following central statements (argued for below):

1. Latvian prepositions never agree in φ-features with their complement DPs;
2. They assign case only once and locally to the entire complement, and it is always either the accusative or the genitive.

The central claim of the current article follows from these ideas:

> *The dative case on plural DPs embedded in PPs is a surface phenomenon whose locus is entirely post-syntactic.*

More specifically, I will assume a DM-like model of grammar where actual phonological strings representing individual morphemes are inserted into the terminal nodes of a clausal structure at the time when it is being spelled out and transferred to the phonological module. Before the respective morphemes are inserted, an optimality-theoretic mechanism analyses the structure and adjusts the feature bundles of various terminals in accordance with the requirements posed by a set of faithfulness and markedness constraints. In the specific case of Latvian PPs, I will argue that the genitive and the accusative cases create a marked configuration when used in prepositional contexts. While tolerated in the singular, this configuration becomes too marked in the plural, and the originally assigned case is therefore replaced with the unfaithful dative.

   Before going into the details of the analysis, I will argue in favor of this issue being an interface phenomenon rather than something taking place in narrow syntax. The arguments are listed in Section 2 below.

2 Against a purely syntactic account

In this section, I will begin with the null hypothesis assuming that Latvian prepositions assign different case values to their complement DPs in narrow syntax in response to these DPs' φ-feature values. In order to gain access to the φ-features of a DP, a preposition has to establish an Agree relation with its complement. Under the assumption that a P-head

in UG (Universal Grammar) is capable of assigning case independently without receiving any of its complement's features in return (Adger 2003; Baker 2013), this Agree operation would need to be a separate step taking place before case assignment. One issue that arises immediately under this assumption is *why* a P-head would need φ-features in the first place. There is no evidence for it in Latvian, with the language belonging to the typologically most common language class with non-inflecting prepositions. Leaving this issue aside for now, I will now sketch out (informally) the tentative sequence of syntactic operations needed to achieve the desired result:

(9)   P: Agree (φ) → Assign ACC/GEN if # is [–pl]; otherwise DAT.

This simple mechanism (even though it is definitely an ad-hoc solution in its essence) is perfectly capable of capturing the data in the previous sections. A more interesting question is what happens when there is more than just a simple DP in a P-head's complement position. In particular, I consider the following two instances worthy of attention: (a) coordinated structures and (b) case-transferring constructions. Generally, in both of these construction types, the DPs involved should have matching case values in narrow syntax, provided the whole construction is embedded under one single case-assigning element, such as a prepositional head. A case mismatch between singular and plural DPs within one such construction is an indication of the difference in case between singular and plural DPs is a surface rather than a deep syntactic phenomenon. I now address this issue in a detailed manner.

   For coordinated constructions, I will assume the structure in (10), as argued for in Murphy & Puškar (2018). I assume that the φ-features of the coordinated DPs are combined, and the resulting φ-complex is visible at the top of the projection. According to Murphy & Puškar, the number feature on ConjP is always going to be [+pl].

(10)   *Syntax of coordinated structures:*
         ConjP [φ = f(φ1,φ2)]

              DP₁   Conj'
              [φ1]
                      Conj   DP₂
                             [φ2]
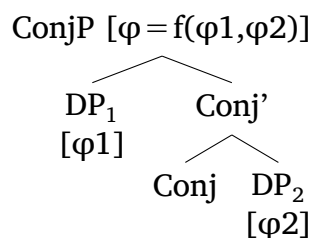
Case transferring is a concept going back to Fanselow (1990) (see also Haider 2010: Ch. 7). A poster-child example of case transferring is German where a secondary predication must match the case of its antecedent. Consider the following two examples:

(11)   *Case transferring in German (Prof. G. Müller, p.c.):*
         a.   Ich   frag-e   dich   als mein-en   Freund.
              1SG.NOM ask-1SG   2SG.ACC   as   my-ACC.SG friend
              'I am asking you as my friend.'
         b.   Sie   red-en   nicht mit Leut-e-n   wie mir.
              3PL.NOM   talk-3PL not   with people-PL-DAT.PL like 1SG.DAT
              'They don't talk to people like me.'

The DPs *meinen Freund* and *mir* must appear in the same case as their antecedents. Using the default nominative case would lead to ungrammaticality. Secondary predications of this kind are often introduced by elements like *as, such as,* or a pause (direct apposition).

In these constructions, the two DPs act as one in terms of case assignment. With both of them having unvalued case features, they establish an agreement link and later receive case values from a higher head parallelly. Very much like German, Latvian happens to have case-transferring structures, as well:

(12)   *Case transferring in Latvian:*
    a.   Dievin-u   Dienvid-francij-u   kā lielisk-u   viet-u
        adore-1SG south-france-ACC.SG as great-ACC.SG place-ACC.SG
        atvaļinājum-am.
        vacation-DAT.SG
        'I love the South of France as a great place for a vacation.'

    b.   Redz-u   At-i,   man-u   lab-o   draug-u.
        see.PRS-1SG A-ACC.SG my-ACC.SG good-ACC.SG friend-ACC.SG
        'I see Atis, (who is) my good friend.'

Crucially, the two DPs in the examples above must be in the same grammatical case. This holds for complex DPs in all syntactic positions. In the remaining part of this section, I will implicitly assume the syntactic derivation in (13) for case-transfer constructions (see Pesetsky & Torrego 2007 and Nevins 2014 for approaches to splitting feature matching and feature valuation into two different steps).

(13)   *A general template for case-transfer structures:*
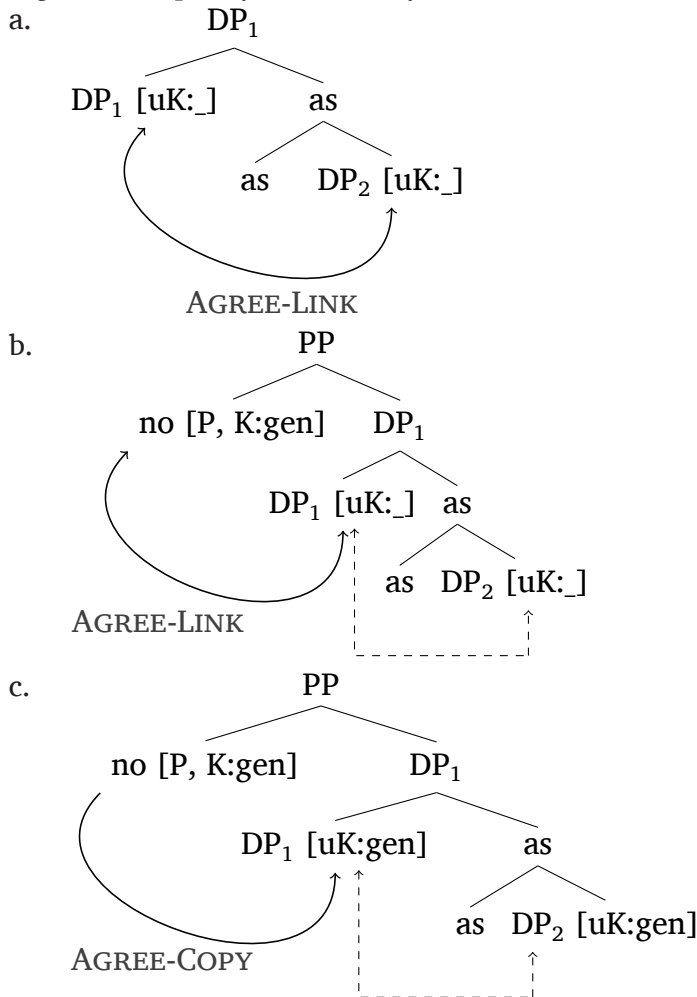
2.1 The analytic options based on agreement

Depending on the exact assumptions made about how Agree works, the following analytic options are possible for deriving the behavior of Latvian PPs in narrow syntax:

i. **Option I.** Classic Agree (Chomsky 2001).

Under this assumption, the probe on the preposition – $[u\varphi:\_]$ – probes once within its c-command domain and agrees with the closest DP. If the DP is singular, the entire complex will receive the accusative/genitive case. Otherwise, the entire structure will show up in the dative case. In case the preposition's probe is also able to detect φ-features on ConjP (the top of the coordinated structure), one would expect coordinated structures to always appear in the dative following a preposition:

(14) a.   P + [DP$_{SG}$ (as) DP$_{SG/PL}$] → ACC/GEN
      b.   P + [DP$_{PL}$ (as) DP$_{SG/PL}$] → DAT
      c.   P + [ConjP$_{PL}$ DP$_{SG/PL}$ & DP$_{SG/PL}$] → DAT

ii. **Option II.** Relativized probing/searching for plural features.

This alternative relies on the ideas outlined in Preminger (2014). Instead of simply being a probe in need of features, one could have a probe pre-specified for particular feature values: P [*find(PL)*]. If the probe remains unsatisfied, default valuation takes place. Such a probe will scan the entire c-command domain ignoring intervening goals which are not able to satisfy it. The result yielded by this kind of relativized probing is the following: the entire complex will be in the dative case if at least one DP in it has plural features. If both DPs are singular, the accusative/genitive will be assigned. If the probe is relativized to find singular features, then the entire complex will be in the accusative/genitive if at least one DP is singular, and in the dative otherwise. Again, if the probe can read the φ-features on ConjP, then all coordinated structures will show up in the dative in case the probe is relativized to [+pl].

iii. **Option III.** Relativized probing with multiple case assignment.

In this approach, the relativized probe on P, e.g. P [*find(PL)*], will continue probing until it finds plural features or until the scanning of the c-command domain of the preposition has been completed. Every time the probe fails to find a matching goal, it assigns the accusative/genitive to the current goal. Once the probe has found a plural DP, the probing stops and the remaining DPs uniformly receive the dative case:

(15)   P + [DP$_{SG}$ → ACC/GEN, … DP$_{SG}$ → Acc/Gen, DP$_{PL}$ → DAT, DP$_{SG/PL}$ → DAT, …]

Again, for coordinated structures, one would expect the dative case only under the assumption that the probe finds the plural features on ConjP.

Without a doubt, further analytical options are possible. For instance, one could have a system where the number projection acts as an intervener for prepositional agreement. In this case, the number phrase would have to be very high inside the DP (above the D-level), which is not a very attractive option. I am not aware of a single syntactic model where NumP would project above D, since it is at the D-layer where reference is established, and by that time, the grammatical number must be determined. Also, it is not clear why the number phrase should be an intervener in the first place. In order to intervene, it would either need

to be phasal (Chomsky 2001), or it would have to have case features, thus becoming a defective intervener (Chomsky 2000). Both options seem very implausible to me.

2.2 Analytic options vs data

With the above three options in mind, I would like to turn to the data provided by the consultants. The first dataset containing coordinated constructions is presented below.[4]

(16) *Prepositional phrases with coordinated DPs:*
    a. Viņš iet   ar   puik-u   un meiten-i.
        he   goes with boy-ACC.SG and girl-ACC.SG
        'He is walking with a boy and a girl.'   [SG & SG]

    b. Viņš iet   ar   puik-ām   un meiten-ēm.
        he   goes with boy-DAT.PL and girl-DAT.PL
        'He is walking with boys and girls.'   [PL & PL]

    c. Māte   gāja ar   sav-u   sun-i   un saviem
        mother went with own-ACC.SG dog-ACC.SG and own-DAT.PL
        div-iem   kaķ-iem.
        two-DAT.PL cat-DAT.PL
        'Mother walked with her dog and two cats.'   [SG & PL]

    d. Nora bija vispar viena, bez   sav-iem   bērn-iem
        N   was all   alone without own-DAT.PL child-DAT.PL
        un sav-a   vīr-a.
        and own-GEN.SG husband-GEN.SG
        'Nora was all alone, without her children and husband.'   [PL & SG]

In the examples in (16), two prepositions are used: *ar* 'with' governing the accusative case and *bez* 'without' requiring a complement in the genitive. In both cases, however, a plural complement shows up in the dative. In case the complement is coordinated and consists of one singular and one plural DP, there is a case mismatch, as seen in (16-c) and (16-d).

This result is unexpected. If we turn to the agreement options presented above, they all fail to account for the latter two examples. **Option I** predicts (16-c) to have two accusatives and (16-d) to show up with two datives. If ConjP is a legitimate goal for agreement, then both sentences would have two datives. If we pursue **Option II** with the probe relativized to [+pl], then (16-c) and (16-d) would show up with two datives. If it's relativized to [–pl], then (16-c) and (16-d) would have two accusatives. Finally, **Option III** predicts the following: with the probe relativized to [+pl], (16-c) would be predicted correctly, but (16-d) would show up with two datives, contrary to fact. With the probe relativized to [–pl], (16-c) would have two accusatives.

Moreover, Latvian can have coordinated structures with more than two conjuncts. In these cases, each DP acts as if it were the only DP in the preposition's c-command domain. No matter how the number values alternate on the conjuncts, all singular DPs will be in the accusative/genitive and all plural ones in the dative.[5]

Since all three options predict unattested results, one might assume – as the simplest possible way out – the presence of a further copy of the preposition in front of each conjunct in coordinated structures, which is subsequently deleted at PF:[6]

(17)   … ar savu suni un (ar) diviem kaķiem
        '… with her dog and (with) two cats'

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[4] In order to save space, the glosses in the examples below have been somewhat reduced.
[5] This is an independent further argument against Option III.
[6] In this case, the conjuncts would be PPs, not DPs.

In this configuration, each P-head agrees with its local DP and assigns it case independently. In the surface structure, the superfluous copies of the preposition are deleted.

It is, however, not always the case that a second copy of the preposition can be inserted in all contexts without a change in the semantics of the sentence:

(18)   *One preposition vs two prepositions:*
        a.   Viņš sarunājās   ar   zēnu   un divām   meitenēm.
              he   made.plans with boy.ACC and two.DAT girls.DAT
              'He made plans with a boy and two girls (i.e. one set of plans).'

        b.   Viņš sarunājās   ar   zēnu   un ar   divām   meitenēm.
              he   made.plans with boy.ACC and with two.DAT girls.DAT
              'He made plans with a boy and with two girls (i.e. two independent
              sets of plans).'

There are therefore straightforward examples where a single preposition takes scope over a conjunction of two DPs. In these constructions, the case mismatches mirror those we saw in (16).

Another example where one cannot have a second copy of a preposition involves an emphatic construction with "self"-like element:

(19)   Gribētu   satikties ar   Jums   paš-u.
        want.COND meet   with 2PL.DAT self-ACC.SG
        '[I] would like to meet with YOU specifically.'

In (19), the speaker is addressing exactly one person. The reason the pronoun is in the plural is because it is used in the honorific form. However, the emphatic particle *pats* 'self' reflects the natural singular number of the addressee. The construction absolutely cannot be re-written/re-interpreted as **ar Jums ar pašu*.

Finally, we will take a look at what happens in appositive constructions, where, in the meanings intended below, there is no reason to assume the presence of a second prepositions (although it is much easier for my consultants to permit one in these utterances than in the ones above).

(20)   *Prepositional phrases with appositive DPs:*
        a.   Es gribu doties uz Rīg-u,   sav-u   mīļāk-o
              I   want to.go to R-ACC.SG own-ACC.SG favorite-ACC.SG
              pilsēt-u.
              city-ACC.SG
              'I want to go to Riga, my favorite city.'   [SG & SG]

        b.   Gribēju izdarīt to   ar   viņ-iem   kā man-iem   labāk-ajiem
              wanted to.do this with 3SG-DAT.PL as my-DAT.PL best-DAT.PL
              draug-iem.
              friend-DAT.PL
              'I wanted to do it with them as my best friends.'   [PL & PL]

        c.   Iemācījos to   no   man-as   komand-as   kā vienīg-ajiem
              learned   this from my-GEN.SG team-GEN.SG as only-DAT.PL
              cilvēk-iem,   kur-i   mani   saprot.
              human-DAT.PL REL-NOM.PL me.ACC understand.PRS.3
              'I learned this from my team as the only people who   [SG & PL]
              understand me.'

     d.   Viņa atgriežas no   Cēs-īm,   sav-as   bērnīb-as
           she returns from C-DAT.PL own-GEN.SG childhood-GEN.SG
           pilsēt-as.
           city-GEN.SG
           'She is returning from Cēsis, her childhood's town.'   [PL & SG]

The data in (20) perfectly match those in (16). Once again, the analytic options listed above fail to predict the correct distribution of case forms in Latvian PPs. One final way of accounting for the data in narrow syntax would be to postulate unlimited cyclic Agree[7] (P agrees with DPs in its c-command domain as long as there are DPs to agree with). During this process, the preposition would assign case independently to each nominal phrase. This idea is, of course, very unattractive in many ways. Unlimited probing is not something that's commonly assumed in standard Minimalism. Also, one would have to get rid of Fanselow's generalization about DPs in case-transfer structures receiving case in a joint manner.

2.3 Against a case peeling approach

In Caha (2009), case is split into multiple functional projections above D, in which the projection for structural cases are lower, and oblique cases are higher and properly include structural ones:

(21)   … [$_{DatP}$ Dat [$_{GenP}$ Gen [$_{AccP}$ Acc DP]]]

A universal hierarchy of nested case projections is assumed for all languages:

(22)   … [Abl [Loc [Instr [Dat [Gen [Acc/(Erg) [Nom]]]]]]]

Similarly, a preposition consists of multiple syntactic projections if its meaning is complex. A static spatial preposition, such as *'in'*, consists of a PlaceP project, while its dynamic counterpart *'into'* has a PathP projection above PlaceP:

(23)   [$_{PathP}$ Path [$_{PlaceP}$ Place KP]]

Every nominal phrase is assumed to be born with the highest number of case projections permitted by a given language. This complex case projection is then embedded under PlaceP. This captures the fact that in languages like German, Czech and Russian static spatial prepositions usually take the most complex oblique case(s) available in the system: the locative and the instrumental in Slavic, the dative in German.

   If the preposition contains a higher projection containing PathP (rendering a path to the location anchored by PlaceP), then, in order to interpret the construction properly, part of the nominal phrase has to move into the SpecPath-position. The part that moves is AccP, leaving the upper case projections stranded down below. These are spelled out together with the Place head as the respective phonological string of the preposition. Also Place alone can be spelled out the same way if there is not Path projection (thanks to the Superset Principle). The AccP in SpecPath is naturally spelled out as the accusative case.

   One could theoretically implement this proposal for Latvian PPs. A nominal phrase would be embedded as GenP (DatP in two cases) under PlaceP.[8] The, if PathP is projected

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[7] … not necessarily in the same terms as Béjar & Rezac (2009) since, in their account, the probe does actually have a valid reason to agree more than once. It would have to be a system akin to that in Deal (2015), with an insatiable probe.
[8] In Slavic, two projections are possible, too: InstrP and LocP.

above PlaceP, AccP would move to it, leaving the GenP (and DatP) shells behind. It can easily be shown that it is not PathP that has to be made responsible for such movement: in most cases where a dynamic spatial preposition is used, the genitive case is used nonetheless. We already saw this in (3) above. Caha argues that some prepositions involving a PathP cannot spell out the Place head together with the stranded shell of oblique case projections, thus preventing AccP from moving up. This explanation would need to be adopted for most of the spatial prepositions existing in Latvian, which is not an elegant solution. Moreover, it is not entirely clear why AccP would need to move in the static reading for the preposition *starp* 'between' in (5) above.

The peeling approach works neatly for Slavic PPs because, in the Slavic languages (apart from Bulgarian and Macedonian), locative prepositions alternate between Loc/Instr and Acc in the vast majority of cases. In Latvian, however, every preposition requires one specific case from its complement. Whether it is the accusative or the genitive seems to have nothing to do with the presence/absence of a PathP-projection in the structure.

Furthermore, there are other issues that arise with this approach. First and foremost, a mechanism would need to be proposed for how plural DPs lack the ability to undergo case peeling, or, better yet, possess the ability to resist it. One idea would be to deem the syntactic number projection some kind of intervener, making it impossible for anything below it to be extracted. Naturally, the number projection would, once again, need to be very high up in the structure, above all the case layers. I reject this idea for the following reasons: (a) I do not see any principled reason why number should be above the D- and K(ase)-layers in the nominal phrase, nor am I aware of any analyses proposing this; (b) even if the latter were the case, *all* nominals in the plural would need to have stranded case projections under number, in order for number to scope over the base D-layer. This makes it unclear how one could ever have plural cases other than the dative in the first place;[9] (c) if the number projection does indeed intervene, then the intervention effect should always be active, again, making it unclear how plural non-datives even exist.

2.4 Against non-autonomous cases

Another potentially viable alternative to the analysis presented in this paper is assuming that the instrumental case still exists in Latvian. Under this assumption, one could say that all the accusative prepositions in Latvian have shifted to assigning the instrumental case instead.

The instrumental case would then be restricted to being used only after prepositions. Furthermore, it would be fully syncretic with the accusative in the singular and the dative in the plural. This idea is, in fact, not irrational. In Slovene, for instance, the instrumental and the locative case are exclusively used with prepositions (Derbyshire 1993). However, even though they are partially syncretic with other case forms, the instrumental and the locative still have unique dedicated forms in at least some inflectional classes in Slovene (e.g. locative and instrumental plural in nearly all instances, as well as instrumental singular of masculine and neuter nouns). The existence of such unique forms makes postulating these cases much more justifiable than claiming an abstract instrumental in Latvian.

Even though bare dative plurals may still occasionally be used in Modern Latvian in instrumental contexts (a potential further argument in favor of the instrumental as a separate entity in Latvian), these constructions are becoming less and less productive with every passing year and are highly marked in daily usage (Holvoet 2010).

There is a further complication in Latvian making this alternative analysis even less attractive. We have previously seen that, in Modern Latvian, all prepositions assigning the

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[9] Unless counter-cyclic peeling is allowed, which I do not consider a welcome addition to the theory.

genitive case to singular DPs now also assign the dative case in the plural. This would need to be accounted for by employing yet another non-atonomous case, again, syncretic with the genitive in the singular and with the dative in the plural. Not only is this "Instumental 2" (or, going even further, "Ablative") very unattractive for the same reason as the instrumental discussed in the previous paragraph: additionally there is no diachronic evidence for such a case having ever existed in Latvian.

2.5 Section summary

The purpose of this section was to show that the traditional syntactic approaches to case and agreement fail to capture the pattern we saw above. With the obvious lack of evidence for the contrary, I conclude that Latvian prepositions do not react to the φ-features of their complement DPs in the manner of assigning them different cases. Apart from the two prepositions assigning the dative case, I will henceforth assume that Latvian prepositions *always* assign either the genitive or the accusative case to their complements in narrow syntax.

   Once the syntactic structure has been built, it is transferred to the syntax-PF interface. Before actual case formatives can be inserted into the respective slots, an inspecting mechanism evaluates the *complete* structure. From the viewpoint of this mechanism (which is defined in optimality-theoretic terms), certain feature values are more marked than others in given morpho-syntactic contexts. The genitive and the accusative cases happen to be marked when embedded under P-heads. Additional markedness violations are incurred when these two cases are used in plural contexts. Together, these two factors trigger a repair mechanism where the case features are replaced with those of the dative.

   Section 3 below develops a detailed proposal regarding the nature of this post-syntactic readjustment.

3 The analysis

In what follows, I will develop a morphological analysis of the data from Section 1. I have already argued that Latvian prepositions always assign the genitive/accusative case to their complement DPs in narrow syntax, regardless of the φ-features of the DP. The syntactic case features are then modified at the syntax-PF interface in certain marked configurations. These configurations involve a "gang" effect in Latvian grammar: marked fusional exponents, though tolerated in most contexts, are ruled out when genitive/accusative DPs are located in non-structural positions.

   In a nutshell, I will show that the dative plural exponent /-m/ expones one single feature: the dative case. In the genitive and accusative forms, the two exponents are fusional, realizing case and number simultaneously. The simple dative exponent is less marked than the other two in the grammar of Latvian. However, as long as genitive and accusative plurals appear in their canonical positions, i.e. embedded under D and V respectively, the marked exponents are tolerated:

(24)   a. $[_{DP}$ D … DP[GEN,PL] …]   [realized by N-GEN.PL]
        b. $[_{VP}$ V DP[GEN,PL]]   [realized by N-ACC.PL]

However, if a genitive or accusative DP is embedded under a P-head, the respective case is not in its canonical structural position, thus creating a second layer of markedness on top of the marked fusional exponents for Acc and Gen in the plural. Together, the two markedness violations trigger a repair mechanism which changes the case feature on the DP to Dat, which is the unmarked case in PPs due to its global status as an inherent case in the system.

(25) a. [$_{PP}$ P DP[ACC/GEN,PL]] :: contains two violations of markedness: (a) structural case (Gen/Acc) in the wrong position (under P) (b) fusion of case and number features in one exponent;

b. [$_{PP}$ P DP[ACC/GEN,PL]] → [$_{PP}$ P DP[**DAT**,PL]] (realized by discrete simple exponents: N-PL-DAT) :: fixes both markedness violations at the expense of incurring a violation of case identity between deep syntax and the surface representation.

In the singular, the number feature is never exponed explicitly, which makes it possible to have the marked accusative and genitive DPs embedded within a P-layer (fusional exponence is never violated, thus making it impossible for the repair mechanism to be triggered):

(26)   [$_{PP}$ P DP[ACC/GEN,SG]]   [realized by N-ACC/GEN]

I will begin this section by presenting some evidence regarding the distribution of structural and inherent case in Latvian.

3.1 Structural and inherent case in Latvian

The dichotomy into structural and inherent case is well known in modern linguistic theories (e.g. Haider 1985; Marantz 1991; McFadden 2004; Baker & Vinokurova 2010; Baker 2015). Inherent case is assigned locally to DPs by the syntactic heads licensing them. Inherent case is frequently associated and goes hand-in-hand with θ-role assignment. Structural case, on the other hand, is assigned to DPs located in particular structural positions relative to the positions of other DPs in a derivation, such as those of the direct object and the subject.

The distribution of the five cases in Latvian along the structural/inherent line is summarized in Table 2. Two of the five cases may be either structural or inherent, depending on where and how they are assigned. One case (the nominative) is strictly structural (or default), with the remaining two (dative and locative) being always inherent. This distribution will be relevant for the analysis sketched out in the following subsection.

The nominative case is typical for the subject position, i.e. Spec-v or Spec-T (depending on whether EPP-movement (Adger 2003; Koeneman & Zeijlstra 2017) takes place in Latvian, which I will not be discussing in this paper). It also shows up on nominal predicates (probably as a default case,[10] cf. Baker 2015).

(27)   *Subject nominative and predicative nominative:*
a. Uld-is   sa-lauz-a   nūj-u.
U-NOM.SG PFV-break.PST-3 stick-ACC.SG
'Uldis broke the stick.'

Table 2: Structural vs inherent case in Latvian.

	Structural	Inherent
N	✔	✘
G	✔	✔
D	✘	✔
A	✔	✔
L	✘	✔

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[10] I will treat default nominatives as structural in all positions.

    b.   Tas   ir kok-s.
         this.M.NOM.SG is tree.M-NOM.SG
         'This is a tree.'

The accusative case is the case of the internal argument of a bivalent verb as long as its θ-role does not qualify for inherent case assignment (see below):

(28)   Laps-a   nogalinā-j-a putn-u.
       fox-NOM.SG kill.PST-EP-3 bird-ACC.SG
       'The fox killed the bird.'

Bivalent verbs with the recipient or benefactor role on the object assign an inherent dative:

(29)   Tēv-s   palīdz   zēn-am.
       father-NOM.SG help.PRS.3 boy-DAT.SG
       'The father is helping the boy.'

Structural accusative becomes nominative under passivization (with no grammatical way to express an oblique agentive argument in passive structures):

(30)   a.   Es   iz-lasī-j-u   grāmat-u.
            1SG.NOM PREV-read.PST-EP-1SG book-ACC.SG
            'I read the book.'
       b.   Grāmat-a   tik-a   iz-lasī-t-a.
            book.F-NOM.SG AUX.PST-3 PREV-read-PASS.PST-F.NOM.SG
            'The book was read.'

The genitive case is no longer assigned by verbs inherently (unlike Russian or Lithuanian).[11] It is canonically the structural case on DPs embedded in other DPs (possessors, internal arguments of nominalized verbs):

(31)   a.   At-a   cepur-e   ir liel-a.
            A-GEN.SG hat.F-NOM.SG is big-F.NOM.SG
            'Atis's hat is big.'   [Possessor]
       b.   Pilsēt-as   iznīcinā-šan-a.
            city-GEN.SG destroy-NMNLZ-NOM.SG
            'The destruction of the city.'   [Theme]

The genitive and the accusative may also be inherently assigned by prepositions, as in (1). These two cases may therefore appear as structural, as well as inherent cases depending on the concrete mechanism used to assign them. However, since they *can* be structural, their use as inherent cases will always incur a violation of a constraint active in the grammar (see below).

   The dative and the locative cases are always inherent in Latvian. The dative is almost always associated with a specific thematic role (and therefore assigned locally either by the lexical verb or by the Appl head when the object is merged in), while the locative is either lexically assigned by a verb or, in adverbials, introduced by a silent preposition, which assigns it the locative case (see Baker 2015 for more information on silent P-heads):

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[11] Some verbs, such as *trūkt* 'to lack', used to assign a lexical genitive, but they no longer do so in the modern language. Forms like [trūkt + GEN] are considered old-fashioned by present-day speakers.

(32) a. Es   dod-u   puķ-i   Laur-ai.   [θ:Rec]
          1SG.NOM give.PRS-1SG flower-ACC.SG L-DAT.SG
          'I am giving Laura a flower.'

      b. Es   palīdz-u   Laur-ai.   [θ:Ben]
          1SG.NOM help.PRS-1SG L-DAT.SG
          'I am helping Laura.'

      c. Tagad es-am   [$_{PP}$ Ø [P, Cas:Loc] [$_{DP}$ Viļņ-ā.]]
          now   be.PRS-1PL   V-LOC.SG
          'We are in Vilnius now.'

Importantly, the dative object of a ditransitive verbs cannot be the target of passivization, such as the sentence *Laura was given a flower* in English. Passivization of bivalent verbs with dative objects is possible with preservation of the dative and default agreement on the passive participle, which further confirms the fact that the dative is an inherent case in the system (McFadden 2004; 2015):

(33) a. Es   palīdzēj-u   Rūt-ai.
          1SG.NOM help.PST-1SG R-DAT.SG
          'I helped Ruta.'

      b. Rūt-ai   tik-a   palīdzē-t-s.
          R.**F**-DAT.SG AUX.PASS.PST-3 help-PASS.PST-**M**.NOM.SG
          'Ruta was helped.'

In (33), the benefactor argument is a female person. When the sentence is made passive, the participle does not agree with the dative subject and displays default masculine singular agreement.

3.2 The morphological profile of nominal inflections

This subsection's purpose is to show that the accusative and genitive cases in the plural are realized by featurally complex fusional exponents, while the dative-case inflection is a simple formative only realizing the case feature (which is further confirmed by the fact that the same suffix appears in the singular, as well).

(34)   *The case exponents in the plural:*
          i.   GEN: -[GEN,PL] ~ -u
          ii.   ACC: -[γ,PL$_{ACC}$]-[(NOM/)ACC$_{PL}$] ~ -u/a/e-s
          iii. DAT: -[PL]-[DAT] ~ -ie/ā/ē/ī-m

The genitive plural exponent contains directly referenced case and plural features. The accusative plural exponents consist of two parts, with the first part referencing number features with contextual case features, and the second one being the mirror image of the first (case features with contextual number features). The dative plural exponent consists of two parts, one exponing only number and the other one dealing exclusively with case. This asymmetry will become crucial in the optimality-theoretic analysis below.

   As far as inflectional suffixes are concerned, Latvian nouns are grouped into six classes, determined by their lexical class specification, and the noun's inherent gender. Table 3 lists all the inflectional affixes for the various noun classes in Latvian. The singular formatives are in the top part of the table, and the plural ones are located below them. Under each class number, the characteristic theme vowel is listed above all the affixes. Classes I through III are reserved for masculine nouns; feminine nouns are restricted to Classes IV, V and VI.

Table 3: The inflectional affixes of Latvian nouns, ordered by class.

Cl	Masculine				Feminine		
	I	IIa	IIb	III	IV	V	VI
Th	a	i	i	u	a	e	i
N	-s	-is	-s	-us	-a	-e	-s
A	-u	-i	-i	-u	-u	-i	-i
G	-a	-ja	-s	-us	-as	-es	-s
D	-am	-im	-im	-um	-ai	-ei	-ij
L	-ā	-ī	-ī	-ū	-ā	-ē	-ī
N	-i	-ji	-ji	-i	-as	-es	-is
A	-us	-jus	-jus	-us	-as	-es	-is
G	-u	-ju	-ju	-u	-u	-ju	-ju
D	-iem	-jiem	-jiem	-iem	-ām	-ēm	-īm
L	-uos	-juos	-juos	-uos	-ās	-ēs	-īs

The morphological template of an inflected nominal in Latvian consists of the nominal root (N^0), followed by a series of morphological heads realizing various inflectional categories (cf. Halle 1992; Bruening 2017).

(35)   *The morphological template of an inflected nominal:*
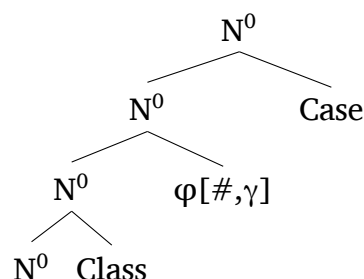
The *Class* terminal carries no functional load and only signals a noun's affiliation with a particular inflectional class. Depending on the root's specification, the vowel in this slot will be /a/, /e/, /i/ or /u/.

Decomposed across the three inflectional slots, the inflectional affixes take on the the shape shown in Tables 4 and 5.[12] In the two tables, the rows containing the simple number-neutral dative-case exponent are highlighted.

If we focus on the cases that interest us in this work (the genitive, the accusative, and the dative), then the following picture emerges from the case decomposition presented above:

- The genitive plural has the same exponent for all classes, namely the suffix /-u/. This string is not shared with any genitive forms in the singular. Therefore, it is possible to claim that this suffix is a fusional exponent realizing number and case simultaneously. In the analysis sketched above, it spans over both morphological heads.
- In the singular, the genitive case has either the exponent /-a/ (for two classes), or the exponent /-s/. These exponents are realized in the Case slot. They need not

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[12] In the table, [μ] stands for the insertion of an additional mora, i.e. lengthening. [hi] is the addition of the feature [+high] to the preceding vowel. For an alternative approach to decomposing the inflectional affixes of Latvian nouns, see Halle (1992).

Table 4: Masculine case affixes, decomposed.

	I			IIa			IIb			III		
	Cl	φ	Case	Cl	φ	Case	Cl	φ	Case	Cl	φ	Case
N	∅	∅	s	i	∅	s	∅	∅	s	u	∅	s
A	a	∅	[hi]	i	∅	[hi]	i	∅	[hi]	u	∅	[hi]
G	a	∅	a	i	∅	a	∅	∅	s	u	∅	s
D	a	∅	m	i	∅	m	i	∅	m	u	∅	m
L	a	[μ]		i	[μ]		i	[μ]		u	[μ]	
N	∅	i		i	i		i	i		∅	i	
A	∅	u	s	i	u	s	i	u	s	∅	u	s
G	∅	u		i	u		i	u		∅	u	
D	∅	ie	m	i	ie	m	i	ie	m	∅	ie	m
L	∅	uo	s	i	uo	s	i	uo	s	∅	uo	s

Table 5: Feminine case affixes, decomposed.

	IV			V			VI		
	Cl	φ	Case	Cl	φ	Case	Cl	φ	Case
N	a	∅	∅	e	∅	∅	∅	∅	s
A	a	∅	[hi]	e	∅	[hi]	i	∅	[hi]
G	a	∅	s	e	∅	s	∅	∅	s
D	a	∅	j	e	∅	j	i	∅	j
L	a	[μ]		e	[μ]		i	[μ]	
N/A	a	∅	s	e	∅	s	i	∅	s
G	∅	u		i	u		i	u	
D	a	[μ]	m	e	[μ]	m	i	[μ]	m
L	a	[μ]	s	e	[μ]	s	i	[μ]	s

refer to any φ features: a contextual reference to Classes I and IIa for /-a/ is suf-
ficient. This contextual feature does not make the exponent fusional in the sense
defined in the following subsection. Since class features are internal to the noun
itself and do not affect anything in the syntactic structure, the markedness con-
straint below is not triggered.

• The accusative plural has the exponent /-s/ in all classes. The accusative singular
has a vowel-raising featural exponent: [+hi]. Again, with [+pl] being the marked
feature, it makes sense to specify the former as a complex exponent, and the fea-
tural affix as the elsewhere accusative marker. In the accusative plural, the φ slot
also has dedicated plural formatives, which refer to the case features, as well.
Thus, both heads (φ and Case) contain fusional exponents in the accusative plural.

• In the dative case, the picture is different. Here, the elsewhere marker /-m/ spans
across masculine singulars and all plurals. The more specific marker here is the /-j/ of
naturally feminine nouns in Classes IV and V, and all nouns in Class VI. Thus, dative
singular has a fusional exponent for feminine nouns, and a simple elsewhere forma-
tive in all other cases. The φ head has no singular exponent, and a generic plural
exponent, which depends on the gender features. Therefore, in the dative plural, the
two heads realize strictly their own dedicated features and contain simple exponents.

For the decomposition of the various case values found in Latvian, I will use the case hierarchies proposed in Caha (2007; 2009; 2013):

(36)   LOC » DAT » GEN » ACC » NOM

The default case (the nominative) has the simplest feature specification: [A] (corresponding roughly to the notion *Case*). The other two structural cases (the accusative and the genitive) inherit the features of the simpler case(s), and also add their own. Thus, the accusative is specified as [AB], and the genitive as [ABC]. Finally, the oblique cases (the dative and the locative) have four and five abstract features respectively.

(37)   *The case features, decomposed:*
    i.   NOM: A
    ii.   ACC: AB
    iii.   GEN: ABC
    iv.   DAT: ABCD
    v.   LOC: ABCDE

The presence of the higher-ordered feature of a more complex case entails automatically the presence of the features of all the simpler cases. Therefore, the context [D] refers not only to the dative case, but also the locative, since the locative case also includes the feature [D]. Therefore, if one wants to contextually refer only to the dative, one needs to exclude the next feature in the hierarchy: [D,-E] (strictly dative). If a feature is specified negatively without another positively specified feature, then all the cases which do not include it will be referred to: [-C] thus refers to nominative and accusative, because both of these cases do not contain the feature [C] (present in the genitive, dative and locative).

   The gender features values are [±m (asc)], and number is [±pl]. The natural female gender will be captured using the feature [F], which is shown below.

   The generalization for the theme vowels is very simple: the back vowels /a/ and /u/ delete before a φ- or φ-and-Case-formative beginning with a full vowel. The theme vowels /i/ and /e/ become /j/ between a stem-final consonant and a full vowel. Additionally, the theme vowels are deleted in a few unpredictable contexts.

(38)   *The theme vowel deletion/modification rules:*
    i.   V → Ø / __ Cl:[I,IIb,VI] φ:[–pl] C:[-B]
    ii.   V → Ø / __ Cl:[IIb,VI] φ:[–pl] C:[C,-D]
    iii. a,u → Ø / __ V
    iv. e,i → j / __ V[13]

For formatives that realize the features of more than one morphological head at a time, the notion of a *Span* will be used (Merchant 2015; Bruening 2017).

(39)   *The spanning exponents:*
    i.   [μ] ↔ φ:[–pl] Case:[ABCDE]   [LOC.SG]
    ii.   u ↔ φ:[+pl] Case:[ABC,-D]   [GEN.PL]
    iii. i ↔ φ:[+pl, +m] Case:[-B]   [NOM.PL.M]

Individual Case morphemes:

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[13] This glide then coalesces with some stem-final consonants, resulting in mono-segmental palatals. For example: *brāl+i+ie+m → brā[ʎ]iem* 'brother.DAT.PL'.

(40) *The Case slot exponents with contextual features:*
    i.   j ↔ Case:[ABCD,-E] / ___ Cl:[VI] V φ:[−pl,F]   [DAT.SG.VI,DAT.SG.F]
    ii.   a ↔ Case:[ABC,-D] / ___ Cl:[I,IIa]   [GEN.SG.M (I,IIa)]
    iii. s ↔ Case:[-C] / ___ φ:[+pl]   [NOM/ACC.PL]
    iv. Ø ↔ Case:[-B] / ___ Cl:[IV,V]   [NOM.SG.F]

(41) *The pure Case slot exponents without contextual features:*
    i.   m ↔ Case:[D,-E]   [DAT]
    ii.   [hi] ↔ Case:[B,-C]   [ACC. (SG)]
    iii. s ↔ …   [NOM/GEN.SG]

Individual φ morphemes:

(42) *The φ slot exponents:*
    i.   uo ↔ φ:[+pl,+m] / ___ Case:[ABCDE]   [(LOC).PL.M]
    ii.   u ↔ φ:[+pl,+m] / ___ Case:[B,-C]   [(ACC).PL.M]
    iii. Ø ↔ φ:[+pl,–m] / ___ Case:[-C]   [(NOM/ACC).PL.F]
    iv. [μ] ↔ φ:[+pl,–m]   [PL.F]
    v.   ie ↔ φ:[+pl]   [PL]

In the insertion rules above, the exponents I consider *fusional* are the ones that: (a) span over morphological heads; (b) have φ-features with contextual case features, and the other way around. Importantly, the constraints below are not sensitive to exponents fusing φ- or case features with class features, since the latter are not meaningful from the point of view of featural markedness.

3.3 A gang effect in Latvian grammar

This subsection explores in greater details the rough sketch of the analysis I presented at the beginning of the current section. With the insights from the previous subsection in mind, we will now see how two marked configurations interact and trigger a repair mechanism in Latvian morphology.

  In Section 3.1, I spoke about the structural/inherent case distinction in the grammars of natural languages, and Latvian in particular. The following generalizations can be stated about the different types of case:

   i.   Structural case is important for distinguishing core grammatical positions within the clausal hierarchy. In many languages, it is the essential linking mechanism (e.g. in those with no agreement and a free order of constituents) (Stiebels 2002);
   ii. Inherent case is usually tied to thematic roles and helps indicate the exact semantic relationship between a licensing head and its complement (e.g. datives on recepient/benefactor objects);
   iii. Purely lexical case is semantically obscure from the point of view of synchronic grammar. All instances of idiosyncratic case assignment must have been, at some point, grounded in semantic or structural principles no longer visible in the language.

Structural case, being associated with core syntactic positions, is something that languages naturally tend to mark unambiguously. In other words, structural case should ideally have dedicated forms and not overlap in form with inherent or idiosyncratically assigned cases. However, we saw in Table 2 that two of the Latvian cases – the genitive and

the accusative – show up as both structural and inherent case. Every time these two cases are assigned lexically (by a preposition), it incurs a violation of the above-mentioned principle, which I will informally call STRUCCASE for now (split into two constraints in the tableaux below, see Section 3.5). This principle is not violated only in those instances where the accusative is the case of the internal argument of a verb, and the genitive is the case of a dependent DP embedded within another DP:

(43)   *Violation and satisfaction of* STRUCCASE:

Gen/Acc	STRUCCASE
V_{tr} + DP$_{[ACC]}$	✓
P_{ACC} + DP$_{[ACC]}$	*
[$_{DP}$ … DP$_{[GEN]}$ …]	✓
P_{GEN} + DP$_{[GEN]}$	*

At the same time, there is another principle in the grammar which makes sure that each and every surface output mirrors the respective input. This principle will work to preserve lexical case assigned by prepositions in Latvian, which I assume to be idiosyncratic in the modern language. I will call this principle ID(ENTITY)CASEI(NPUT)O(UTPUT).[14]

(44)   *The case identity constraint:*

Gen/Acc	IDCASEIO
P_{ACC} + DP$_{[ACC]}$	✓
P_{ACC} + DP$_{[GEN/DAT/...]}$	*

Thus, in the sentence in (45), the accusative DP is not the internal argument of a transitive verb, so STRUCCASE is violated. However, with IDCASEIO being ranked higher than the former principle, nothing happens and the syntactically assigned accusative surfaces faithfully.

(45)   Ed-u [æ:-]   ar   dakš-u.
         eat.PRS-1SG with fork-ACC.SG
         'I am eating with a fork.'

Speaking in OT-terms (Prince & Smolensky 2004), this can be demonstrated in the following manner:

(46)   *IDCASEIO wins over STRUCCASE:*

	Inp: P_{ACC} + DP	IDCASEIO	STRUCCASE
a.	☞ ACC		*
b.	DAT	*!	
c.	GEN	*!	*

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[14] An anonymous reviewer questions the notion of IDCASEIO based on the assumption that this principle would try to preserve something that is unnatural and confusing to begin with. I disagree with this criticism. The exact reason why prepositions in Latvian ended up assigning Acc or Gen may have become opaque in the modern language. However, there is extensive evidence that languages do not easily give up patterns simply because these create marked configurations. IDCASEIO is in its essence not different from any regular faithfulness constraint known from OT-like theories. Regardless of how marked a given input is, there will always be a faithfulness constraint protecting it, due to the fact that this type of input is possible.

The interaction of these two principles creates a natural tension in the grammar. On the one hand, cases which are used in structural positions "want" to show up only in these positions. On the other hand, some heads assign these cases lexically and attempt to realize them as such on the surface. Since we do get accusative and genitive nominal phrases after prepositions in Latvian, I infer that StrucCase alone cannot be strong enough to override IdCaseIO in Latvian. Therefore, these two principles alone cannot explain what happens in Latvian PPs. A third principle/constraint is needed in the grammar to assist StrucCase in overwriting the accusative/genitive case on plural DPs with the inherent dative.

I assume this to be a markedness constraint prohibiting the use of fusional exponents realizing case and φ feature simultaneously. In the previous section, we saw that dative formatives are composed of φ and Case markers, each one of which is a simple exponent. This is not the case with accusative and genitive plural exponents. The genitive plural exponent spans over two morphological heads, and the number exponent for the accusative plural makes reference to case features for both masculine and feminine nouns:

(47)   u ↔ φ:[+pl] Case:[ABC,-D]

(48)   s ↔ Case:[-C] / ___ φ:[+pl]

(49)   a.   u ↔ φ:[+pl, +m] ___ Case:[AB,-C]
         b.   Ø ↔ φ:[+pl,–m] ___ Case:[-C]

Therefore, the constraint *CumulCasePhi (prohibiting overt fusional exponence of case and number features)[15] is triggered by the above four morphemes, but not by the exponents realizing dative plurals.

I will show in Secion 3.6 below how this pattern arose in the language historically (where the constraint agains fusional exponents became capable of assisting StrucCase in overriding case faithfulness). While the current constraint hierarchy is in a way accidental (if seen synchronically), it helped learners of Latvian resolve an interesting acquisition paradox at one point in the past.

3.4 *The Harmonic Grammar framework*

Harmonic Grammar is a framework which, with the seminal work by Legendre et al. (1990), was in a way a predecessor of classic OT (Prince & Smolensky 2004). Since classic OT relies solely on strict constraint rankings to evaluate sets of candidates, it naturally poses difficulties to capturing cumulative effects in grammar where individual marked configurations are not bad enough to incur a fatal violation and create a suboptimal constraint profile but do create such a profile if they occur simultaneously. One way to tackle this problem is to use local conjunction of constraints (see Moreton & Smolensky 2002).

Local conjunction is, however, considered by many to be an unnecessary addition to OT that makes the framework much too powerful (Pater 2009; 2016). In this case, Harmonic Grammar (HG) presents an elegant alternative. In HG, each constraint has a particular weight. The ranking of the constraints naturally corresponds to their relative weighting. A violation of a constraint deducts this constraint's weight from the overall harmony value (which is initially equal to zero in all candidates). The candidate with the harmony value closest to zero wins the competition.

For illustrative purposes, I will now present a toy example of how HG works. Let's imagine that there is a process P in an imaginary language L which is protected by a

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[15] Class features do not, however, play any role here, as mentioned above.

faithfulness constraint C1 with the weight [w = 3]. Every time P takes place, it creates a marked configuration which is banned by the markedness constraint *C2 [w = 2]. In context A, P takes place without violating any further constraints, so faithfulness wins over markedness:

(50)   *Basic faithfulness vs markedness tension I:*

	Inp: context A	C1	*C2	
		w = 3	w = 2	$\mathcal{H}$
a.	☞ P takes place		-1	-2
b.	P does not take place	-1		-3

In context B, the process P violates a further markedness constraint – *C3 [w = 1.5] – but it does not violate *C2:

(51)   *Basic faithfulness vs markedness tension II:*

	Inp: context B	C1	*C2	*C3	
		w = 3	w = 2	w = 1.5	$\mathcal{H}$
a.	☞ P takes place			-1	-1.5
b.	P does not take place	-1			-3

In (50) and (51), classic OT would have yielded the same results since *C2 and *C3 are both ranked below C1. Consider, however, scenario C where the application of P violates both *C2 and *C3. In classic OT, candidate (a) would win again. In HG, the two constraints – *C2 and *C3 – both influence the harmony value. Together, they create a cumulative value of -3.5, which is crucially worse than that produced by candidate (b):

(52)   *The gang effect in HG:*

	Inp: context C	C1	*C2	*C3	
		w = 3	w = 2	w = 1.5	$\mathcal{H}$
a.	P takes place		-1	-1	-3.5
b.	☞ P does not take place	-1			-3

The only way to solve this in classic OT would be to impose a new constraint whose violation would be triggered if both *C2 and *C3 were violated simultaneously. This constraint would need to outrank C1 while C1 continued to outrank *C2 and *C3 individually:

(53)   *Local conjunction of constraints:*

	Inp: context C	*C2 & *C3	C1	*C2	*C3
a.	P takes place	*!		*	*
b.	☞ P does not take place		*		

In this paper, I will further pursue the HG approach. In this framework, the gang effects are a natural consequence of the way grammar is designed. For a concrete HG example,

consider the description of a cumulative effect observed in the syntax of some Slavic languages in Murphy (2017).

3.5 Latvian prepositional phrases in HG

Returning to Latvian prepositional phrases, the idea behind the current analysis is that there is an optimization mechanism which applies post-syntactically to the syntactic representation of the PP at the time when inflectional morphemes are inserted into the respective terminals (Halle & Marantz 1993). Its task is to create a configuration for the insertion of the optimal case formative in a given context. In order to implement this mechanism, I assume the following constraints to be relevant for the phenomenon in question (these constraints are based directly on what I discussed in Section 3.3 above):

(54) *The constraints:*
  i. IDCASEIO, w = 2.0: assigns a violation mark to an output candidate whose case features do not match those in the input;
  ii. V-ACC, w = 1.8: assigns a violation mark to DPs with accusative case features which are not minimally c-commanded by a lexical V-head;
  iii. D-GEN, w = 1.8: assigns a violation mark to DPs with genitive case features which are not minimally c-commanded by a lexical D-head;
  iv. *CUMULCASEPHI, w = 0.4: assigns a violation mark to any output candidate which contains a morphological terminal filled with an exponent whose features span over multiple terminals, literally or contextually.

A representative example of how the above constraints interact can be seen in the tableaux below. I will use the accusative preposition *ar* 'with', combined with the DP *kok-* 'tree'.

(55) *T1: Accusative preposition with a singular DP*

	Inp: P$_{ACC}$ + DP[ACC,SG] *ar kok-?*	IDCASEIO 2	V-ACC 1.8	D-GEN 1.8	*CUMULCASEPHI 0.4	$\mathcal{H}$
a.	☞ *no change* ar kok-Ø-Ø-u [+hi] ↔ [B,-C]		-1			-1.8
b.	[AB] → [ABC] ar kok-Ø-Ø-a a ↔ [C,-D]	-1		-1		-3.8
c.	[AB] → [ABCD] ar kok-a-Ø-m m ↔ [D,-E]	-1				-2

Every candidate in the tableau is listed in the following manner: in the top row, the case feature changes are listed, followed by the stem and the inflectional exponents, followed by the specification of the exponent(s) which was/were inserted. The entries for the theme vowels are not listed since they are irrelevant.

(56)　　*T2: Accusative preposition with a plural DP*

		IDCASEIO	V-ACC	D-GEN	*CUMULCASEPHI	
	Inp: P_{ACC} + DP[ACC,PL] *ar kok-?*	2	1.8	1.8	0.4	$\mathcal{H}$
a.	*no change* ar kok-Ø-u-s u ↔ φ:[+pl,+m] / __ C:[B,-C] s ↔ Case:[-C] / __ φ:[+pl]		-1		-2	-2.6
b.	[AB] → [ABC] ar kok-u u ↔ φ:[+pl] / __ C:[C,-D]	-1		-1	-1	-4.2
c.	☞ [AB] → [ABCD] ar kok-Ø-ie-m ie ↔ φ:[+pl] m ↔ [D,-E]	-1				-2

In the two examples above, the preposition *lexically* assigns the accusative case to its complement. This case is canonically expected in another environment, as required by the constraint V-ACC, hence the violation in the respective columns of the tableaux. Having a lower weight than IDCASEIO, the constraint V-ACC is alone not strong enough to ensure the insertion of the dative case exponent in singular contexts, as in (55). However, if the DP is in the plural, there is an additional violation of the constraint against fusional exponents realizing case and number simultaneously. Together with V-ACC, the markedness constraint *CUMULCASEPHI creates a harmony value worse than that produced by candidate (c) in (56) after violating IDCASEIO (the case features in the output no longer match those of the input).

Crucially, this happens specifically in the plural because the corresponding singular affixes realize case features only, as we saw in the subsection where the various case exponents were decomposed.

When marking a direct object, the accusative case is in the expected configuration, as in *redzu kok-us/*kok-iem* 'I see trees', which means that V-ACC is not violated and the *CUMULCASEPHI constraint loses its "gang partner". Thus, it cannot override IDCASEIO alone:

(57)   *T3: Plural direct object*

Inp: V + DP[ACC,PL]		IdCaseIO	V-acc	D-gen	*CumulCasePhi	
redzu kok-?		2	1.8	1.8	0.4	$\mathcal{H}$
a.	☞ *no change* redzu kok-Ø-u-s u ↔ φ:[+pl, +m] / __ C:[B,-C] s ↔ Case:[-C] / __ φ:[+pl]				-2	-0.8
b.	[AB] → [ABC] redzu kok-u u ↔ φ:[+pl] / __ C:[C,-D]	-1		-1	-1	-4.2
c.	[AB] → [ABCD] redzu kok-Ø-ie-m ie ↔ φ:[+pl] m ↔ [D,-E]	-1				-2

The same situation arises when comparing DPs in the genitive following prepositions with those occurring within another DP. I am not including the tableaux here since they would look exactly like (55), (56) and (57).

An important question that remains unanswered is how this unusual interaction of V-acc/D-gen with *CumulCasePhi became an effective mechanism in the grammar of Latvian. I will answer this question in the following subsection.

3.6 The demise of the instrumental and case in PPs

In this subsection, I argue that the main reason for the dative case to make its way into all plural DPs embedded under a preposition is the history of the instrumental case which previously existed quite robustly in the language (and still does exist in modern Lithuanian, although it was lost in Prussian, like it has been in Latvian).

Below are presented the reconstructed instrumental forms of Common East Baltic nouns together with their evolution into the corresponding modern forms (the reconstructed forms are based on those in Stang 1966). The tables below include three cases only since the rest of the paradigm is irrelevant for our concerns.[16]

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[16] Only two declension classes are shown here, namely, I and IV. The changes in the other classes were exactly the same.

(58)   *The historic development of Latvian case paradigms:*

	M		F	
Old Paradigm	Sg	Pl	Sg	Pl
Dative (N)	*-ui	*-amus	*-āi	*-āmus
(dat. pronominal)	*-am	*-iemus		
Accusative	*-an	*-uons	*-ān	*-āns
Instrumental	*-uo	*-ais	*-ān	*-āmis

	M		F	
Modern Paradigm	Sg	Pl	Sg	Pl
Dative	-am	-iem	-ai	-ām
Accusative	-u	-us	-u	-as
Instrumental	-u	-iem	-u	-ām

After multiple phonological and analogical changes, the instrumental case no longer had dedicated forms in any of the inflectional classes in Early Modern Latvian. It remained a separate case by the virtue of systematically syncretizing with two different cases in the singular/plural: INSTR.SG = ACC.SG, INSTR.PL = DAT.PL. Some of the prepositions in Old Latvian combined with the instrumental case, e.g. *ar* 'with'. After the morphological changes mentioned above, the modern pattern emerged, where the preposition required a case identical with the accusative in the singular and with the dative in the plural:

(59)   *The syncretisms of the instrumental case:*
        INSTR.SG = ACC.SG   INSTR.PL = DAT.PL
        ar   bērn-u   bērn-iem
        ar   meiten-I   meiten-ēm

At the same time, the use of the bare instrumental (sans preposition) gradually declined:

(60)   es ēdu rokām » es ēdu **ar** rokām
        'I am eating **with** [my] hands.'

The result of this process was basically a total elimination of instrumental forms from all non-prepositional contexts. With the instrumental case being virtually purged from the system, prepositions such as *ar* 'with' were re-analyzed as ones that take the accusative in the singular and the dative in the plural. This opened the window for more prepositions to undergo a shift in the same direction. Originally, only those prepositions that took the accusative underwent this shift. Gradually, the pattern was also extended to prepositions that originally combined with the genitive in both numbers (Holvoet 2010).[17] In the following paragraphs, I will explain how this process was implemented in the grammar of Latvian.

I begin by assuming that the original weights of the constraints V-ACC and D-GEN were lower than what is found in the modern language, e.g 1.0. Tableau T4 demonstrates the original system (before the decline of the instrumental) at work using the accusative preposition *gar* 'along/past'.

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[17] Endzelīns (1906) mentions that some Latvian dialects had not completed this process by the early 1900's and only used dative plurals with those prepositions that took accusative forms in the singular.

(61)   *T4: The original system at work*

	Inp: P_{ACC} + DP[ACC,PL] *gar kok-?*	IDCASEIO 2.0	V-ACC 1.0	D-GEN 1.0	*CUMULCASEPHI 0.4	$\mathcal{H}$
a.	☞ *no change* gar kok-Ø-u-s u ↔ φ:[+pl, +m] / __ C:[B,-C] s ↔ Case:[-C] / __ φ:[+pl]		-1		-2	-1.8
b.	[AB] → [ABC] gar kok-u u ↔ φ:[+pl] / __ C:[C,-D]	-1		-1	-1	-3.4
c.	[AB] → [ABCD] gar kok-Ø-ie-m ie ↔ φ:[+pl] m ↔ [D,-E]	-1				-2

When the instrumental was eliminated from the system of independent cases used outside of prepositional contexts, it was no longer identified as a separate case in the minds of young speakers acquiring the language based on the input coming from their environment. The prepositions appearing with the original instrumental case caused confusion since they were seemingly used with two different cases, depending on the number of the complement DP. Because very few prepositions took dative singulars, it was assumed by the acquiring speakers that these former instrumental prepositions were, in fact, accusative prepositions with a peculiarity displayed by plural DPs following them, rather than the other way around (i.e. dative prepositions with exceptionally accusative singular complements).

   In the system proposed here, the accusative plural exponents are more marked than the dative plural ones. For a speaker acquiring the language around the time of the elimination of the instrumental case, it was enough to increase the weight of V-ACC by a few decimal points (without even changing the fundamental ranking of the constraints) in order for the cumulative markedness of the accusative plural exponent combined with the markedness of the accusative case appearing in the complement position of a P-head to override IDCASEIO and trigger an output shift to the dative:

(62)   *The cumulative weights before and after the shift:*
   a.   w/V-ACC (1.0) + 2*w/*CUMULCASEPHI (0.4) = 1.8
        < w/IDCASEIO (2) (the original system)
   b.   w/V-ACC **(1.8)** + 2*w/*CUMULCASEPHI (0.4) = 2.6
        > w/IDCASEIO (2) (the adjusted system)

Out of multiple possibles paths towards resolving the existing asymmetry (with the most straightforward one probably having been the decision to level the case after the originally

instrumental prepositions to either the accusative or the dative in both numbers), the speakers of Latvian opted for promoting the weight of the constraint V-ACC which penalizes accusative DPs which are not minimally c-commanded by a lexical V-head. This allowed them to fit the instrumental prepositions into the newly emerging system lacking the instrumental case.

However, once the weight of V-ACC was increased in the grammar of Latvian, this was, however, going to have consequences not only for the originally instrumental prepositions (of which there was a handful), but all accusative prepositions. The expectation is that new higher weight of V-ACC would have forced all the accusative prepositions into appearing with dative plural complements. This is exactly what happened in the Latvian language shortly after the elimination of the instrumental.

Additionally, the promotion of V-ACC did not have any impact on the prepositions assigning the genitive case. During the initial stages of the prepositional case shift, the system had the following shape:

(63)   *The intermediate stage:*

| ar | meiten-I | ACC.SG | bez | meiten-es | GEN.SG |
| ar | meten-ēm | DAT.PL | bez | meiteņ-u | GEN.PL |

This is indeed what is attested in older Latvian texts (Endzelīns 1906). While the switching to dative plurals with accusative prepositions was motivated by a conflict during the acquisition process, I believe that the second phase of the case shift (Gen.Pl → Dat.Pl) in prepositional phrases was due to pure analogy and thus more or less accidental. One reason it might have taken place is because the two constraints – V-ACC and D-GEN – are motivated by similar linguistic principles and tend to have equalized weights.

3.7 Other adpositions

Along with the numerous prepositions, Latvian has three postpositions: *dēļ* 'for/because of/for the sake of', *labad* 'for the sake of', *pēc* 'because of'. They uniformly take the genitive case in both numbers.

(64)   a.   Cieš-u   man-a   bērn-a   dēļ.
              suffer.PRS-1SG my-M.GEN.SG child.M-GEN.SG for
              'I suffer for my child.'

        b.   Cieš-u   man-u   bērn-u   dēļ.
              suffer.PRS-1SG my-M.GEN.PL child.M-GEN.PL for
              'I suffer for my children.'

Additionally, some adverbs (which, unlike true prepositions, do not have an obligatory argument) are capable of taking an optional DP-complement. In this case, they function as pre- or postpositions (each one chooses its linear position relative to the complement idiosyncratically), and their complement is obligatorily in the dative case. In certain cases, there are also shifts in the meaning of these adverbs.

(65)   a.   Pretī   bij-a   liel-a   māj-a.
              opposite be.PST-3 big-F.NOM.SG house.F-NOM.SG
              'Opposite, there was a big house.'

        b.   Viņ-š   nāc-a   man   pretī.
              3SG-M.NOM.SG come.PST-3 1SG.DAT opposite
              'He came toward me.'

I assume these adverbs assign a lexical dative case to their complement DPs when they do take a complement. This will not pose any challenges for the analysis developed below since all such instances of dative assignment are instances of lexical case assignment. The dative case is the canonical case in inherent positions (see below), so assigning it in these configurations is already the optimal thing to do. In this paper, I will claim that the grammar of Latvian struggles specifically in those instances when it is *not* the dative but a structural case that is assigned in a non-structural position.

A question that remains open is how to account for postpositions, which invariably take the genitive case. Without going too deep into historic linguistics, I will simply propose a hypothesis that these postpositions are originally nominals (see, for instance, Smoczyński 2007 for the preposition *dėl* in Lithuanian) and retain some of their nominal properties (while being phonologically reduced and lacking their own inflections), among which is the structural genitive.

Thus, *tevis labad* 'for the sake of you' is originally a complex expression consisting of the following parts (Smoczyński 2007) (the reconstruction below is my own):

(66)   *The reconstructed structure of a postposition:*
        ** Tev-is   lab-a   **dēl-im.
           2SG-GEN   good-GEN.SG   part-DAT.SG
           Lit. 'for the part of your good.'

I assume that the contracted form *labad* still behaves like a noun in terms of embedding a nominal complement.

4 Conclusions

This paper's goal was to tackle the non-trivial pattern of case assignment in Latvian prepositional phrases. While the generalization is very easy to formulate pre-theoretically, it poses a significant challenge to all modern theories of case assignment.

It is fairly easy to capture the phenomenon if we restrict its scope to individual DPs embedded under a P-layer. One alternative is an agreement operation between the preposition and its complement. While it is not entirely clear why a preposition might need φ-features, it may be assumed to release case in exchange for the number feature value it receives from the DP. This hypothesis did, however, falter under a more close-up scrutiny: there were case mismatches in coordinated and appositive structures where the two DPs show up in different numbers, regardless of their linear order. The only way to salvage this analytic approach would have been to propose multiple probing by the preposition into all the DPs in its complement position. In addition to the rather odd assumption that a non-inflected element somehow needs φ-features in order to assign case, we would now lose the generalization that case is shared by the DPs within appositive and coordinated structures at least in narrow syntax.

With all this being said, I consider it important to look at the synchronic state of affairs through a diachronic lens in this particular case. The development of the pattern in focus has been traced back in history, and its roots are well-known. The elimination of the instrumental case from the system (primarily for phonological reasons) created a pattern where some prepositions ended up taking the accusative case in the singular and the dative case in the plural. This asymmetry prompted the speakers of the language to devise a repair strategy. With the accusative plural exponents being cumulative (unlike the simple dative exponent /-m/), even a slight increase in the penalty received by any candidate placing an accusative in non-structural position was enough for the two principles (the one protecting structural cases and the one penalizing fusional exponence) to overthrow the

input-output identity constraint for case features. This caused a massive shift of the former accusative-governing prepositions into the newly emerging pattern because, once V-ACC was promoted, it was inevitably going to have an effect on all non-structural accusatives. Later on, genitive prepositions transitioned into the same pattern, most likely by analogy.

Abbreviations

1 = first person, 2 = second person, 3 = third person, γ = gender, μ = mora, φ = phi feature(s), ACC = accusative, AUX = auxiliary, CONV = converb, DAT = dative, EP = epenthetic, F = feminine, GEN = genitive, IMP = imperative, INSTR = instrumental, KP = case phrase, LOC = locative, M = masculine, NMNLZ = nominalizer, NOM = nominative, NEG = negation, PASS = passive, PF = phonological form, PL = plural, PREV = preverb, PRS = present tense, PST = past tense, REL = relative, RFL = reflexive, SG = singular.

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Competing Interests

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