

# A Novel Nanosyntactic Approach to Case in Latvian

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## **Abbreviations**

1, 2, 3	1st, 2nd, 3rd person
ACC	Accusative case
B.ACC	Big accusative case
B.GEN	Big genitive case
DAT	Dative Case
GEN	Genitive case
LOC	Locative case
NOM	Nominative case
PAST	Past tense
PL	Plural
S.ACC	Small accusative case
S.GEN	Small genitive case
SG	Singular

## **Abstract**

Following prepositions, Latvian nouns engage in a cross-linguistically unorthodox case-marking scheme that corresponds to number features. Singular nouns receive either the accusative or genitive case following prepositions, while plural nouns receive the dative exclusively -- irrespective of gender, noun class, or any other circumstances. In light of this puzzling situation, we turn to Pavel Caha's case shell hierarchy as outlined in his 2009 dissertation in nanosyntax, to acquire a framework and craft an analysis that will reconcile our understanding of this unusual case assignment. Insofar as we apply this framework to the Latvian language, however, several problems become apparent for nanosyntax -- which we set out to answer: what accommodations can we make for Latvian syncretisms that skip cases, or that syncretize across number and case, and what technologies precisely could account for number-based case assignment following prepositions? What implications and consequences do these processes have for the morphosyntax? This inquiry culminates into one broader question: how can we reconcile the peculiarities of Latvian case assignment with existing nanosyntactic theory? We will explore the possibilities afforded by processes of case splitting in the accusative and genitive, movement of a prepositional root, feature checking, and backtracking, in order to find potential solutions for the essential issues that Latvian case puzzles pose for nanosyntax.

## **§1. Introduction**

The unorthodox issue that first draws our attention to the Latvian case system is the assignment of dative case to all plural nouns that follow prepositions, as opposed to the accusative or genitive case assigned to singular nouns in the same ostensible syntactic position. This marking scheme stands in opposition to a cross-linguistic standard of case assignment that does not depend on number to determine noun case. In as contemporary and respected sources as Halle (1991: 41) and the works of Andra Kalnača, the accusative singular and dative plural assignments following prepositions have been framed as an instrumental case that is universally syncretic with the two other aforementioned cases -- a result of the diachronic loss of a true instrumental case -- although it should seem that its retention to designate prepositional complements is at present illusory, and its continued presence in the grammar, mythological.

In order to frame the matter of case in Latvian, observe the following nominal paradigms that illustrate case throughout the six noun classes (three of which are masculine, and three feminine). Syncretisms, where they occur within a declension, are highlighted.

Table 1

Class 1 -- <i>gals (end)</i>			Class 2 -- <i>gailis (rooster)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>gals</i>	<i>gali</i>	Nom	<i>gailis</i>	<i>gaiji</i>
Acc	<i>galu</i>	<i>galus</i>	Acc	<i>gaili</i>	<i>gaijus</i>
Gen	<i>gala</i>	<i>galu</i>	Gen	<i>gaija</i>	<i>gaiju</i>
Dat	<i>galam</i>	<i>galiem</i>	Dat	<i>gailim</i>	<i>gaijiem</i>
Loc	<i>galā</i>	<i>galos</i>	Loc	<i>gailī</i>	<i>gaiļos</i>
Class 3 -- <i>tirgus (market)</i>			Class 4 -- <i>galva (head)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>tirgus</i>	<i>tirgi</i>	Nom	<i>galva</i>	<i>galvas</i>
Acc	<i>tirgu</i>	<i>tirgus</i>	Acc	<i>galvu</i>	<i>galvas</i>
Gen	<i>tirgus</i>	<i>tirgu</i>	Gen	<i>galvas</i>	<i>galvu</i>
Dat	<i>tirgum</i>	<i>tirgiem</i>	Dat	<i>galvai</i>	<i>galvām</i>
Loc	<i>tirgū</i>	<i>tirgos</i>	Loc	<i>galvā</i>	<i>galvās</i>
Class 5 -- <i>pele (mouse)</i>			Class 6 -- <i>uguns (fire)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>pele</i>	<i>peles</i>	Nom	<i>uguns</i>	<i>ugunis</i>
Acc	<i>peļi</i>	<i>peles</i>	Acc	<i>uguni</i>	<i>ugunis</i>
Gen	<i>peles</i>	<i>peļu</i>	Gen	<i>uguns</i>	<i>uguņu</i>
Dat	<i>pelei</i>	<i>peļēm</i>	Dat	<i>ugunij</i>	<i>ugunīm</i>
Loc	<i>pelē</i>	<i>peļēs</i>	Loc	<i>ugunī</i>	<i>ugunis</i>

When placed after prepositions, nouns present the following pattern as predicted. This phenomenon is consistent throughout all six nominal declensions, ruling out the possibility that it is incidental:

- (1) Viņš iet [pa **ceļ-u.**]  
 he-NOM go-3sg along road-ACC.sg  
 “He goes along the road.”
- (2) Viņš iet [pa **ceļ-iem.**]  
 he-NOM go-3sg along road-DAT.pl  
 “He goes along the roads.”
- (3) Es paslēp-u [aiz **liel-a** **kok-a.**]  
 I-NOM hide-1sg.PAST behind big-GEN.sg.masc tree-GEN.sg  
 “I hid behind a big tree.”
- (4) Es paslēp-u [aiz **div-iem** **liel-iem**  
 I-NOM hide-1sg.PAST behind two-DAT.pl big-DAT.pl.masc  
**kok-iem.]**  
 tree-DAT.pl  
 “I hid behind two big trees.”

Initially, two matters evident within the grammar of Latvian case assignment and marking stand out as puzzling after examining the paradigms and examples. First, by what means can a plural noun appear in a different case than its singular counterpart, and why does this only occur following prepositions? And, secondly, how might one account for syncretisms lacking syntactic adjacency, such as those that surface between NOM.sg and GEN.sg in classes 3 and 6, or the various number-spanning syncretisms prevalent throughout the paradigms?

In hopes of introducing a technological framework that answers the question of number-based case assignment, we will first turn to Pavel Caha's 2009 dissertation *The nanosyntax of case*, wherein a proposed case hierarchy is laid out in the syntax. Each functional head within a hypothesized KP (case phrase) bears a morphological feature, the accumulation of which by a nominal moving up from below informs the case ending with which it spells out. However, this hierarchy of case features cannot perform the task on its own: these questions themselves suggest the hierarchy must be modified to meet the needs of Latvian. On these grounds, we will suggest an analysis of the Latvian case system that aims to reconcile its problems with nanosyntax, fit it into the framework, and answer our original questions in the process. In the following §2, we shall introduce Caha's nanosyntactic framework and expound upon its relevance to the study of case in Latvian. In §3, we will outline the peculiarities of the Latvian case system in greater detail, and highlight what problems they cause for the case shell hierarchy proposal in its current state. §4 will address number-internal case syncretisms, and the proposed division of the accusative case that reconciles them. §5 proposes a feature that coordinates nominal number with the case received by the noun as a prepositional complement, and §6 discusses the hypothesis that the featural beginnings of preposition formation and

spell-out originate KP-internally, and are involved in peeling movements alongside the nominal that has acquired case -- a tactic needed to accommodate nanosyntactic case-building in Caha's view. §7 employs backtracking technologies to synthesize a solution for the spell-out of "kitty-corner" syncretisms across number and case. Finally, §8 concludes, and extends further questions and closing remarks.

## **§2. Nanosyntax Review**

It is first useful to present the relevant facts of nanosyntax, the framework that plays host to this analysis. Most of the facts in this section will draw from Caha (2009), and a more comprehensive insight into nanosyntactic mechanics may be found there and in its preceding works. However, the technologies of the framework have continued to evolve where necessary thereafter, and several of these evolutions will also serve the current analysis.

As it stands, nanosyntax's primary mission holds that all morphological properties are present in the syntax from the beginning, a separate syntactic head nesting a feature in sequence. Via successive cyclic movement, these features may accumulate so as to contribute to spelling out a desired lexical form, or the features may remain in situ, such that a span of features are matched with those required to spell out one or more vocabulary items, as in Vanden Wyngaerd et al. (2020: 16) -- in this regard, it echoes its predecessor (and contemporary) Distributed Morphology. The spell-out mechanisms discussed in this analysis draw particularly from Vanden Wyngaerd et al. (2020) and Caha (2009), although we will conduct spell-out of items in the specifier position: features contained below a particular phrase contribute to the lexical tree that

spells out its specifier. Implicit to an analysis rooted in nanosyntax, such as the following, are a few principles and assumptions that merit review first and foremost.

At the outset, one must keep in mind two fundamental principles of nanosyntax: first, that each morphological feature is merged into the syntax on a head of its own, to contribute to the spell-out of a specifier either individually or in a sequence (as stated), and second, that spell-out drives the nanosyntactic machinery. After each merger, spell-out is conducted in order to assess the viability of the sentence, according to an ingrained Spellout Algorithm following from Starke (2018). If phonological forms are available for it (even if these are not the forms that it adopts in its final state), it may proceed to the next instance of Merge-F -- and if not, repair mechanisms deploy that shall be discussed shortly (Vanden Wyngaerd et al. (2020)). Ultimately, in the nanosyntactic regard, the routine vigilance of the Spellout Algorithm acts something like a recurring application of phase, which may stand at odds with the restrictions of a phase-based analysis<sup>1</sup>.

Before we can move along to the relevant data for such an analysis, however, we must consider some laws of nanosyntax that will both problematize that data, and allow us to surmise a sensible pattern that accommodates it. From Caha (2009: 4) comes the first:

(5) Law of Adjacency: *Syncretism in case is restricted by adjacency in a total linear order.*

In other words, two case forms of the same noun may not spell out identically if they are not adjacent in the noun's paradigm -- which necessarily adheres to a Universal Adjacency that Caha identifies in the same work. Caha's Universal Adjacency proceeds in the following order:

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<sup>1</sup> Testimony from personal correspondence with Pavel Caha, October 2020.

(6) Universal Adjacency: *nominative -- accusative -- genitive -- dative -- instrumental -- commitative*

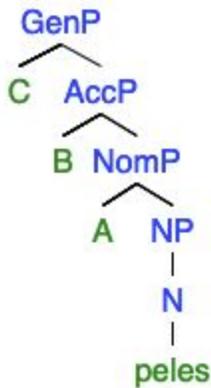
Although Cahá expects this sequence to hold cross-linguistically, we will eventually modify it to suit the needs of our Latvian analysis -- but not in such a way that alters the current ordering, so much as makes it more specific. But, generally speaking, we should always expect syncretism to hold in this order, and that is borne out in certain Latvian noun classes: *galvas* is both the nominative plural and accusative plural form of “head” (class 4), for example. The fact that several Latvian nominal syncretisms do not seem to respect the Universal Adjacency hierarchy, as seen in Table 1, is precisely the origin of our problem.

Next, we examine briefly the Superset Principle and Elsewhere Condition, which determine the phonological forms that spell out our syntax. The first is the tool by which the Spellout Algorithm confirms each merger to be sound, before allowing the next node to merge -- especially by building on spans of heads acknowledged for their features, which allows it to operate on the basis of containment. Per Starke (2009: 3):

(7) Superset Principle: *A lexically stored tree L matches a syntactic node S iff L contains the syntactic tree dominated by S as a subtree.*

So, to demonstrate this principle as it might apply in Latvian, the lexically stored tree for the vocabulary item *peles* (“mouse,” genitive singular) matches the following uppermost syntactic node (note the representation of case features on each head of an individual phrase) because in our conception, the lexical tree *peles* contains the same tree dominated by that node. Therefore, via cyclic override, that tree may spell out as *peles* once the node is merged, and the next merger may occur thereafter.

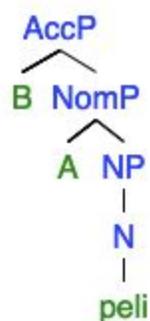
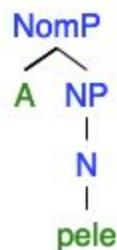
(8) *peles* (GEN.sg)



But, what then of the vocabulary items borne on lower heads within the syntax? We do not simply ignore them in favor of phonological forms introduced at higher nodes that then spell out the rest of the tree. The nominative and accusative singular iterations of this noun require their own representations, and that is where the Elsewhere Condition comes into play by negotiating the necessary forms to spell out each feature in a span when it already has a vocabulary item introduced at a higher node. Per Caha (2009: 14):

(9) Elsewhere Condition: *In case two rules,  $R_1$  and  $R_2$ , can apply in an environment  $E$ ,  $R_1$  takes precedence over  $R_2$  if it applies in a proper subset of environments compared to  $R_2$ .*

This principle supposes that a more specified phonological form may apply to the lower strata, ruling out the generalized form such that it becomes restricted to spelling out the higher node. because it has been supplanted lower. In the case of the *peles* example, say that the lexically stored tree of such a form corresponds exactly to the syntactic tree depicted above. On the other hand, lexically stored trees for the vocabulary items *pele* (“mouse,” accusative singular) and *pele* (“mouse,” nominative singular) appear as follows, respectively:

(10) *pele* (ACC.sg)(11) *pele* (NOM.sg)

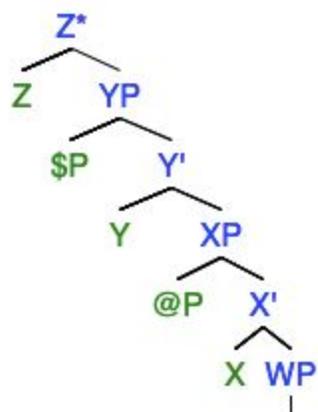
Here, we see that *pele*'s conditioned environment is more specific than *pele*'s, which in turn is more specific than that of *peles*, insofar as each one's environment is a proper subset of the potential environments of the following form. Thereby, *pele* takes the place of where *peles* might have applied below the genitive phrase, and *pele*, where *pele* might have applied below the accusative. The technology of the Elsewhere Condition thus completes our overview of the basic mechanisms that ensure successful spell-out under nanosyntax.

The final element of our nanosyntax review is reserved for instances when spell-out is entirely unsuccessful given ordinary circumstances, and it will serve the Latvian analysis handily: the mechanism of backtracking. The broader backtracking process involves three steps, each implemented if the prior step fails: first, when spell-out is unachievable, the specifier of the phrase in question's complement moves to the phrase's own specifier in an attempt to save the derivation. Should this fail, the second step moves the entire complement to the specifier position, in the hopes that it will spell out correctly. At last, if this is impossible, backtracking *proper* reverts the tree to the previous cycle, and proceeds to rewrite it with the next step of this very procedure that follows whichever one had been used prior. We will implement this process

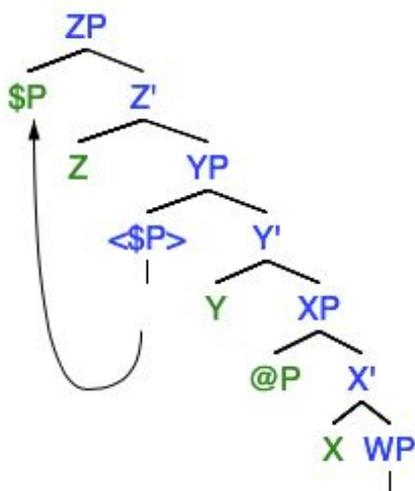
to coax such singular forms as genitive *galvas* and accusative *galvu* to spell out as they do, syncretic with lower plural forms that have been moved up to their specifiers in §7.

A primitive tree, followed by three trees illustrating the steps, are provided below (or see Vanden Wyngaerd et al. (2020: §6). The process is demonstrated in the partial trees below<sup>2</sup>.

(12) *Suppose that the prospective ZP is unable to spell out.*

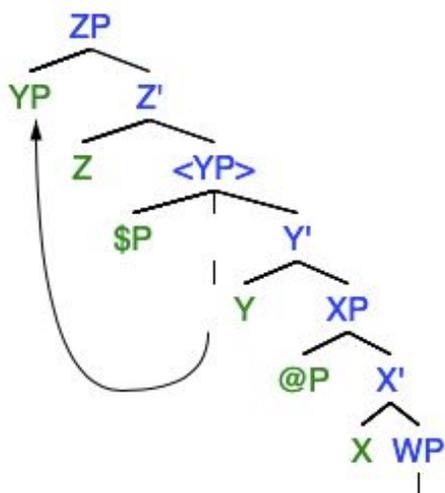


(13) *First step: move the specifier of the phrasal complement to the phrase's specifier.*

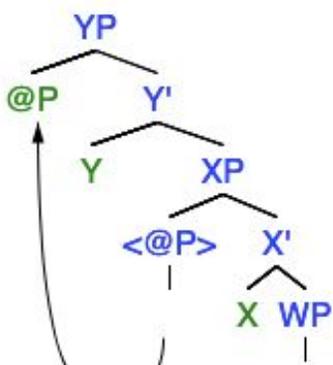


<sup>2</sup> Partial trees will be used throughout the analysis, in the interest of space, and any indeterminate symbols (\$, @) used for categories beyond X, Y, and Z are merely genericized placeholders.

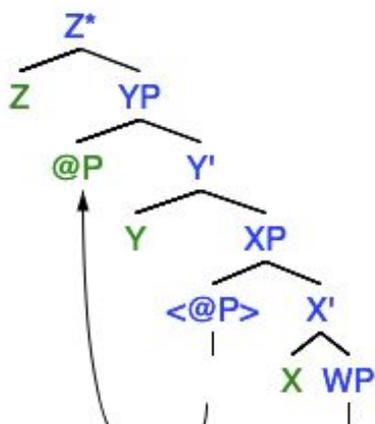
(14) Second step: If it still cannot spell out, move the whole complement.



(15) Third step: If it still cannot spell out, backtrack to the previous cycle and repeat step 1 there.



(16) If this spells out, proceed to the next cycle. If not, repeat the process.



Although my analysis will only necessitate up to the second step of this process, I have included the third in the spirit of completion. With these technologies outlined, furthermore, our nanosyntactic review is complete, and we may proceed to the data, problems, and preliminary analysis in adherence to nanosyntax.

### **§3. The Latvian Data in a Nanosyntax Framework**

Foremost in laying out the Latvian data, we will reprise Table 1 and dissect the most important factors evident in this paradigm: noun class (and gender), number, noun case, and case syncretism -- then problematize the elements that will receive solutions throughout the analysis, and sketch out how we might expect a nanosyntax-oriented tree to look in Latvian for a given noun. In so doing, the full realization of the separate *case phrases* that debuted in §2 will become available for scrutiny. They will be further dominated, from the outset, by a Case Phrase rendered as KP -- the implementation of which is suggested in Caha (2009) -- the requisite role of which will become clear in §6 of the analysis.

Consider Table 1, which exemplifies Latvian nouns, once more:

Table 1

Class 1 -- gals (end)			Class 2 -- gailis (rooster)		
	Singular	Plural		Singular	Plural
Nom	<i>gals</i>	<i>gali</i>	Nom	<i>gailis</i>	<i>gaiļi</i>
Acc	<i>galu</i>	<i>galus</i>	Acc	<i>gaili</i>	<i>gaiļus</i>
Gen	<i>gala</i>	<i>galu</i>	Gen	<i>gaiļa</i>	<i>gaiļu</i>
Dat	<i>galam</i>	<i>galiem</i>	Dat	<i>gailim</i>	<i>gaiļiem</i>
Loc	<i>galā</i>	<i>galos</i>	Loc	<i>gailī</i>	<i>gaiļos</i>
Class 3 -- tirgus (market)			Class 4 -- galva (head)		
	Singular	Plural		Singular	Plural
Nom	<i>tirgus</i>	<i>tirgi</i>	Nom	<i>galva</i>	<i>galvas</i>
Acc	<i>tirgu</i>	<i>tirgus</i>	Acc	<i>galvu</i>	<i>galvas</i>
Gen	<i>tirgus</i>	<i>tirgu</i>	Gen	<i>galvas</i>	<i>galvu</i>
Dat	<i>tirgum</i>	<i>tirgiem</i>	Dat	<i>galvai</i>	<i>galvām</i>
Loc	<i>tirgū</i>	<i>tirgos</i>	Loc	<i>galvā</i>	<i>galvās</i>
Class 5 -- pele (mouse)			Class 6 -- uguns (fire)		
	Singular	Plural		Singular	Plural
Nom	<i>pele</i>	<i>peles</i>	Nom	<i>uguns</i>	<i>ugunis</i>
Acc	<i>peļi</i>	<i>peles</i>	Acc	<i>uguni</i>	<i>ugunis</i>
Gen	<i>peles</i>	<i>peļu</i>	Gen	<i>uguns</i>	<i>ugunu</i>
Dat	<i>pelei</i>	<i>peļēm</i>	Dat	<i>ugunij</i>	<i>ugunīm</i>
Loc	<i>pelē</i>	<i>peļēs</i>	Loc	<i>ugunī</i>	<i>ugunīs</i>

The first aspect of the paradigm of which to take note is Latvian's six noun classes.

Among these, the former three are masculine and the latter three are feminine, and the populations of classes 3 and 6 are particularly restricted. None of the classes pertain to particular or cohesive semantic categories, and in fact, certain gendered words may exist in noun classes that exhibit contrary grammatical gender (e.g. *puika*, "boy," is in the feminine class 4). One must mind the noun classes not because they exert much overt sway on the following analysis in their own right (with one seeming exception when investigating kitty-corner syncretisms -- syncretisms across number for consecutive cases), but because case suffixes vary from class to class. While one may note superficial trends in the phonology, one cannot reliably assume a specific phonological form corresponds to the same case suffix between classes. On the contrary, however, it is important to assert now: *all* noun classes are consistent with one another in their presentation of the post-prepositional phenomenon we will explore, and in that vein, the analysis

for that section will apply across all six. The phonological differences (or similarities) do not have a bearing on that particular issue.

Secondly, note that Latvian has singular and plural number (with the exception of uncountable or mass nouns, which are perpetually marked as if singular). While nothing unorthodox, number will play importantly into the analysis, seeing as it dictates which case a noun assumes following a preposition, and holds an integral role in so-called “kitty-corner syncretisms.” The marked number feature we shall take up is assumed to be a [+PI] feature that occurs local to the NP, and below the case phrases.

At initial glance, Latvian displays five noun cases: nominative, accusative, genitive, dative, and locative. Although I have mentioned a defunct instrumental case in §1, this has been repurposed into the accusative and genitive cases among singular nouns following prepositions, and into the dative among plural nouns in the same instances, for purposes of both this paradigm and the entire analysis. As is common in nominative-accusative languages, nominative and accusative are structural cases and the rest oblique, but clearly the array of cases available to Latvian already necessitates modifications to the hierarchy of case shells Caha presents in his Universal Adjacency. This task is simple, though: we herein assume that locative case follows dative somewhere in the hierarchy; whether it is beyond instrumental and committative is irrelevant because they do not (presently) exist explicitly in the language. Among these cases, it is also pertinent that all five of them can and regularly do occur independently of any prepositions, and they do not offer any insight into the post-prepositional problem in their own regard. The standard place of each is demonstrated below, with an example sentence (*Vīrs deva puikas suni sievai pilsētā.*) to illustrate how each case might be used in context:

- (17) Vīr-**s**                      dev-a                      puik-**as**                      sun-**i**  
 man-**NOM**.sg              give-3sg.PAST              boy-**GEN**.sg              dog-**ACC**.sg  
 siev-**ai**                      pilsēt-**ā**.  
 woman-**DAT**.sg      town-**LOC**.sg  
 “The man gave the boy’s dog to the woman in town.”

- (18) Nominative case occurs on the sentential subject.

Eg. “**Vīrs** deva puikas suni sievai pilsētā.”

- (19) Accusative case occurs on the sentential direct object, *and is the case that occurs on most post-prepositional singular nouns*.

Eg. “Vīrs deva puikas **sunī** sievai pilsētā.”

- (20) Genitive case occurs on possessors, *and is the case that occurs on some post-prepositional singular nouns*.

Eg. “Vīrs deva **puikas** suni sievai pilsētā.”

- (21) Dative case occurs on the sentential indirect object, *and is the case that occurs on all post-prepositional plural nouns (and a tiny minority of singular nouns)*.

Eg. “Vīrs deva puikas suni **sievai** pilsētā.”

- (22) Locative case occurs on nouns that would follow the prepositions “at” or “in” in English (in the absence of overt prepositions in Latvian).

Eg. “Vīrs deva puikas suni sievai **pilsētā**.”

As we delve deeper into the Latvian case system and address the difficulties its syncretisms pose for the Law of Adjacency and the spellout of plural number in certain instances, this case paradigm will become more complex. As for these syncretisms, however, I will first address them here. Syncretisms are marked by the red- and green-colored cells in Table 1, each internal to its own noun class. In classes 3, 4, 5, and 6, syncretisms surface within the same number: nominative--genitive in classes 3 and 6 singular, and nominative--accusative in

classes 4, 5, and 6 plural. These syncretisms are of the more straightforward breed, although one shall note immediately that nominative--genitive syncretism already violates the Law of Adjacency, as accusative case intercedes between nominative and genitive as to prevent their right to syncretize, so this is the first problem that the analysis will ameliorate.

Perhaps more troubling, on the other hand, are the “kitty-corner syncretisms” that dot the paradigms rather sporadically, in which syncretism occurs across the number feature. Never does it restrict itself to the same case on either side of number -- rather, the syncretism ubiquitously occurs across both number *and* case, despite otherwise great variation in its emergence.

Kitty-corner syncretism appears in:

(23) Class 1, as ACC.sg--GEN.pl

Eg. *galu* (ACC.sg) vs. *galu* (GEN.pl) -- “end”

(24) Class 3, as both NOM.sg--ACC.pl--GEN.sg and ACC.sg--GEN.pl

Eg. *tirgus* (NOM.sg) vs. *tirgus* (ACC.pl) vs. *tirgus* (GEN.sg) -- “market”

Eg. *tirgu* (ACC.sg) vs. *tirgu* (GEN.pl) -- “market”

(25) Class 4, as both ACC.sg--GEN.pl and NOM.pl--ACC.pl--GEN.sg

Eg. *galvu* (ACC.sg) vs. *galvu* (GEN.pl) -- “head”

Eg. *galvas* (NOM.pl) vs. *galvas* (ACC.pl) vs. *galvas* (GEN.sg) -- “head”

(26) Class 5, as NOM.pl--ACC.pl--GEN.sg.

Eg. *peles* (NOM.pl) vs. *peles* (ACC.pl) vs. *peles* (GEN.sg) -- “mouse”

While its occurrence across number may not be problematic by itself, the fact that a singular form in a syntactically “higher” case (i.e. genitive) may spell out identically to a plural form in a syntactically “lower” case (i.e. accusative) is unexpected to nanosyntax, because it

implies that the singular form in the higher case has somehow managed to spell out without the plural feature that was thought to be ancillary in attaining such a vocabulary item. If this is possible, it makes the impact of the plural morpheme on spell-out appear arbitrary or circumstantial, which we wish to avoid in observance of a cogent and cohesive analysis. Hence, we will address this issue in §7.

In the meantime, a mystery that bridges the discussion of number arises. As touched upon in §1, the Latvian language bears the puzzling attribute that following a preposition, nouns exhibit a number-based case assignment wherein singular nouns are realized in the accusative or genitive, and all plural nouns in the dative.<sup>3</sup> While the split between those that take the accusative in the singular and those that take the genitive appears to be purely lexical to the preposition, the necessary conferral of dative case in the plural is systematic and universal to all nouns, which merits an investigation of the morphosyntactic circumstances that underlie such a cross-linguistically uncanny phenomenon. This is yet another question the analysis sets out to tackle, and in so doing, it will further build on Caha (2009)'s proposal that in some fashion, the preposition itself is *grown* within the case phrases, and that the noun (once it is assigned case) eventually peels out to realizational or feature-checking positions higher in the derivation.

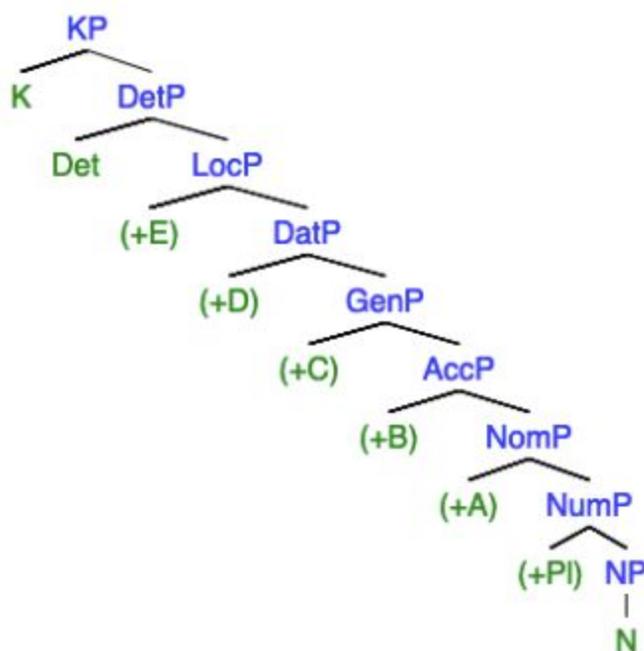
Below we reprise the set of example sentences from §1 to illustrate the number-based case assignment. In (27), the singular noun *ceļu* takes on accusative case following preposition *pa*, but in (28), it pluralizes and takes on dative case as *ceļiem*. Likewise, in (29) the singular noun *koka* appears in genitive case following preposition *aiz*, but in the plural in (30), it is the dative *kokiem* following the same.

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<sup>3</sup> Three prepositions, *līdz* (“until”), *pa* (specifically when meaning “through”), and *par* (“for/as”), require the dative case in the singular.

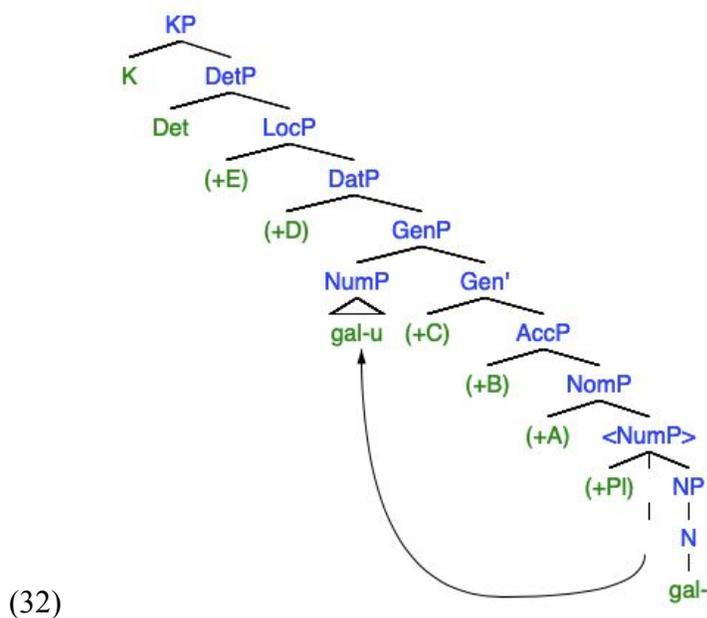
- (27) Viņš iet [pa ceļ-u.]  
 he-NOM go-3sg along road-ACC.sg  
 “He goes along the road.”
- (28) Viņš iet [pa ceļ-iem.]  
 he-NOM go-3sg along road-DAT.pl  
 “He goes along the roads.”
- (29) Es paslēp-u [aiz liel-a kok-a.]  
 I-NOM hide-1sg.PAST behind big-GEN.sg.masc tree-GEN.sg  
 “I hid behind a big tree.”
- (30) Es paslēp-u [aiz div-iem liel-iem  
 I-NOM hide-1sg.PAST behind two-DAT.pl big-DAT.pl.masc  
**kok-iem.**]  
 tree-DAT.pl  
 “I hid behind two big trees.”

At last, before we discuss an analysis of the matters I’ve problematized above, I will present a basal tree for a Latvian noun’s case structure, in adherence with nanosyntax conventions, and detail its properties.



(31)

Here, we see the layout of the case shells as assumed in the Latvian analysis, as close to the case hierarchy of Caha’s Universal Adjacency as can be initially achieved. The nominal merges lowest, followed by a number phrase that opts into the syntax when the noun is plural to bestow a [+PI] feature unto it. Above this, we ascend the tree by merging first the core cases nominative and accusative, followed by the three oblique cases genitive, dative, and locative, followed by the determiner phrase<sup>4</sup> -- which does not spell out in Latvian except as a suffix on adjectives modifying definite nouns -- and at last the culminating “case phrase” KP (which we will motivate particularly in §6). Following Caha (2009), the noun phrase ultimately moves to the specifier of the case it is assigned. Suppose a plural noun *gal-* (“end”) achieves genitive case, realized as *galu* (“end’s”), as visible in Table 1. The associated tree would then appear as follows:

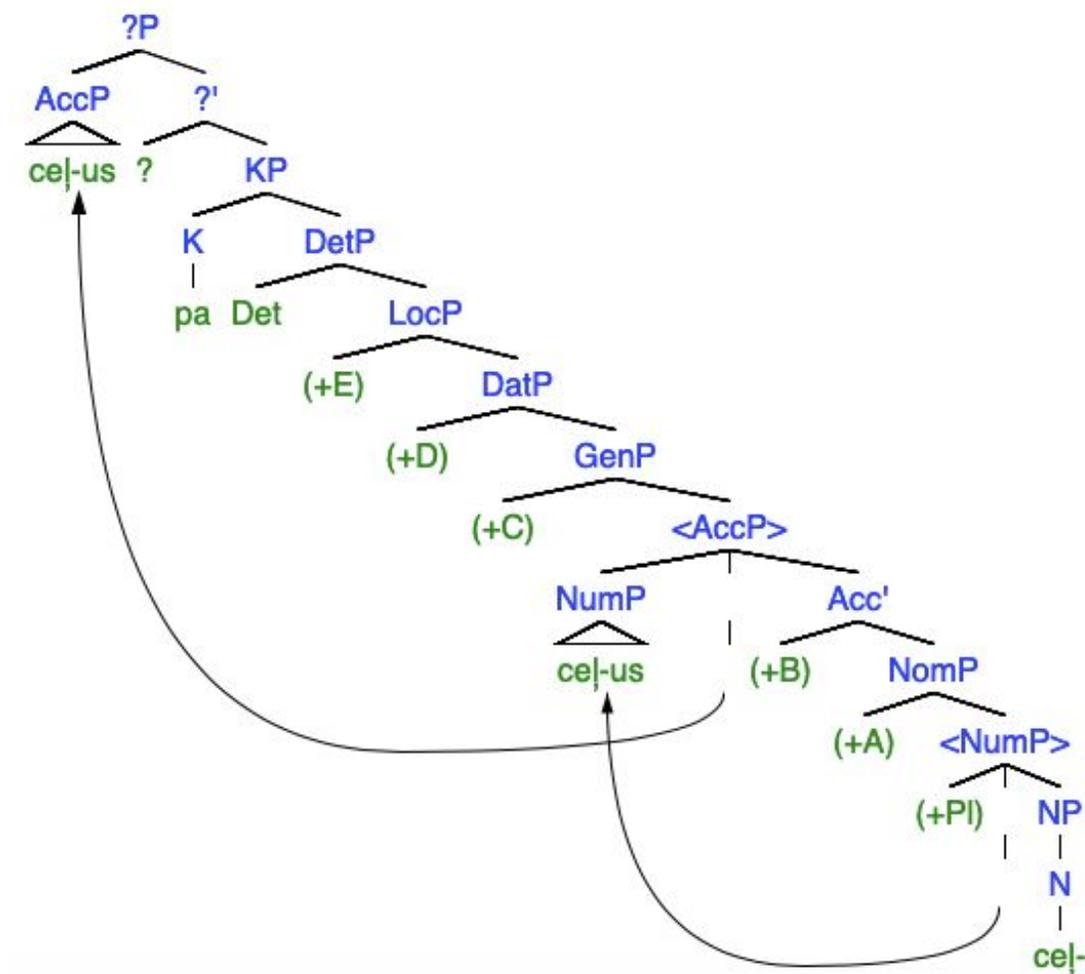


<sup>4</sup> We call the determiner phrase “DetP” here rather than “DP,” to avoid confusion with the dative phrase “DatP” which offers a dative feature labeled “[+D]” in trees, in the fashion of Caha (2009).

In moving to the specifier, the featural spread of the nodes it has moved over is now assumed by the noun, and it will spell out such case morphology according to the vocabulary item most specified for its particular feature matrix -- in this case, class 1's genitive suffix *-u*. This is the manner in which we shall present the Latvian morphosyntax going forward.

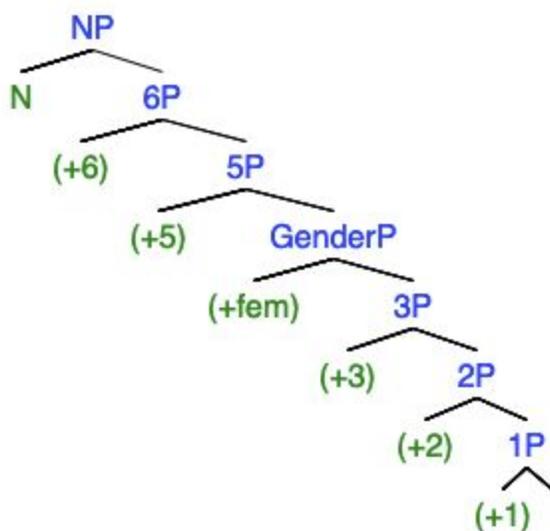
Following this movement, Caha (2009) proposes a "peeling" hypothesis by which a noun moves up to a case-realizational checking position once it has landed in its desired specifier within the KP -- for example, the subject position for a nominative noun (which also accounts for passives that move first to an accusative-realizational position, then peel up to a nominative-realizational position). In such cases that the sentence includes a preposition above the designated noun, that preposition is spelled out on the KP by the span of case features that linger there, once the lower case shells assumed by the noun have moved up and away, as demonstrated in (33). On account of the broader application of this type of exo-KP movement to checking positions, another problem is generated: how does the preposition assume its place before the noun (in other words, how does it move higher than the noun's feature-checking position) rather than end up a postposition? Fortunately, a functional projection that we shall introduce to manage the number-based case assignment will also serve the purpose of prepositional movement to its own feature-checking position in §6 of the forthcoming analysis.

- (33) *Once the nominal arrives in the specifier of its desired case (here, “ceļu” in the accusative), it peels away to a feature-checking position above, and KP spells out the preposition “pa” from the span of genitive, dative, and locative features.*



Finally, in the vein of portraying Latvian within the workings of nanosyntax, it may be useful to dissect the mechanics of noun class -- and gender therein -- as a span of features that is merged prior to the NP (a proposal in the vein of which is introduced throughout Caha (2020: §2). Our decision to place this hierarchy beneath NP comes with the sense that declension features are contained by the nominal root, as opposed to features like the [+PI] number feature above the noun, or the case features, the spell-out of which is affected predictably by the declension class of the root. The discrete cutoff of feminine nouns appearing in class 4 and

subsequent suggests that the feature acquired to distinguish a noun of this class is [+fem], but otherwise, those class-stratifying features are indeterminate in this analysis. In any case, this is represented as follows:



(34)

While noun class won't play a very significant role besides determining which syncretisms are in place, our Latvian nominal derivation is now cast completely in the nanosyntax mold. With that in mind, let us proceed to treat the first problem in our analysis.

#### **§4. Number-Internal Syncretisms: The Split Accusative Case**

The first of the issues thus detailed that this analysis aims to solve is that of purely number-internal syncretism. Whereas plural-internal syncretism that obeys the Law of Adjacency appears in the feminine noun classes and proves perfectly acceptable, the problem concerns the noun classes 3 and 6, as well as a marginal sub-grouping of class 2 (hereafter class 2b), wherein syncretism occurs within the singular number in defiance of the Law of Adjacency. Below are paradigms that afford a closer look at each such class.

(35)

Class 3 -- <i>tirgus</i> (market)	
	Singular
Nom	<i>tirgus</i>
Acc	<i>tirgu</i>
Gen	<i>tirgus</i>
Dat	<i>tirgum</i>
Loc	<i>tirgū</i>

(36)

Class 6 -- <i>uguns</i> (fire)	
	Singular
Nom	<i>uguns</i>
Acc	<i>uguni</i>
Gen	<i>uguns</i>
Dat	<i>ugunij</i>
Loc	<i>ugunī</i>

(37)

Class 2b -- <i>asmens</i> (blade)	
	Singular
Nom	<i>asmens</i>
Acc	<i>asmeni</i>
Gen	<i>asmens</i>
Dat	<i>asmenim</i>
Loc	<i>asmenī</i>

As one notes from these three paradigms, the singular-internal case syncretisms share a commonality in all applicable classes: the syncretism appears solely between the nominative and genitive cases. These are the most flagrant failures before the Law of Adjacency in Latvian, but since they are the *sole* environment for such a syncretism, the approach to its resolution may target the cases in that span of the case shell hierarchy in particular, without interfering on a grander scale. Specifically, taking number into account, one might target the offending case with regard to blocking adjacency between nominative and genitive: the accusative case.

In Caha (2018: 9, 17), following Starke (2017), the notion of split dative case is raised to deal with puzzling \*ABA patterns -- as Bobaljik (2007: 3) does not permit -- pertinent to Russian, Icelandic, and Skolt Saami case spell-out. For example, in Icelandic, Caha provides the following paradigm<sup>5</sup> from Harðarson (2016) which places dative between accusative and genitive case to accommodate acc--dat syncretism:

<sup>5</sup> The image in (37) was obtained directly from Caha (2018) for ease of representation, as it lays out the Icelandic examples quite clearly.

*Syncretism in Icelandic (Harðarson 2016)*

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

(38)

In the spirit of most languages that he attests in his classic hierarchy place the dative following the genitive, however, as well as apparent “dative split languages” that can manifest datives in both positions, Caha settles on an analysis containing a big and small dative. While none of our syncretisms involve the dative, the notion of a split accusative internal to Latvian is particularly appealing to this analysis: particularly in such a scenario as the split revolves around number. Caha’s original accusative case diverges into new cases addressed as “big accusative” and “small accusative,” so we shall operate on the use of these labels too. In his own work, the small accusative falls between the nominative and the genitive, and the big accusative, between the genitive and (big) dative, removing half of the accusative case from our offending position and relocating it to the nearest position that does not meddle between the syncretizing cases. If, in our view, the relocated case could accommodate the accusative noun when it bears the number in question, this would clear the path for nominative and genitive cases to achieve syncretism

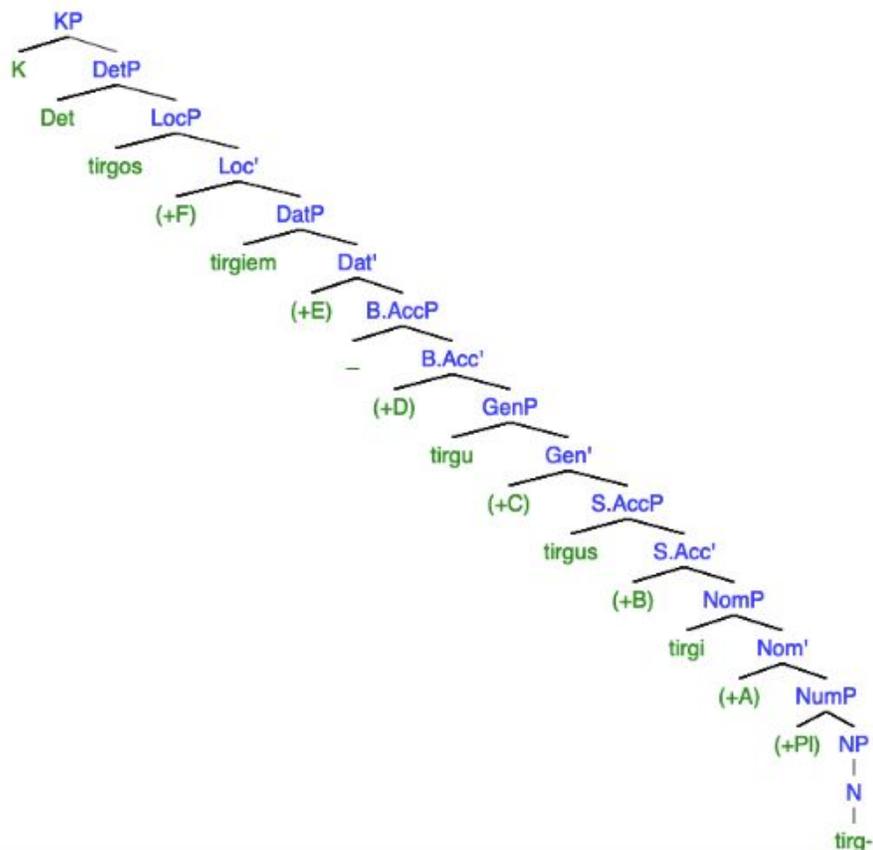
internal to that number. Meanwhile, the noun could then realize the accusative case in the half that remains in its original place only when *external* to that number.

The first consequence to note when splitting the case in such a manner is that in the singular, no phonological form is associated with the small accusative case. It is simply inaccessible in the singular, leaving a vacuum that establishes nominative and genitive in effective adjacency with nothing between. Conversely, the big accusative is inaccessible to plural nouns and does not provide phonology for them -- not that they would move that high in any regard, when their desired small accusative position is lower. The result is the following functional adjacency hierarchy for Latvian:

- (39) Case Adjacency Hierarchy (Latvian): *nominative -- small accusative -- genitive -- big accusative -- dative -- locative*

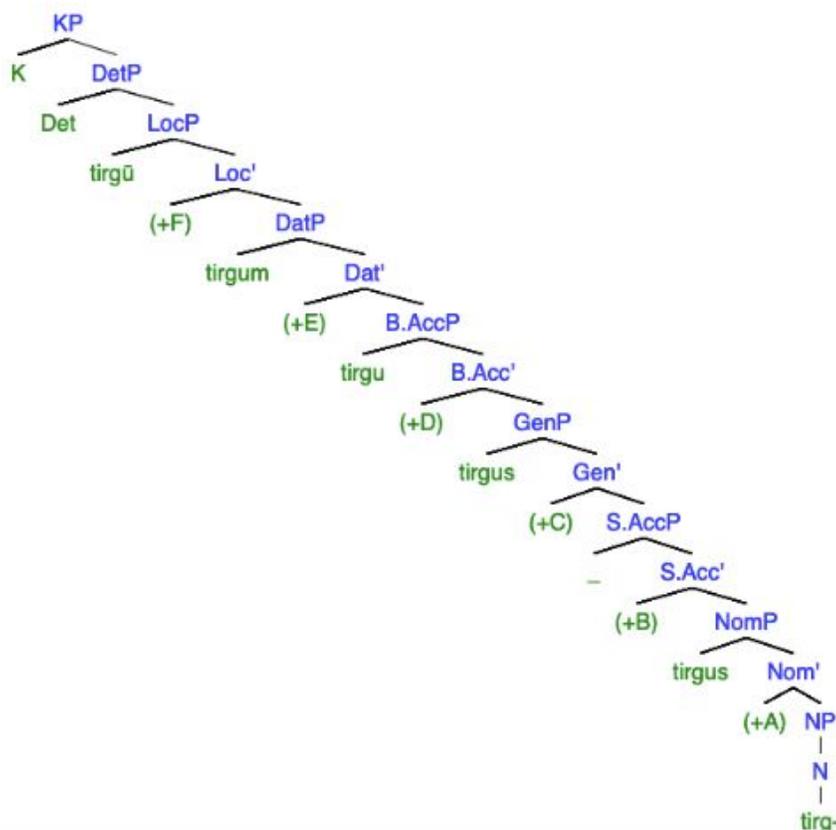
The singular and plural noun each have their own protocol, then, in moving through this hierarchy. Since it is the less interesting of the two, the portrait of what cases the plural noun may achieve is illustrated first in (40) below using noun class 3, where each available vocabulary item is indicated in the specifier of its associated case. Presumably, the presence of the marked [+PI] feature on the noun opens up the small accusative case to it, while a singular noun that lacks this feature is forced to continue until a suitable case (the big accusative) accepts it into the specifier.

- (40) Latvian Case Adjacency Hierarchy (Plural): nominative -- small accusative -- genitive -- dative -- locative



In (40), it is clear that the big accusative case does not have a vocabulary item on hand for a plural noun. Contrast that with (41) as follows, which replicates the process but with a singular noun of class 3. The small accusative is now unavailable to the noun, but the big accusative is perfectly free for the noun that requires it.

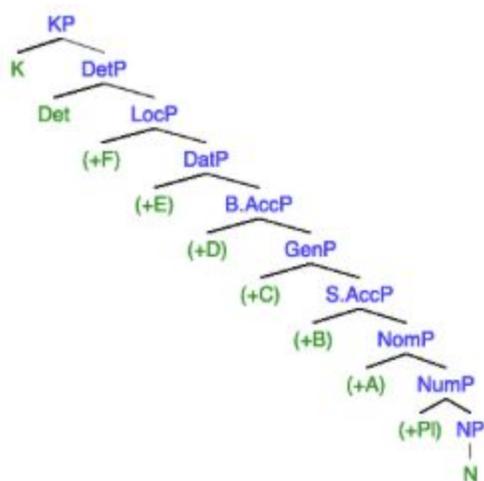
- (41) Latvian Case Adjacency Hierarchy (Singular): nominative -- genitive -- big accusative -- dative -- locative



In (41), *small accusative* is the unavailable seat for the noun lacking the [+PI] feature, and so it lacks a vocabulary item while *big accusative* offers one. Note the vocabulary items that spell out, then, on either side of the unavailable small accusative within the derivation: *tirgus* in the nominative, and *tirgus* in the genitive. These forms are syncretic, and by virtue of the null character of the small accusative, they are functionally adjacent and may syncretize as the reviewed paradigms predict. Quite beneficially to the analysis, the splitting of the accusative case portends no other consequences: the placement of the big accusative between the genitive and dative poses no issues since these two cases are never syncretic under any circumstances, and the elimination of a singular noun's ability to move to the specifier of an accusative case between

nominative and genitive is not problematic because the accusative singular is likewise never syncretic with the nominative singular or genitive singular under any circumstances. The reassignment of big accusative case to this position, and distribution of nouns to the split accusative cases based on number feature to allow for NOM--GEN syncretisms, yields the desired result.

In concluding this section, and having mustered a solution to the troubling number-internal syncretisms that appeared to violate the Law of Adjacency, we provide the tree in (42) below as the present case hierarchy, and further modify Table 1 to furnish Table 2 with our updated case schematic.



(42)

Table 2

Class 1 -- <i>gals (end)</i>			Class 2 -- <i>gailis (rooster)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>gals</i>	<i>gali</i>	Nom	<i>gailis</i>	<i>gaiji</i>
Small Acc		<i>galus</i>	Small Acc		<i>gaijus</i>
Gen	<i>gala</i>	<i>galu</i>	Gen	<i>gaija</i>	<i>gaiju</i>
Big Acc	<i>galu</i>		Big Acc	<i>gaiļi</i>	
Dat	<i>galam</i>	<i>galiem</i>	Dat	<i>gailim</i>	<i>gaiļiem</i>
Loc	<i>galā</i>	<i>galos</i>	Loc	<i>gaiļī</i>	<i>gaiļos</i>
Class 3 -- <i>tirgus (market)</i>			Class 4 -- <i>galva (head)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>tirgus</i>	<i>tirgi</i>	Nom	<i>galva</i>	<i>galvas</i>
Small Acc		<i>tirgus</i>	Small Acc		<i>galvas</i>
Gen	<i>tirgus</i>	<i>tirgu</i>	Gen	<i>galvas</i>	<i>galvu</i>
Big Acc	<i>tirgu</i>		Big Acc	<i>galvu</i>	
Dat	<i>tirgum</i>	<i>tirgiem</i>	Dat	<i>galvai</i>	<i>galvām</i>
Loc	<i>tirgū</i>	<i>tirgos</i>	Loc	<i>galvā</i>	<i>galvās</i>
Class 5 -- <i>pele (mouse)</i>			Class 6 -- <i>uguns (fire)</i>		
	Singular	Plural		Singular	Plural
Nom	<i>pele</i>	<i>peles</i>	Nom	<i>uguns</i>	<i>ugunis</i>
Small Acc		<i>peles</i>	Small Acc		<i>ugunis</i>
Gen	<i>peles</i>	<i>peju</i>	Gen	<i>uguns</i>	<i>uguņu</i>
Big Acc	<i>peļi</i>		Big Acc	<i>uguni</i>	
Dat	<i>pelei</i>	<i>pelēm</i>	Dat	<i>ugunij</i>	<i>ugunīm</i>
Loc	<i>pelē</i>	<i>pelēs</i>	Loc	<i>ugunī</i>	<i>ugunīs</i>

## **§5. Post-Prepositional Number-Based Case Assignment and [+Funk]**

The next task in the analysis is the synthesis of a system that accounts for the unique pattern of case assignment to nouns following prepositions. As reviewed primarily in §3, a prepositional complement appears in accusative or genitive in the singular, and dative in the plural. As for those two cases allowed in the singular, the case assigned appears completely arbitrary and specific to the preposition, without any sense of semantic commonality among those followed by accusative nouns or those followed by genitive nouns, so it will be treated as such. What morphosyntactic element could compel a noun to acquire only these restricted cases when a preposition enters the fold -- especially when prepositions supposedly merge *higher* in the derivation than the case shells through which the nouns are moving? This affords our first

clue in the matter: if the feature that determines which case the noun attains begins affecting movement within the case phrases before the preposition has even merged, then that feature ought to merge low.

Since it is the noun that will be assigned case, ultimately, it would be ideal if this feature merged quite local to the bare nominal. Furthermore, if this feature has some intrinsic relation to the eventual preposition (as one would expect), and only sees the noun move to the specifier of the cases in question when it follows a preposition, it seems the case that the feature must be able to look ahead in such a way that it *only* merges into the syntax when a preposition is slated to appear -- or perhaps, a preposition will only appear once this feature has appeared, since the feature merges earlier. More support for the nominal root-local merger of this feature may be adduced from Russian. The examples in (43a-b) illustrate that the animacy feature of a prepositional complement affects which preposition may appear in a possessive sentence.<sup>6</sup> If the possessor is animate, as in (43a), the preposition *u* appears. If inanimate, preposition *v* appears as in (43b):

(43) Predicative possessive constructions among animate vs. inanimate nouns:

(a) *Animate prepositional complements in this construction elicit the preposition u.*

**U**      **menja**      (est') kniga.  
at      me.GEN      (be)      book.NOM  
'I have a/the book.'

(b) *Inanimate prepositional complements in this construction (generally) elicit the preposition v.*

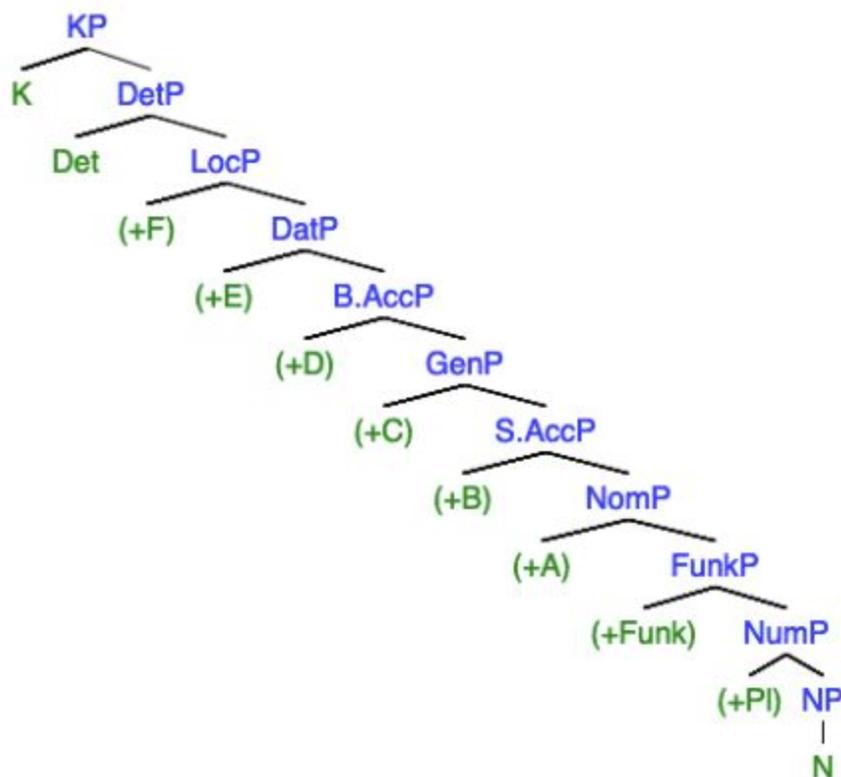
**V**      **našem**      **dome**      (est') pjat'  
in      our.PREP      house.PREP      (be)      five.NOM  
bol'six      komnat.  
big      rooms.GEN  
'Our house has five big rooms/There are five big rooms in our house.'

---

<sup>6</sup> Data obtained from personal correspondence with Dr. Stephanie Harves, October 2020.

Seeing as qualities of the noun such as animacy exert such influence over the final choice of preposition that merges, one supposes that some element of the preposition begins local to the nominal root in order that it ends up so influenced. General consensus holds that the Baltic and Slavic branches of language are not so distant to each other either, so it is hardly an unusual idea that if a prepositionally-related node of some sort merges local to the noun in Russian, it could proceed much the same in Latvian too. To that end, motivated by the above evidence, we will introduce a new projection quite local to the noun (but above other features that could potentially influence it, as a precaution), called *Funk* -- so named simply because it is a functional projection. In the proceeding portion of the analysis, we will proceed to outline the purpose and abilities of Funk as a technology, and exactly how it contributes to the number-based case assignment that we observe following prepositions in Latvian.

The FunkP -- the phrase in which the [+Funk] feature is located -- thus merges above NumP when present, while NomP merges above it and begins the case shell hierarchy. In order for the case shells to interact with it, and to interact likewise with the [+Pl] feature on plural nouns, the FunkP and NumP must be included in the movement to a case specifier. This is in line with a standard nanosyntax analysis, wherein movement is by and large phrasal in nature. (44) depicts the position in which Funk begins within a nominal derivation (in this example, for a plural noun). Note that no higher location for a preposition is yet represented in the tree diagram, since we will expound on that shortly.



(44)

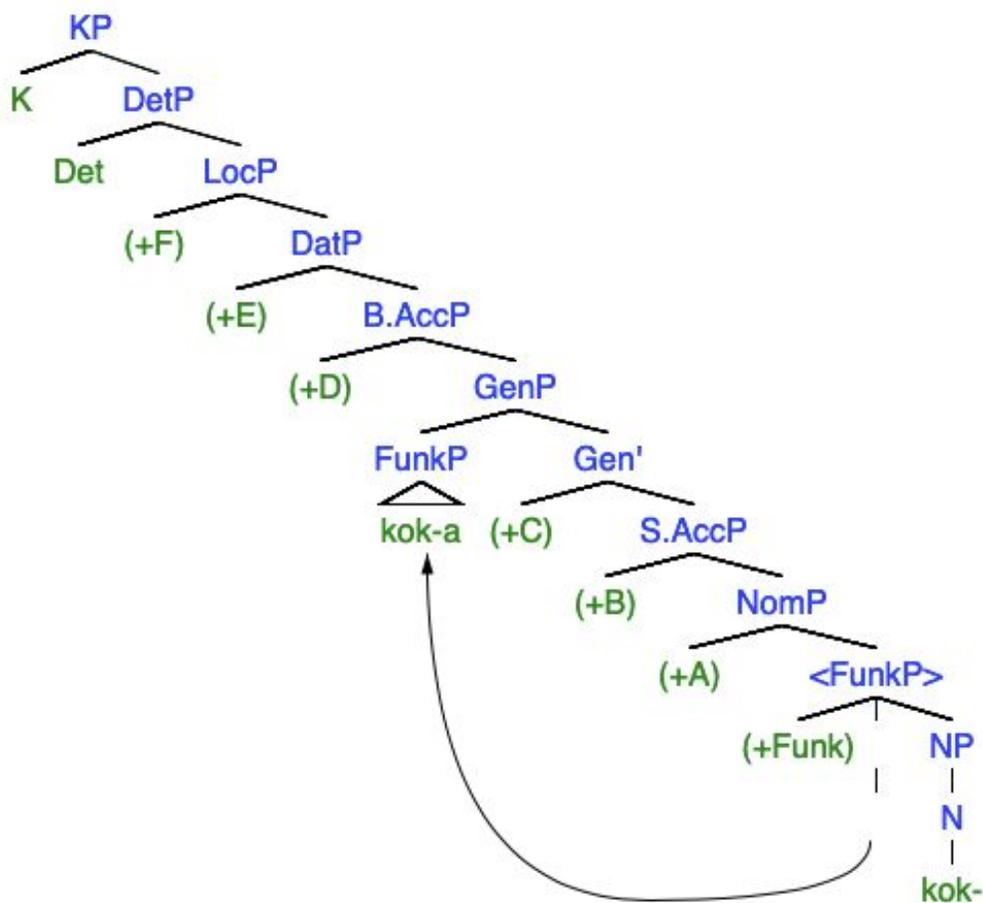
The first purpose of [+Funk] which we will focus on is that it creates a probe-goal relationship between the moving nominal and the big accusative, genitive, and dative phrase specifiers, only in derivations that will include a preposition (since these are the only ones in which FunkP merges). The analysis proposes that these cases in particular have some capacity to “recognize” [+Funk] at the forefront of the moving nominal and stop it, as if to peer into the contents of the nominal. Funk, in turn, renders all of the other cases -- nominative, small accusative, and locative -- entirely unavailable as landing sites for the noun; they will reject it. While the designated three cases, then, may allow for the noun’s momentary pause, [+Funk] itself is not sufficient on its own to ground the nominal in a specifier that will assign it case -- after all, this section focuses on a very decisive *number-based* assignment. [+Funk] is only the trait that creates an initial attraction, but the greater deterministic factor requires the case shell to

look beyond it.

Rather, the case phrase must peer within the nominal complex and observe whether it contains [+PI] in its feature matrix. If it does not, these are the circumstances under which the noun is permitted to stop moving in the specifier of either the genitive or big accusative cases. If the marked [+PI] is present, however, the noun is forced on its way until it reaches the dative case. The dative case looks once again for [+Funk], and since this is present, it peers deeper and notes [+PI]. This is the requisite featural combination to lock the noun in place in the dative specifier, which favors [+PI], so there it stops. The [+Funk] feature, and the discrete presence or absence of the [+PI] feature, orchestrate the number-based prepositional complement case assignment in tandem. The next section will discuss the prepositional nature of [+Funk] in further detail, including its apparent role as either the preposition's nanosyntactic root or part of it, but it may be worthwhile to mention beforehand that as a core element of the preposition's formation that steers the noun's case assignment, it may have some bearing on which of the lexical choices for preposition a singular noun will take: big accusative, or genitive. In that case, it may stand to reason that there are in fact two features that this analysis recognizes as [+Funk] on a plenary level: one that stops at genitive unless [+PI] accompanies it (in which case it moves to dative and stops the noun there), and another that stops at big accusative unless [+PI] is present (moving into dative thereafter). Since this quality is lexical to the preposition, and Funk as it the root of the preposition, this seems a sensible next step for further analysis.

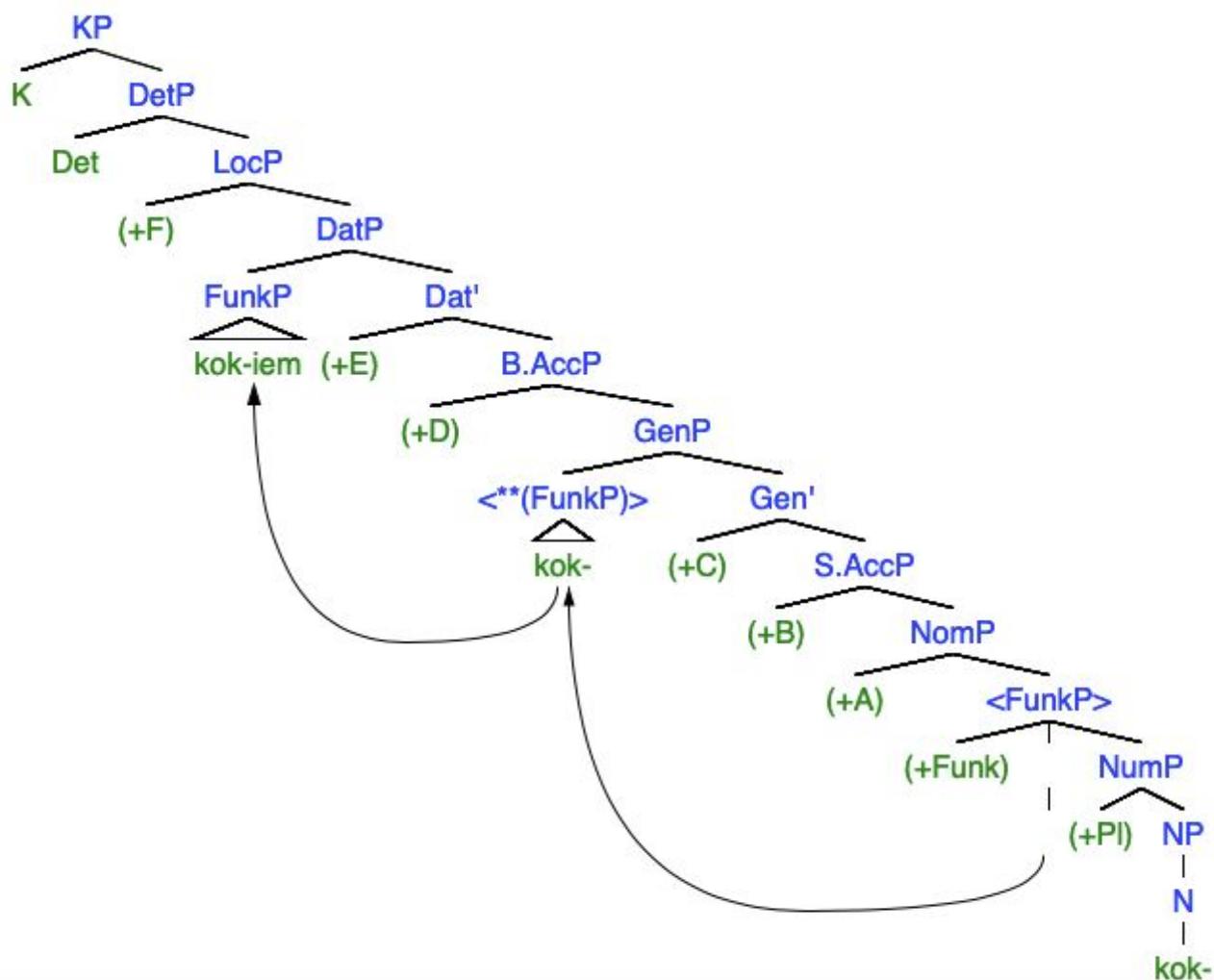
For the reader's ease, below is a demonstration of the [+Funk]-navigated movement process through the case shells, based on reprising the following earlier example sentences (now modified so as to exclude numerals and modifiers):

- (45) Es paslēp-u aiz kok-a.  
 I-NOM hide-1sg.PAST behind tree-GEN.sg  
 "I hid behind the tree."



In (45), note the lack of [+PI] as the noun after the preposition is singular. The FunkP moves to the genitive case specifier, as dictated by its number and the particular preposition (*aiz*) that it follows. While [+Funk] permits it to stop there, GenP peers into the nominal complex and does not observe the deterrent [+PI], so it may remain in that position. It is not forced elsewhere. From there, it may spell out the correct vocabulary item for its case suffix. For the converse example, look below to (46).

- (46) Es paslēp-u aiz kok-iem.  
 I-NOM hide-1sg.PAST behind tree-DAT.pl  
 "I hid behind the trees."



As one can see in (46), the [+Pl] feature is now present in the nominal complex, and moves along with it. [+Funk] first ensures that it stops moving at the specifier of GenP as it would if it were singular, but GenP observes that it carries [+Pl], so it does not settle permanently in this position (hence the parentheses and asterisks surrounding FunkP there, and the lack of case suffix). It moves again upward to spec-DatP per [+Funk], whereupon DatP recognizes [+Pl] in the noun's feature matrix and allows it to land there. This has been signified

in the diagram by the appension of the correct case suffix. In future tree structures within the analysis, the “rebuff” from the case that the noun would occupy in the singular will not be illustrated since it has no further consequence, and the movement will appear straight to the ultimate destination.

Now that the analysis has addressed the matter of number-based case assignment following prepositions, it comes time to address the prepositions themselves: how and where do they form, what conditions the process, what movements do they undertake, and how do they ultimately interact with the noun? This section of the analysis will include taking a look at the derivation beyond the immediate nominal domain, although that will still be crucial to KP-ingrown prepositions. We will also deal with movement for purposes of feature-checking and case realization, which will entail a continued exploration of [+Funk]’s further role in the Latvian prepositional phrase.

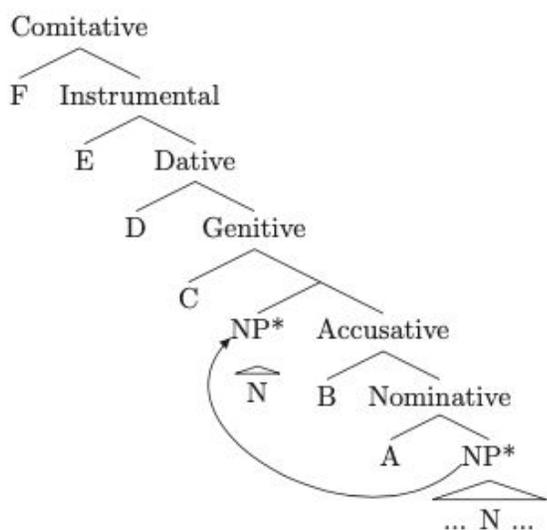
## **§6. KP-Ingrown Prepositions and Peeling for Feature Checking**

Integral to the Caha (2009) treatise on case is the proposal that prepositions are “grown” within the KP, using features left over in the case shells above the noun. The primary motivation for such a claim is that functional prepositions serve the same grammatical and semantic purposes -- in the languages in which they are present -- as the oblique cases do in other languages. Caha (2009: 29-31)<sup>7</sup> gives the example of Bulgarian in (47) below, wherein a noun that moves to the accusative case gets case features of the accusative and nominative, while a given preposition above it comprises case features of the left-over cases: genitive, dative, and (in

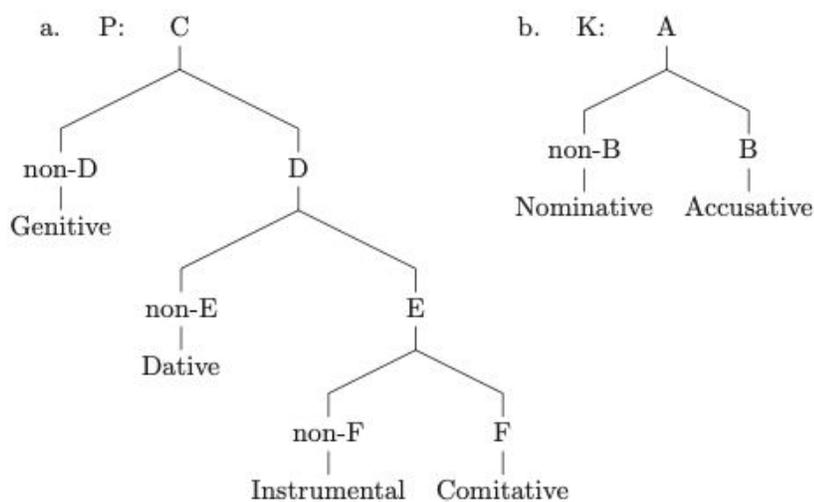
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<sup>7</sup> Trees (46) and (47) have been lifted straight from Caha (2009) for ease of representation.

that language) instrumental and comitative. This division is further illustrated in (48), wherein *P* represents the preposition, and *K*, the nominal that receives case.



(47)



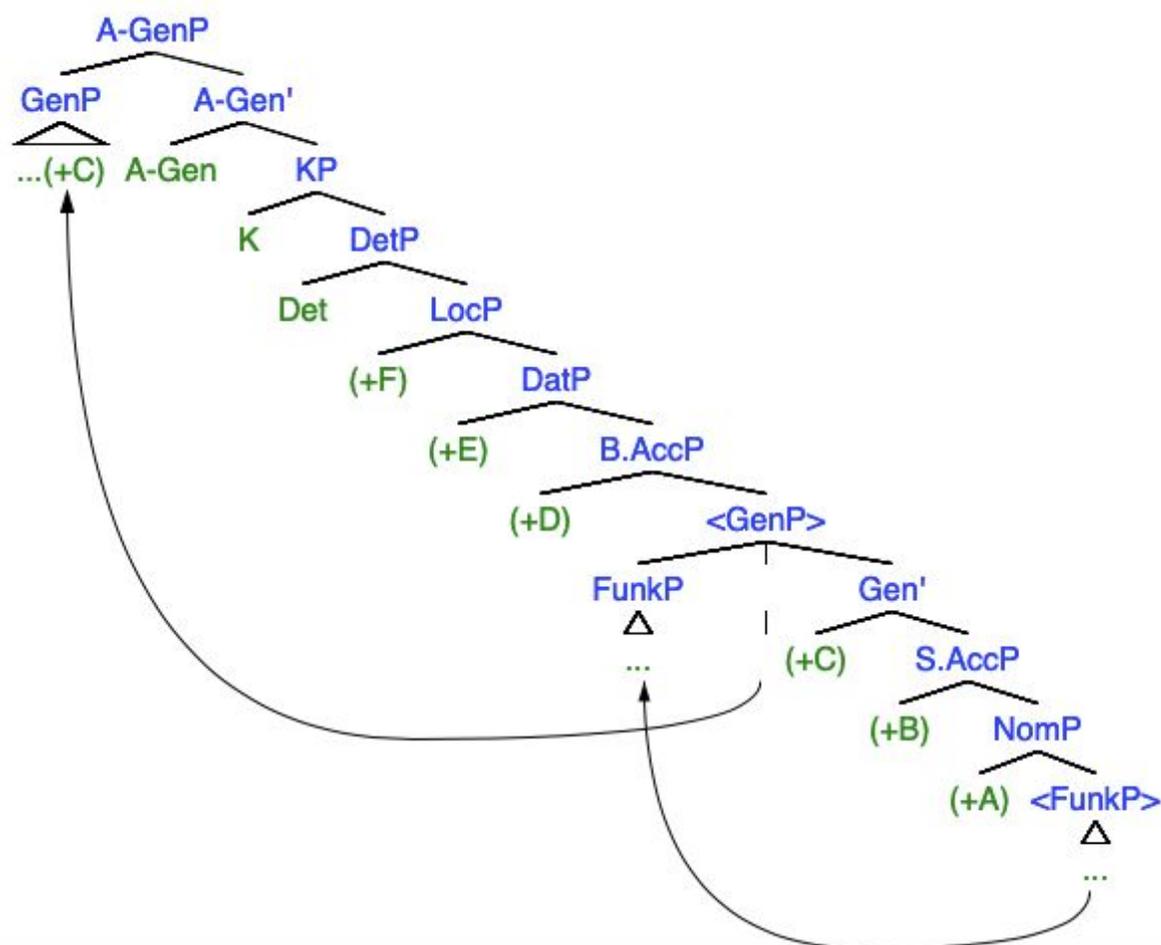
(48)

That proposal thus regards the prepositions in question as composed from the same features that comprise the cases: once the noun has moved to the specifier of its desired case and assumed all of the case features below it, informing how it spells out, some case features that merge in upon forthcoming case-phrasal nodes will seemingly go unused. These have the

potential to ultimately spell out a preposition, Caha asserts -- especially if a specific preposition must precede the case attained by the noun, in any adherent language. Incidentally, prepositions may only be syncretic with those composed of adjacent cases, in this proposal. This is the relevant extent to which Caha addresses prepositional spell-out, so in order that our own analysis keep within the nanosyntactic framework, then, we too shall adopt this formulation, and elaborate on it in further depth. One notes that there remains discussion to be had about which prepositions ascertain the mysterious label “functional” -- and from what class of prepositions this label might distinguish them -- but in the spirit of unified analysis that captures the patterns of all members of the prepositional category within Latvian, we generalize it in the hopes that it will suit all prepositions.

Likewise on account of Caha (2009: 35, §4), who follows Chomsky (1995), the “Peeling Hypothesis” also comes into play in the final realization of case on nouns -- and throws a wrench into an otherwise clean technology of prepositional ingrowth wrapping up matters in the KP, so we shall propose a solution to it as well. Essentially, the case features that a noun acquires must be checked, so it peels away from its position within the KP and moves to a higher case-realizational position, as depicted in (49) below. We will concern ourselves with the type of specifier to which it moves for our analysis shortly, though that is hardly as consequential: it is represented hypothetically with Caha’s nomenclature in (49) as a genericized phrase A-GenP (for the genitive noun in this example). In the case of an accusative noun, the alias might be A-AccP, or for a nominative, A-NomP, but such are Caha’s hypothesized positions for case feature checking. The chief concern as regards this movement is that it would strand the newly-formed preposition below the noun, resulting in a postposition; therefore, if we wish to

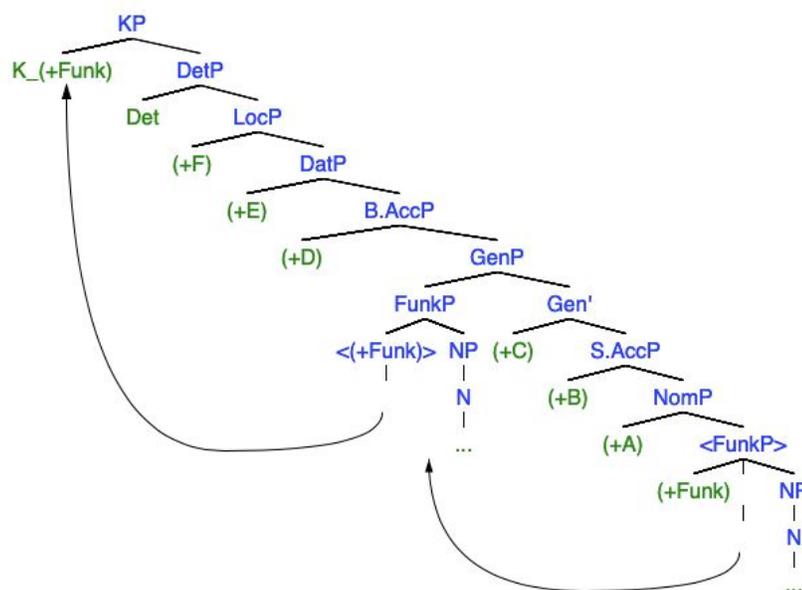
save this analysis, the preposition must move in turn. Here, the [+Funk] feature will achieve a further purpose, guiding the formation of the preposition for which it has served as a portent lower in the syntax, as what may be an incomplete prepositional root. The feature then necessitates checking itself, a need which justifies the movement that will place it in a prepositional relation to the noun once more.



Now that the concerns of case in Latvian as it relates to prepositions are laid out, let us set out to address them. First of all, by what mechanism does the preposition grow within the KP? If Caha's analysis that places the prepositional root in this span is correct, and we regard

[+Funk] as the closest available element to a prepositional root, it will have to move into a zone within the KP that will spell out the preposition (external to the noun, where it is currently located), and preferably a position that denotes where the preposition itself will spell out, encompassing all of the case-featural heads that contribute to its formation. Fortunately, a phrase already exists suited to precisely such a scenario: the KP level itself.

The K head in particular will serve as the target for head-to-head movement, to which the [+Funk] feature will be deployed higher up. As the KP dominates the remaining case shells that haven't been devoted to the noun, which play a part in spelling out the preposition, the partial prepositional *root* will attain a position here in order that it be both situated locally to the other features in the preposition's matrix, and no longer stationed wherever the noun stopped moving, else it would also peel away and move higher when it is still needed for the preposition. Once the Funk head has finally moved into position, everything is in place within the KP for the preposition to spell out. Some question remains as to whether its terminal form is achieved at this stage or later, but that does not otherwise affect the analysis. A view of this movement -- in the fashion of Collins (2017: 6) -- is available in (50), which would take place prior to the peeling movement represented by Caha's proposal in (49).



(50)

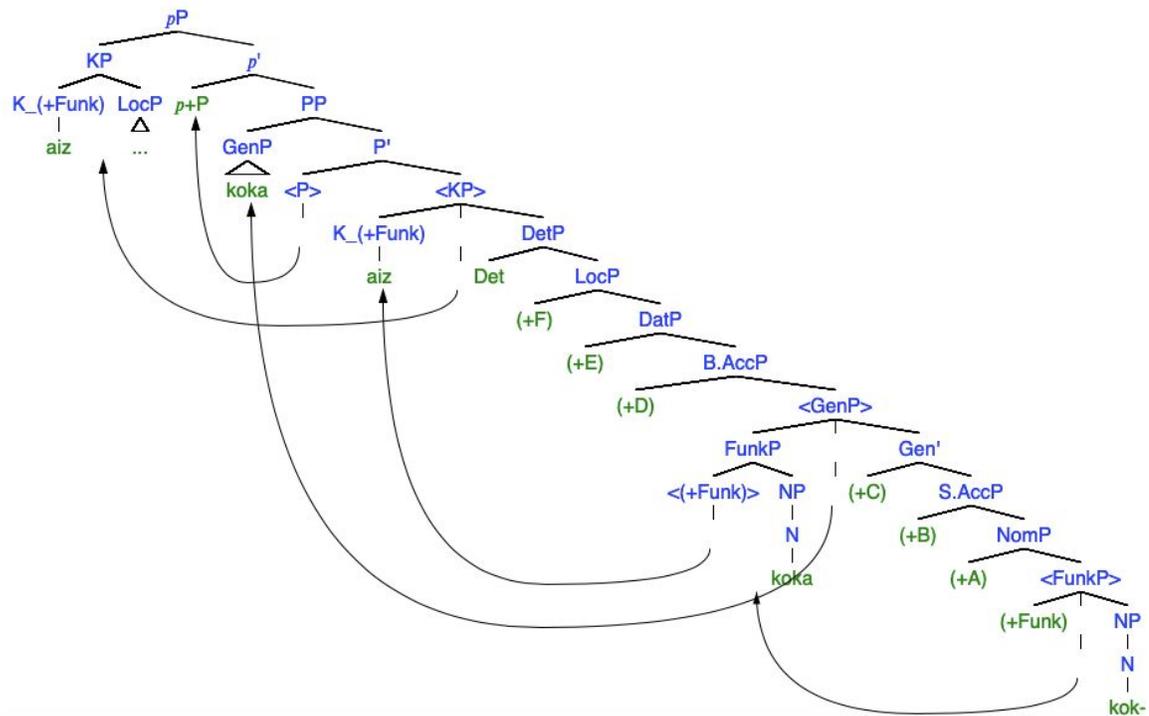
Once the Funk head has moved, the entire case shell containing the noun -- and everything below it -- is free to peel away to its case-realizational position above. The derivation is no longer in danger of failing to spell out a preposition by keeping Funk low, and also avoids counter-cyclical movement in so doing. This is fairly straightforward, as the process in (50) occurs first, followed by the process in (49), but we are then left with the problem previously presented: the preposition is stranded beneath the noun as if it were a postposition. Ergo, it must move too, to reprise its place dominating the noun. As a result, we will introduce a feature-checking, or preposition-realizational, position for the preposition too: optimally and rather necessarily, this will incorporate a prepositional phrase.

What does one make of the noun's case-realizational position then, which must come under the preposition-realizational position? For this matter, we implement a modified form of the PP-shell proposal first outlined in Svenonius (2003). Although Svenonius exploits the PP-shells for other purposes, ours shall ultimately function as feature-checking levels for the

noun and preposition. The PP layer will serve the purpose of whichever among Caha's A-xP phrases the noun must move to, on the assumption that such a layer of shells is available for each case-realizational position, including whichever must be filled. (51) demonstrates how the preposition peels out, and moves to its own feature-checking position, once the noun does likewise to get its case features checked. This prepositional movement to check features *partially* echoes the proposal of Kayne (2004), in which prepositions merge high and attract complements from below.

- (51) Order of movements: 1. *FunkP* moves to *spec-GenP* (in this example, the noun acquires genitive case); 2. *Funk* moves to *K*; 3. *GenP* moves to *spec-PP*; 4. *P* moves to *p*; 5. *KP* moves to *spec-pP*

Demonstrated with sentence: *Es paslēpu [aiz koka]*. ("I hid behind a tree.")



Clearly, in executing this series of movements, two elements move out from within a DP, which may appear controversial. However, as every phrasal node in nanosyntax assesses the

ability to spell out, phase boundaries are not a particularly pressing concern to the framework and analyses that fall within it. More notable, on the other hand, is the P-to-*p* head movement that is occurring within the PP-shells. This movement is depicted in observance of convention for such shells, but the precise nature of these heads is not entirely clear at present, save that they add something to the preposition perhaps not found in its naïve root [+Funk] nor any of the remaining heads within the KP and subordinate shells. For example, one possibility might include a feature that determines whether the preposition formed indexes a static complement or a destinational complement, but for purposes of this analysis, their role is not of dire consequence seeing as they are not spelled out themselves -- only specifiers spell out, in accordance with morphological information from the features of their respective phrasal heads.

Using the [+Funk] feature and the modified prepositional shell analysis motivated by feature-checking, we have now spelled out a PP in which all of the case features that compose the Latvian KP under nanosyntax have achieved their proper places, without becoming unfriendly to prepositions in favor of postpositions. Thereby, the majority of the work needed to fit Latvian's case system into the nanosyntactic framework is now complete, but one pressing issue remains: the "kitty-corner" syncretisms that transcend both case and number, infringing on the Spell-Out Algorithm in the process by allowing plural nouns to syncretize with syntactically higher singular nouns that lack the [+PI] feature. Via the technology of backtracking and the splitting of yet another case, our analysis will arrive at a resolution to this conundrum in §7.

## §7. Kitty-Corner Syncretisms, Backtracking, and the Split Genitive

Several noun classes in Latvian -- 1, 3, 4, and 5 -- exhibit paradigmatically oblique syncretism wherein two case forms appear identical across both number and case axes. We dub these “kitty-corner” syncretisms, and observe that they interfere with the notion that every feature incorporated into a case form contributes to its spellout. Notice in (52) below that the small accusative plural form syncretizes with the genitive singular (*green*), and the genitive plural form syncretizes with the big accusative singular (*red*). This exact pattern -- or one of the two syncretisms within it, rather -- is the same kitty-corner syncretism found in the other relevant noun classes as well, save class 3.<sup>8</sup> Therefore, our analysis will be unified for those noun classes.

Class 4 -- <i>galva</i> (head)		
	Singular	Plural
Nom	<i>galva</i>	<i>galvas</i>
Small Acc		<i>galvas</i>
Gen	<i>galvas</i>	<i>galvu</i>
Big Acc	<i>galvu</i>	
Dat	<i>galvai</i>	<i>galvām</i>
Loc	<i>galvā</i>	<i>galvās</i>

(52)

Examples depicting these syncretisms in context are visible below:

(53) Viņ-i                   sāsīt-a                   galv-as.  
 they.NOM               hit-3pl.PAST   head-S.ACC.pl  
 “They hit heads.”

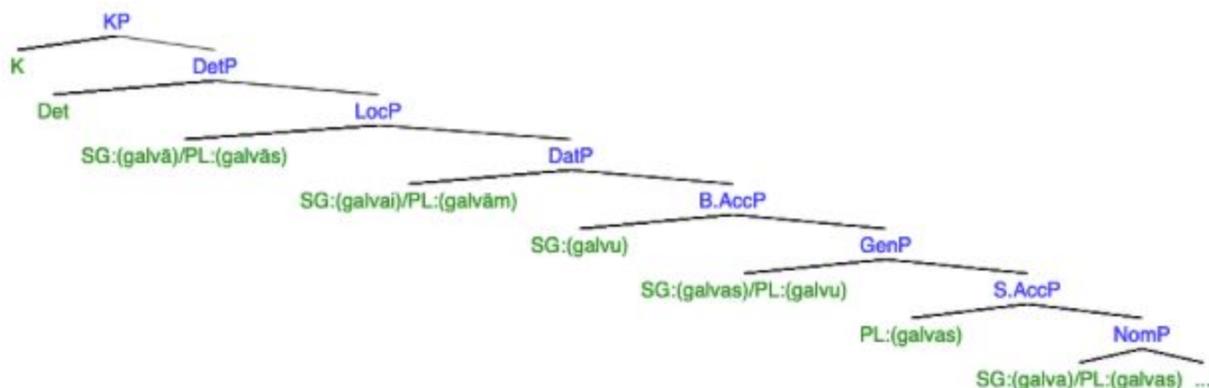
(54) Galv-as               ac-is.  
 head-GEN.sg       eye-NOM.pl  
 “The head’s eyes.”

<sup>8</sup> The following analysis of kitty-corner syncretisms does not propose a full solution to noun class 3. The pattern in this noun class is atypical when compared to the other three classes that exhibit these syncretisms, and furthermore, class 3 only contains a total 10 nouns and 4 proper nouns, so its data should not be taken as a generalizable testament to the other noun classes.

- (55) Galv-u                    ac-is.  
 head-GEN.pl            eye-NOM.pl  
 “The heads’ eyes.”
- (56) Viņ-i                    sasit-a                    galv-u.  
 they.NOM                    hit-3pl.PAST    head-B.ACC.sg  
 “They hit a head.”

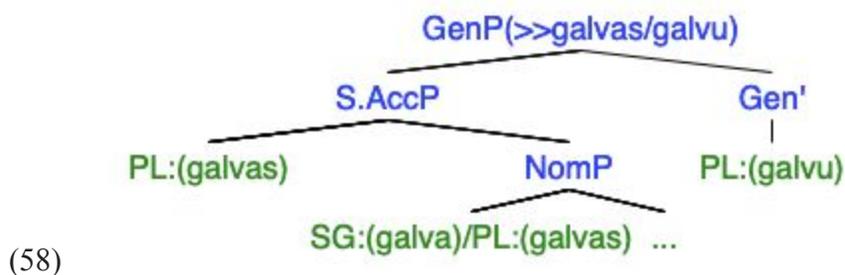
The precise issue that occurs with this breed of syncretism is couched in a plural form syncretizing with a singular form that appears higher in the derivation. Provided that every feature in a case form’s matrix -- [+PI] included -- is incorporated into matching the lexical tree of the vocabulary item that it ultimately adopts, a higher singular form should not be able to adopt the same VI as a lower plural form when it lacks a feature included in that form. Yet, clearly, the truth of the Latvian morphology ignores this disruption, so some sort of technology must be employed to accommodate it. Here, we shall delve into backtracking, which per Vanden Wyngaerd et al. (2020), can function as a measure to allow the reprisal of a prior form without adhering to its full featural matrix, making it an intuitive approach within the context of nanosyntax. As we shall see, however, backtracking alone will not be adequate, so a further alteration of the case hierarchy is in order thereafter.

First, observe the KP tree (57), which depicts each singular and plural form within the token class 4 case hierarchy. This will be the example tree on which we first demonstrate backtracking, and then our case modification:



This reflects the hierarchy of which case forms appear to spell out at which nodes *as it stands*. However, the backtracking technology hinges on an inability to spell out any form at the problematic nodes, insofar as no iteration of the features below that node match the lexical tree for a VI that could appear there. In this instance, then, one reasons that genitive singular (ultimately *galvas*) and big accusative singular (ultimately *galvu*) are the case/number combinations that initially cannot spell out a vocabulary item of their own. At first, we will focus on the lower of these, and employ a backtracking approach to reconcile the spell-out of the genitive singular.

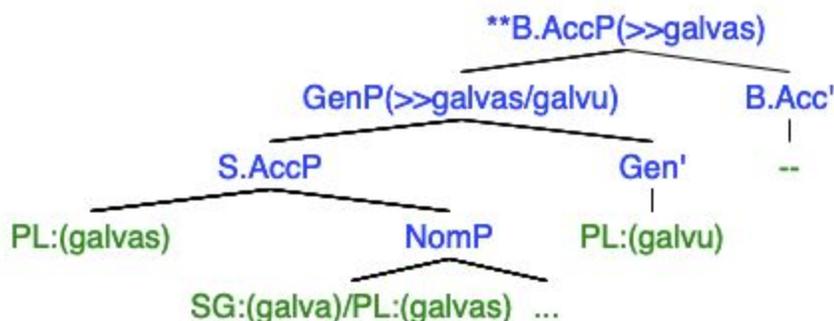
As outlined in §2, the first step to the backtracking process at large is the transposition of the specifier of the problematic phrase's complement to the phrase's own specifier position. In our example tree, this would involve moving spec-S.AccP to the sister position of Gen<sup>1</sup> once it merges. This strategy doesn't afford a solution, however, so we proceed to the second step: moving the entire complement of GenP to its specifier position. The result is thus:



As the ability of each node to spell out is checked by the syntax at a phrasal level, the content spelling out within GenP is noted to now have two forms: the inherent plural form *galvu*, and an inherited singular form *galvas*, which has been brought from below. Per the backtracking outline of Vanden Wyngaerd et al (2020), this process borrows the form beneath irrespective of the fact that the highest available form (*galvu*) lacked a [+PI] feature, and appropriates *galvas* as a satisfactory vocabulary item to fill the gap that was unable to spell out, even though the plural feature lacks in this singular derivation. This is how the first kitty-corner syncretism comes about: the only available form to commandeer via backtracking was a plural form from one case beneath (since the small accusative case can only spell out plural forms), despite the gap representing a singular noun, so the syncretism must transcend number.

Now we attempt the same strategy to reconcile the second syncretism: genitive plural *galvu* and big accusative singular *galvu*. The first step fails similarly, and the second creates an ostensibly similar circumstance, wherein GenP moves to spec-B.AccP, as in (59) below. But, this derivation is distinctly problematic in its own right -- *galvu* is the correct vocabulary item that big accusative attains, but our analysis predicts (as in (59), erroneously) that it would attain *galvas*. After all, the gap once again represents a singular form, and *galvas* is the singular form of the genitive case below it, so why does it ultimately choose the genitive plural form *galvu*?

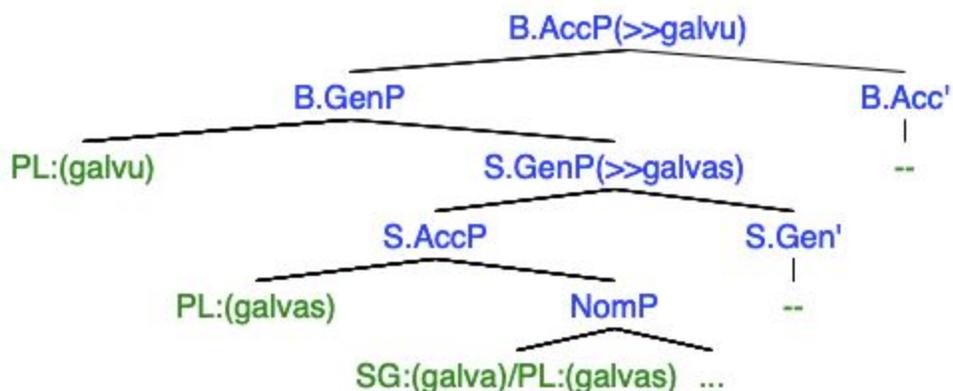
(59) *The analysis makes an erroneous prediction, assuming big accusative would select galvas rather than galvu.*



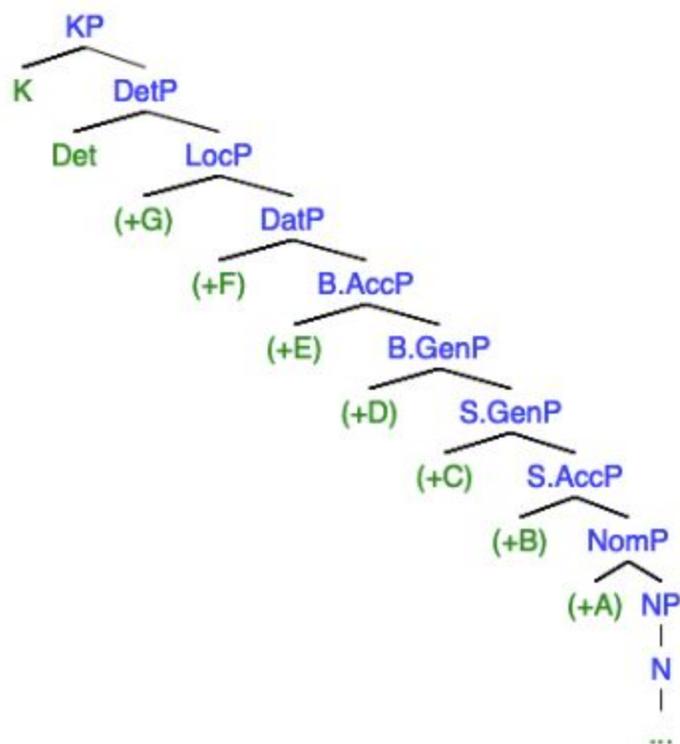
The solution available to us is quite similar to our earlier treatment of the accusative case, then: to split the genitive case on the basis of number. The big accusative case only chooses the genitive case's singular form because it is offered, but when bottlenecked such that only the genitive plural form is accessible to the big accusative case via backtracking, the vocabulary item with which it ultimately ends up would necessarily be the genitive's plural representation. This protocol much reflects the manner by which the genitive singular acquired the small accusative's plural representation -- because the small accusative only spells out a plural representation to begin with. It is only a matter of fixing the paradigm, then, to fashion a similar circumstance between the genitive and the big accusative above it.

We shall split the genitive case, ergo, into two cases: small genitive merges first, and only spells out the singular, though it must call the S.AccP to its specifier to do even that much. Big genitive merges above it, and spells out only the plural. B.GenP is then called to B.AccP's specifier, and from this perch it provides the big accusative a form to spell out: specifically, that which we previously knew as genitive plural, despite big accusative's condition of spelling out strictly the singular noun. We depict this *correct* derivation in partial tree (60).

(60) *This analysis correctly predicts that big accusative will select galvu, because it is the only option.*



Under these conditions, a singular noun that would acquire small genitive case, for example, would merely move to the small accusative specifier despite its lack of the [+PI] feature. One immediate consequence to consider is whether this division of the genitive case interferes with singular number-internal nominative-genitive syncretisms discussed in §4, but that is not the case: the small accusative nevertheless does not meddle in the singular, which is the only case that small genitive spells out under any circumstances. On those grounds, that is not a concern. The split genitive stands as a viable strategy to put genitive-big accusative kitty-corner syncretisms to rest with all features accounted for, and in observing this final hierarchy, the basic KP appears as follows in (61), specifically in instances that do not require complement-specifier movement via backtracking. We also present the latest iteration of the full Latvian case paradigm across all classes in Table 3.



(61)

Table 3

Class 1 -- <i>gals</i> (end)			Class 2 -- <i>gailis</i> (rooster)		
	Singular	Plural		Singular	Plural
Nom	<i>gals</i>	<i>gali</i>	Nom	<i>gailis</i>	<i>gaiji</i>
Small Acc		<i>galus</i>	Small Acc		<i>gaijus</i>
Small Gen	<i>gala</i>		Small Gen	<i>gaija</i>	
Big Gen		<i>galu</i>	Big Gen		<i>gaiju</i>
Big Acc	<i>galu</i>		Big Acc	<i>gaili</i>	
Dat	<i>galam</i>	<i>galiem</i>	Dat	<i>gailim</i>	<i>gaiļiem</i>
Loc	<i>galā</i>	<i>galos</i>	Loc	<i>gailī</i>	<i>gaiļos</i>
Class 3 -- <i>tirgus</i> (market)			Class 4 -- <i>galva</i> (head)		
	Singular	Plural		Singular	Plural
Nom	<i>tirgus</i>	<i>tirgi</i>	Nom	<i>galva</i>	<i>galvas</i>
Small Acc		<i>tirgus</i>	Small Acc		<i>galvas</i>
Small Gen	<i>tirgus</i>		Small Gen	<i>galvas</i>	
Big Gen		<i>tirgu</i>	Big Gen		<i>galvu</i>
Big Acc	<i>tirgu</i>		Big Acc	<i>galvu</i>	
Dat	<i>tirgum</i>	<i>tirgiem</i>	Dat	<i>galvai</i>	<i>galvām</i>
Loc	<i>tirgū</i>	<i>tirgos</i>	Loc	<i>galvā</i>	<i>galvās</i>
Class 5 -- <i>pele</i> (mouse)			Class 6 -- <i>uguns</i> (fire)		
	Singular	Plural		Singular	Plural
Nom	<i>pele</i>	<i>peles</i>	Nom	<i>uguns</i>	<i>ugunis</i>
Small Acc		<i>peles</i>	Small Acc		<i>ugunis</i>
Small Gen	<i>peles</i>		Small Gen	<i>uguns</i>	
Big Gen		<i>peļu</i>	Big Gen		<i>ugunu</i>
Big Acc	<i>peļi</i>		Big Acc	<i>uguni</i>	
Dat	<i>pelei</i>	<i>peļēm</i>	Dat	<i>ugunij</i>	<i>ugunīm</i>
Loc	<i>pelē</i>	<i>peļēs</i>	Loc	<i>ugunī</i>	<i>ugunīs</i>

## **§8. Conclusion**

We have now derived the Latvian case system and its interactions with prepositions within the nanosyntax framework, principally the Universal Adjacency hierarchy and spell-out mechanisms laid out seminally in Caha (2009). In the course of the analysis, we have proposed solutions to issues of number-internal case syncretism, number-based case assignment in prepositional complement nominals, prepositional growth within KP and feature-checking movement, and number-transcendent kitty-corner syncretisms. From these solutions have come developments with regard to the case hierarchy itself: the division of the accusative case into a big accusative that spells out singular nouns and a small accusative that spells out plural, and the division of the genitive into a small genitive that spells out singular nouns and a big genitive that spells out plural. We have likewise innovated a feature [+Funk] local to the noun in any sentence that will contain a preposition; an incomplete prepositional root that signifies the case specifiers to which nouns will move in its course to form a preposition from remaining case shells at the KP level, as well as a modified PP-shell system to check this feature and ensure proper movement.

One might juxtapose the present analysis with past analyses of syncretisms in the Latvian case system as well, such as that of Morris Halle (1991) in *Distributed Morphology*, which analyzes suffix *-s* as an unmarked, basic case suffix syncretic across all noun classes. This is an eminent study on the matter, and long predates our own, which makes differing theoretical assumptions regarding featural representation and VIs in Latvian in general, arguing that many case suffixes are bimorphemic. If our analysis here is correct, then the grounding of analyses such as Halle's may merit some rethinking, though we don't weigh in on this matter as a whole,

nor proclaim that our work trumps his or others. Ultimately, our Latvian study is not this broad: it sets out to reconcile a problem internal to Latvian's relationship nanosyntax, not to reshape the framework fundamentally or revolutionize anything of a larger scope.

Further research is extendable to several areas: most glaringly, an analysis that unifies the kitty-corner syncretisms found in noun class 3 with the other classes is in order. A more intuitive streamlining of the prepositional shell system employed in §6 would also benefit the line of thought we have established here. Similarly, ascertaining the more concrete nature of Funk, and precisely which prepositional property it contains, and which it may meld with in the prepositional phrase to which it moves, would be of tremendous value. Cross-linguistic testing is needed for any of the innovations that this analysis supplies which could apply to other languages as well, even insofar as many of them are quite specific to issues that occur in Latvian -- which the particular scrutinies of nanosyntax may not easily generalize elsewhere -- but may still be testable in related languages such as Latgalian, Lithuanian, or even Russian from which data on prepositions was adduced in this analysis. Just because the problems and solutions associated with this analysis are of most concern to Latvian does not mean they could not hold in other languages, so long as they have been sufficiently assimilated into the nanosyntax mechanism -- though in the end, this has still been an exercise strictly in the Latvian case system. That has been the teleological purpose of this analysis, and in that endeavor, we have succeeded in producing a view of Latvian case in nanosyntax that is, at present, apparently functional.

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