UiT THE ARCTIC UNIVERSITY OF NORWAY

Center for Advanced Study in Theoretical Linguistics

Palatalization in Latvian

—

Olga Urek

A dissertation for the degree of Philosophiae Doctor – March 2016

Palatalization in Latvian

Olga Urek

A thesis submitted for the degree of Philosophiae Doctor

UiT The Arctic University of Norway

Faculty of Humanities, Social Sciences and Education

CASTL

March, 2016

Table of Contents

Abstract

Palatalization is very commonly attested across languages and has sparked considerable interest in fields like linguistic typology, phonetics, and phonology. However, palatalization notoriously exhibits a large degree of diversity, both cross-linguistically and within individual languages, which, on the one hand, precludes a straightforward phonetic explanation, and, on the other hand, poses considerable challenges for formal phonological accounts striving to provide a unified analysis of all processes subsumed under this cover term.

In this dissertation, I undertake a systematic investigation of a group of palatalization processes in Modern Standard Latvian, namely assimilatory palatalization, diminutive palatalization, and palatal assimilation in consonant clusters. The intricate Latvian patterns have hitherto received very little attention in the generative phonological literature.

The relatively narrow empirical focus of this work made it possible to examine the phenomena in considerable depth and to uncover some regularities and dependencies that have been previously overlooked. I develop a representational and constraint-based analysis of Latvian palatalization. The substance-free approach to a process that has traditionally been regarded as a classic example of a phonetically motivated rule developed in this thesis provides a descriptively adequate, explanatory and formally simple analysis of assimilation patterns that posed considerable challenges for traditional phonetically-driven approaches, while at the same time revealing a complex inter-relation of different phonological and morphological phenomena within a given grammar.

Acknowledgements

The work on this dissertation was a long and challenging journey, and I am extremely thankful to all the amazing people who walked this way with me. First and foremost, I must express my deepest gratitude to my supervisors, Martin Krämer and Marit Westergaard, for their patience, support, encouragement and guidance over these years. It has been a great privilege to work with you. If not for you, this work would have never been completed. I am also thankful to Bruce Morén-Duolljá, who was my supervisor during the first year, for helping me to get started on my writing and for suggesting the topic for this dissertation. I am grateful to Alexei Kochetov from the University of Toronto for his insightful comments on the earlier version of this work.

Many thanks go to my wonderful colleagues in Riga, Dace Markus, Anna Vulāne, Tija Zīriņa, Agrita Tauriņa and Ilze Auziņa, for their hospitality, many long conversations about the intricacies of Latvian phonology, and for generously providing me with literature suggestions and grammaticality judgments.

I am very grateful to my fellow PhD students Alex, Anna, Elena, Inna, Joe, Kristina, Marta, Natalia, Sandra, Sebastian and Tammer. Thanks to you, guys, I never felt alone. Special thanks go to Antonio for always believing in me, encouraging me to push my limits and setting an (unrealistic) example of ambition, diligence and academic productivity. I have also benefited greatly from conversations with various CASTL linguists over the years - it has been a great honor to be a part of your amazing community.

Finally, I am eternally grateful to my mother, who supported me, selflessly and patiently, every step of the way. This dissertation is dedicated to her.

1 INTRODUCTION

1.1 Introduction

"Palatalization" is typically used as a cover term for a range of processes whereby a consonant shifts its place of articulation to or closer to the palatal region, usually in the context of a front vocoid (Kochetov 2011). Under a broader definition (Bhat 1978), the term may refer to any structural change that is *either* triggered by a front vocoid *or* results in a palatal/palatalized consonant. Palatalization may be sub-categorized into two main types: (i) secondary palatalization, by which the affected segment acquires a secondary palatal articulation while preserving its primary place, as in /pi/ → [pʲi]; and (ii) full or place-changing palatalization, by which the affected segment shifts its place of articulation to the palatal, postalveolar or alveolar region, as in respectively /ki/ → [ci], /ki/ → [t͡ʃi], and /ki/ → [t͡si]. It is the latter process that is the main focus of this dissertation.

Palatalization is very commonly attested across languages. It is usually regarded as a typical example of a phonetically natural assimilatory process and, consequently, as a process that should be relatively easily accommodated by a phonological model (Hyman 1975:156-161). However, palatalization notoriously exhibits a large degree of diversity, both cross-linguistically and within individual languages, which, on the one hand, precludes a straightforward phonetic explanation (Gussmann 2001, 2004), and, on the other hand, poses considerable challenges for formal phonological accounts striving to provide a unified analysis of all processes subsumed under this cover term. For these reasons, palatalization has sparked considerable interest in fields like linguistic typology, phonology and phonetics.

This chapter is organized as follows. In Section 1.2, I briefly review typological findings concerning palatalization. Section 1.3 summarizes some of the phonetic studies of palatalization. Section 1.4 focuses on formal accounts of palatalization, both representational and computational. Finally, Section 1.5 introduces the focus and structure of this dissertation.

1.2 Typology of palatalization

Both full and secondary palatalization show a large degree of cross-linguistic variability, as revealed by a number of typological studies (e.g. Chen 1973, Bhat 1978, Hall & Hamann 2006[1], Bateman 2007, Kochetov 2011). At the same time, not all possible triggers, targets and outputs are cross-linguistically equally likely. The table in 1.1 summarizes the findings of a typological survey reported in Kochetov (2011), which focuses on palatalization targets and outcomes in 64 languages belonging to 17 language families and 25 genera (numbers in brackets indicate the number of language families and genera respectively where each specific alternation is attested). As evident from the table in 1.1, place-changing palatalization may affect segments of any place of articulation, although non-labial consonants are much more commonly attested as undergoers of the process (see also Bateman 2007:44). It was also found (Bateman 2007) that the process occurs most frequently with obstruents, stops being more common targets than fricatives and affricates, followed by nasals, laterals, and, finally, rhotics, which are very rare to palatalize fully. Other asymmetries include the propensity of palatalization to output sibilants as opposed to stops, and post-alveolar and palatal segments as opposed to alveolar ones (Kochetov 2011).

[1] The survey in Hall & Hamann (2006) deals with assibilation of coronal plosives in the context of high front vocoids (/ti/ → [si]), which falls under the broad definition of palatalization.

1.1 Targets and outputs of palatalization (cited from Kochetov 2011)

Palatalization		*labial*	*coronal*	*dorsal*
Secondary		p → pʲ common [6, 9]	t → tʲ common [6, 8]	k → kʲ common [6, 7]
To a posterior coronal	a. to a non-sibilant	p → c rare [1, 1]	t → c common [7, 8]	k → c common [4, 6]
	b. to a sibilant	p → t͡ʃ rare [1, 1]	t → t͡ʃ common [9, 14]	k → t͡ʃ common [4, 7]
To an anterior coronal	a. to a non-sibilant	p → t absent [0, 0]	n/a	k → t absent [0, 0]
	b. to a sibilant	p → t͡s rare [1, 1]	t → t͡s common [3, 6]	k → t͡s rare [2, 4]

Palatalization triggers were also found to exhibit a number of distributional asymmetries. Front vowels are much more likely to trigger palatalization than non-front ones, although high back and central vowels [u, ɨ, ʉ] are also attested as triggers (Bateman 2007:62-63). It was also observed that high front vocoids, [i, j], are much more likely to trigger the process than lower front vowels (Bhat 1978, Bateman 2007, Kochetov 2011). In addition, two implicational relations among palatalization triggers have been uncovered (Bateman 2007:64, Chen 1973):

1.2

(a) if lower front vowels trigger palatalization, then so will higher front vowels (Bateman 2007, Chen 1973);

(b) if high back/central vowels trigger palatalization, then so will high front vowels (Bateman 2007).

Position of palatalization trigger with respect to the target is also subject to some cross-linguistic variation. The trigger may either precede or follow the target, with the latter scenario being slightly more common (see Kochetov 2011, Bateman 2007, Bhat 1978). In the majority of cases, the trigger is immediately adjacent to the target of palatalization. However, in a handful of cases palatalization can apply over intervening segments that are not themselves targeted. For instance, Bateman (2007:79) quotes the data from Karok and

Western Shoshoni, where the trigger and the target can be separated by a consonant, while Kochetov (2011), with a reference to Rose (1997) provides an example of Harari, where palatalization can apply over one or more syllables.

1.3 Palatalization as a natural rule

Despite its typological variability, palatalization is often regarded as a natural process motivated by the interplay of acoustic, articulatory and perceptual factors, which have been the topic of a large body of work. In a number of studies, it has been claimed that palatalization is primarily motivated by the acoustic similarity between its targets and outputs in the context of front vocoids. Thus, it was shown, for instance, that [ki] and [ti] strings have similar formant transitions (Plauché 2001, Chang et al. 2001 and references therein); similarly, Ohala (1978) shows that F_2 transition of palatalized labials is more similar to that of dentals than to that of plain labials. Further, it was demonstrated that the turbulent noise created when a plosive is released into a high vocoid is comparable in duration to the release noise characteristic of affricates and fricatives, which may explain the propensity of full palatalization to output sibilants (Hall et al. 2006, Cavar & Hamann 2003, Kim 2001). Interestingly, Guion (1998:30) also reports the effect of the vowel height, such that velars are more acoustically similar to postalveolar affricates before higher front vowels than before lower ones, which reflects the implicational hierarchy of palatalization triggers uncovered by Bateman (2007) and Chen (1973).

The fact that listeners may pick up on these acoustic similarities was confirmed in a number of stop confusion studies that found a robust tendency for non-coronal stops to be misidentified as coronals when followed by front high vowels (Winitz et al. 1971, Plauché 2001, Chang et al. 2001 and references therein). In addition, Guion (1998) reports significant confusion rates between velar plosive [k] and postalveolar affricate [t͡ʃ] when followed by high front vowel, especially when the signal was degraded by noise. Similarly, Chang et al. (2001) report higher than chance confusion rates of aspirated [k^{h}i] tokens as [t͡ʃ^{h}i], when the former was degraded to filter out the characteristic mid-frequency spectral peak of the velar.

Some studies also emphasize the role of articulatory factors in palatalization. Thus, Bateman (2007, to appear) argues that acoustic and perceptual facts alone are unable to account for the rarity of full labial palatalization (cf. Ohala 1978). She proposes instead that the cross-linguistic facts receive a straightforward explanation if palatalization is seen as primarily the result of temporal overlap between vocalic and consonantal articulatory gestures. She argues that the temporal overlap of two gestures employing the same articulator, i.e. the tongue, but aiming at different constriction locations may result in gestural blending, where the actual output is shifted with respect to the target (as is the case of full palatalization). However, if two gestures employing the different articulators, i.e. the lips and the tongue, overlap to a considerable degree, no blending occurs – which correctly predicts the rarity of full labial palatalization. Importantly, secondary palatalization of labials is still predicted and attributed to a minimal temporal overlap between the articulatory gesture executing a labial closure and the gesture executing a front vowel.

However, the natural-rule view of palatalization is challenged by numerous recent findings. First, palatalization is not necessarily assimilatory. Cases where palatal alternations apply productively in the absence of any obvious phonological trigger are well attested: such is, for instance, expressive palatalization that applies in diminutive morphology, sound symbolism, baby talk and child-directed speech (Kochetov & Alderete 2010). Second, even in cases where palatalization rules that operate in a given language can be viewed as assimilatory, a more detailed examination may uncover complex morphological conditioning, seemingly unmotivated gaps and a considerable degree of variability, which has led some to question the central and causal role of phonetics in palatalization (Gussmann 2001, 2004).

1.4 Formal accounts of palatalization

Any formal analysis of palatalization necessarily concerns itself with a number of fundamental – and as of yet controversial – issues in phonology. For instance, palatalization has been crucial in informing models of subsegmental representation. Being a consonant-vowel interaction, it has served as one of the main sources of evidence for the nature, constituency and affiliation of phonological features (Chomsky & Halle 1968, Clements 1985, Hume 1992, Clements & Hume 1995, Halle, Vaux & Wolfe 2000, Calabrese 2005, Morén 2006). Palatalization has also sparked considerable interest in computational accounts, where attempts have been made to explain asymmetries and implications through universal restrictions on the computational component, i.e. fixed rankings (Rubach 2003). In what follows, I briefly review previous representational and constraint-based analyses of palatalization, highlighting the main challenges of different accounts.

1.4.1 Palatalization in SPE

In SPE formalism (Chomsky & Halle 1968), phonological representation of an utterance was a two-dimensional matrix, with rows labeled by universal features, and columns labeled by the consecutive segments of that utterance. Each binary-valued phonological feature reflected an articulatory characteristic, e.g. location or degree of stricture, active articulator involved, etc. While features themselves and their definitions are familiar, some points relevant to the analysis of palatalization have to be emphasized. First, all vowels (except for retroflex ones) were specified as [-coronal], because they are produced "with the blade of the tongue in the neutral position" (Chomsky & Halle 1968:304). Second, all vowels were [-anterior], because they are produced without constriction in the oral cavity. Third, features [high], [low] and [back], which reflected the displacement of the body of the tongue relative to its neutral position (in vowels, as well as in consonants), had a dual role. In [-coronal, -anterior] consonants, these features characterized the primary place of articulation; in [+anterior] and/or [+coronal] consonants, they characterized secondary ("subsidiary") articulations like palatalization, velarization and pharyngealization (Chomsky & Halle 1968:305-306). Thus, palatalized consonants were treated as [+high, -back]. Feature specifications of vowels and consonants that are implicated in palatalization are summarized below (based on Chomsky & Halle 1968:307):

1.3 Consonants

	[anterior]	[coronal]	[high]	[low]	[back]
labials	+	-	-	-	-
dentals	+	+	-	-	-
palato-alveolars	-	+	+	-	-
palatals	-	-	+	-	-
velars	-	-	+	-	+
palatalized labials	+	-	+	-	-
palatalized dentals	+	+	+	-	-

1.4 Vowels

	[anterior]	[coronal]	[high]	[low]	[back]
high front	-	-	+	-	-
mid front	-	-	-	-	-
low front	-	-	-	+	-
high back	-	-	+	-	+
mid back	-	-	-	-	+
low back	-	-	-	+	+

Let us now consider how palatalization was captured in SPE formalism. The fact that the same set of features was used to define the place of articulation and the height in vowels, and the secondary articulation of the [+anterior] and/or [+coronal] consonants made it possible to straightforwardly capture secondary palatalization in the context of high vowels as an assimilatory process involving [+high], as shown below:

1.5 t → t^j /_______ i

[+anterior] → [+high] /_______[+high, -consonantal]

Place-changing palatalization of velars, on the other hand, could be represented as the assimilation of [-back] triggered by front vowels, as in 1.6:

1.6 k → c /_______e

[-anterior] [-back] /_______[-back, -consonantal]

There are, however, three problems with this account, also noted and discussed in Kochetov (2011). First, palatalization of labials and coronals and that of velars is treated as two distinct processes, the former involving [+high] and the latter [-back]. Second, it predicts that [+back] vowels cannot trigger palatalization of velars, and [-high] vowels cannot act as triggers of coronal palatalization, even though such cases are attested (see Kochetov 2011). However, it has to be noted that this is clearly reminiscent of the tendency first identified in Bhat (1978), whereby coronals are more readily palatalized by high vowels and velars are more likely to be affected by front vowels. Finally, velars with a secondary palatal articulation, i.e. [k^j, g^j], cannot be distinguished from palatal stops [c, ɟ] in this model, as both have to be represented as [+high, -back]. This in turn entails that velars are predicted to never undergo secondary palatalization, which is contrary to fact (Bateman 2007).

The treatment of place-changing palatalization in the SPE framework is also not uncomplicated, especially in cases where the process is accompanied by assibilation, as in /k/→[t͡ʃ]. The fact that non-retroflex vowels were specified as [-coronal] precluded the possibility of treating velar coronalization in the context of front vowels as strictly assimilatory. Assibilation could not be represented as assimilatory either, because all non-obstruents were non-strident. This necessitated additional mechanisms to capture place-changing palatalization. Let us illustrate the analysis with an example of First Velar Palatalization (also see Kochetov 2011 for the discussion and criticism of First Velar Palatalization in the SPE formalism).

First Velar Palatalization applied in South, East and West Slavic, turning velar consonants /k, g, x/ into alveopalatal stridents [t͡ʃ, d͡ʒ, ʃ] respectively before front vowels and a palatal glide /j/. In terms of changes of feature specifications, this process can be formalized as shown below (Chomsky & Halle 1968:422):

1.7

[-anterior] → [-back, +coronal, +delayed release, +strident]/_____[-cons, -back]

As Chomsky & Halle (1968:422) note, while the change from [+back] to [-back] is expected in this context and is clearly assimilatory, the change of other feature specifications mentioned in the rule cannot be due to assimilation. Instead, they argue, this structural change is a consequence of the application of so-called "marking conventions" - a universal set of statements that determine which feature values are marked and which are unmarked in a given context. Changes that result in unmarked feature specifications are less costly for the grammar: marking conventions apply automatically, and changes resulting in unmarked feature specifications therefore don´t need to be referred to in the rule. Marking conventions can be overruled – e.g. when a rule needs to assign a marked feature value - but this can only be done at an extra cost, as it will necessitate stating a rule that makes reference to more features. Consider two statements in 1.8, where (a) is a phonological rule, and (b) is a universal marking convention (Chomsky & Halle 1968:420):

1.8

a. X → [αF] / Y [Q, ___] Z
b. [uG] → [βG]/ [[αF, W, ____]

The rule in (a) and the marking convention in (b) are said to be "linked", as the rule in (a) creates the configuration that is the context for the marking convention in (b). The rule in (a) changes the specification of F in X to [αF], while the marking convention in (b) states that the unmarked value of some feature G will be [βG] in the context of [αF]. Thus, if the marking convention in (b) is not specifically blocked at an extra cost for the grammar (for instance, by specifying the structural change in (a) as [αF, -βG]), the change of X to [αF] will automatically entail the change of X to [βG] as well. Two or more marking conventions can also be linked successively, such that change of X to [βG] can trigger the marking convention that has [βG] as its context, and so on.

Turning back to the First Velar Palatalization, the idea is that once a velar plosive assimilates the [-back] specification of the following front vocoid, successively linked marking conventions – unless specifically blocked – will change other relevant feature specifications of the resulting [-back] segment to their unmarked values. Thus the First Velar Palatalization rule can be restated as follows (Chomsky & Halle 1968:423):

1.9 [-anterior] → [-back] /_________[-consonantal, -back]

The marking conventions that are relevant for First Velar Palatalization are listed below (Chomsky & Halle (1968:424)):

1.10

[u cor]	→	[+cor]	/ [____, -back, -ant]
[u del rel]	→	[+del rel]	/ [____, -ant, +cor]
[u strid]	→	[+strid]	/ [____, + del rel, +cor]

According to the universal marking conventions given in 1.10, the unmarked value of [±coronal] for [-back, -anterior] consonants is [+coronal]; unmarked [-anterior, +coronal] consonants, in turn, are [+delayed release], while unmarked

[+coronal, +delayed release] consonants are [+strident]. Thus the least costly result of velar fronting is an alveopalatal affricate rather than a palatal or palato-alveolar plosive.

To sum up, the analysis of palatalization advanced in SPE faced two major challenges: first, the proposed universal feature specifications were not sufficient to account for all attested patterns; second, additional formal mechanisms – marking conventions – had to be invoked to account for the full range of palatalization processes. As we will see shortly, a number of problems inherent in the SPE analysis persisted in later autosegmental treatments of palatalization.

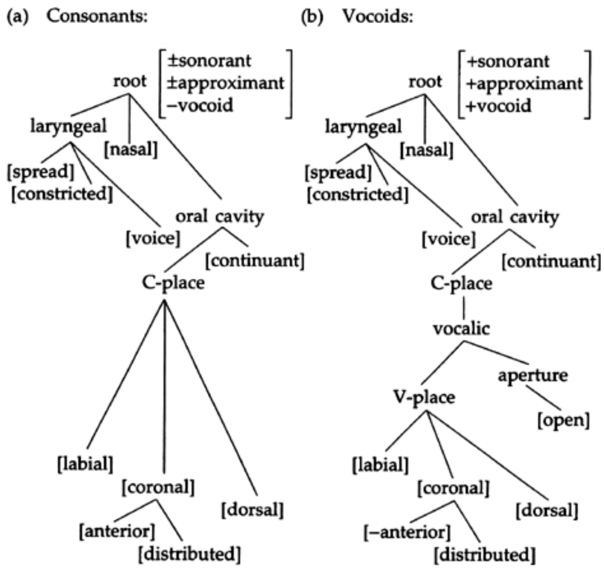
1.4.2 Autosegmental accounts

Cross-category interactions, and palatalization in particular, played a crucial role in informing theories of autosegmental representations as the main source of evidence for the constituency and affiliation of phonological features in the feature tree. However, the original ambition to develop a unified representational analysis capable of capturing all cross-linguistically attested palatalization patterns resulted in only limited success (see Kochetov 2011 for an overview). In the face of the broad typological variability of palatalization patterns, it proved impossible to both maintain the assumption of the universality of the feature tree, and keep the inventory of permissible operations restricted to autosegmental spreading and delinking. For this reason, the analyses adhering to the universality assumption had to invoke additional mechanisms, which obscured the assimilatory nature of palatalization and the relation between its component subprocesses, and even so did not always extend to all attested alternations. In what follows, I briefly outline two major proposals for the hierarchical organization of phonological representations and discuss the ways in which palatalization was analyzed in each of them.

1.4.2.1 Unified Feature Theory

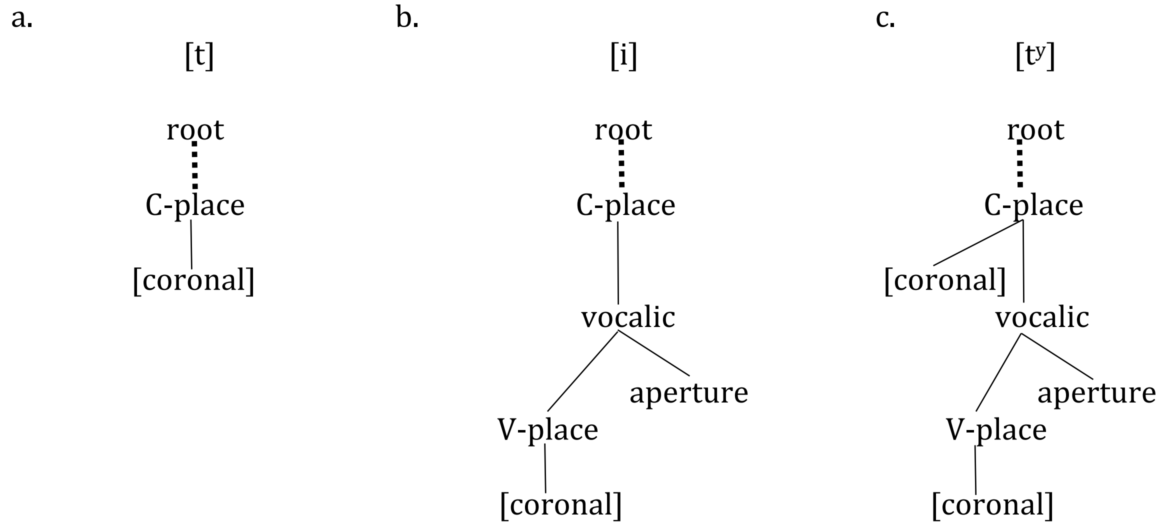
The analysis of palatalization couched within a family of theories that I term here Unified Feature Theories (UFT, Clements 1985, 1991a, Hume 1992, Clements & Hume 1995) departs from SPE not only in that it uses geometric representations, but also in terms of the features that it employs. Crucial to this model is the observation that front vowels and coronal consonants often pattern together in phonological processes. Based on such patterns, it was argued that the close affinity of front vowels and coronal consonants can be straightforwardly captured if these two classes of segments could share a feature that would define them as a natural class to the exclusion of other segments. Recall that in SPE such a representation was hardly possible: alveolar and post-alveolar consonants were characterized as [+coronal], while front vowels were specified as [-back]. Besides, all but retroflex vowels were also [-coronal]. Importantly, palatal consonants were also [-coronal] in SPE, which precluded the possibility that they would pattern with alveolar and post-alveolar consonants. In contrast, proponents of UFT argued that front vocoids, as well as dental, alveolar, postalveolar, retroflex, alveopalatal and palatal consonants all have a feature [coronal] in their representation (Clements 1991a, Hume 1992, Clements & Hume 1995). The definition of the feature [coronal] in UFT refers to the articulation "implemented by raising the tip, blade, and/or the front of the tongue" (Hume 1992:16).

1.11 Feature Geometry in UFT (from Clements & Hume 1995)



The crucial property of the tree in 1.11 is that the place of articulation of both consonants and vowels is characterized by the same set of unary features comprising [labial], [coronal] and [dorsal]. Another major innovation of UFT is segregation of consonant and vowel place features to separate nodes, termed C-place and V-place node respectively. The segregation of vowel and consonant features allows a straightforward representation of consonants with secondary articulation as having V-place features in addition to C-place features. Thus, for instance, palatalized consonants would have a [coronal] feature dominated by the V-place node in this model. This, in turn, predicts that plain/palatalized contrast should be attested in all consonants specified as [coronal], including palatals.

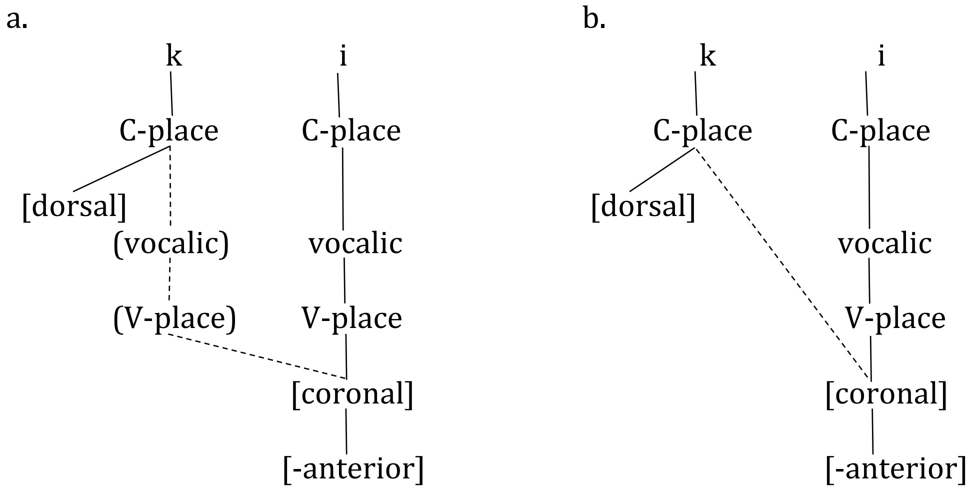
1.12 Coronal segments in UFT (Clements 1991a)



The configurations in 1.12 lead to two further predictions: first, that V-place features can spread across consonants, but C-place features cannot spread across vowels (Clements 1985); second, the fact that vowels and consonants share the same set of place features predicts the existence of *cross-category assimilations*, or cases where some (place) feature spreads from vocoids to consonants or vice versa (Clements 1991a).

Given that both coronal consonants and front vowels are specified for the feature [coronal], representation of secondary palatalization in UFT is straightforward. It can be captured as the assimilatory process by which the V-place [coronal] feature spreads from the front vowel to the adjacent consonant, as shown in (a) below:

1.13 Full and secondary palatalization in UFT (from Clements & Hume 1995:294-295)

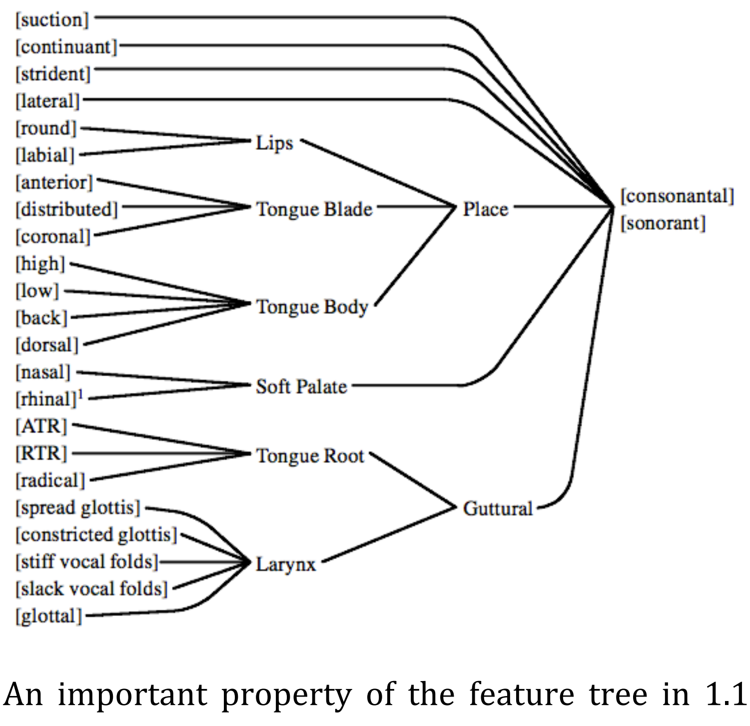


Full, or place changing, palatalization, is also represented as an assimilatory process, but its representation requires additional mechanisms. Analyses advocated in Hume (1992) proposes that in case of place-changing palatalization triggered by front vowels, the V-place-[coronal] feature of the trigger spreads directly to the C-place node of the target, as shown in 1.13b) (this configuration is referred to as cross-planar spreading). An alternative treatment of place-changing palatalization is proposed in e.g. Clements (1991a), Clements & Hume (1995): here, feature spreading is restricted to a given plane (as shown in 1.13a)), but may be optionally followed by *tier promotion*, by which the V-place feature is promoted to the C-place node, where it replaces the original place feature. Under this view, full palatalization involves two steps: feature spreading, and feature promotion. In turn, the representation of cases where the change of place resulting from the assimilation of V-place[coronal] is accompanied by the change of manner, was also somewhat problematic. For instance, Hume (1992:189) attributes the change in manner to "redundancy rule assignment determined on a language specific basis", which is reminiscent of the marking conventions of SPE.

1.4.2.2 (Revised) Articulator Theory

The major conceptual difference between this family of representational theories and the UFT theories considered in the preceding section is in the choice regarding the primary source of evidence for grouping phonological features into higher-level constituents. While Clements (1985) and much subsequent work elaborating his proposal explicitly stated that decisions regarding such grouping should be made solely based on the evidence from phonological processes and not on *a priori* assumptions about the architecture of the articulatory system, the (Revised) Articulatory Theory ((R)AT, Sagey 1986, Halle 1992a, 1995, Halle, Vaux & Wolfe 2000) followed a different path by allowing evidence outside the domain of phonology proper to have a say in determining the architecture of phonological representations.

1.14 Feature geometry in (R)AT (from Halle, Vaux & Wolfe 2000)

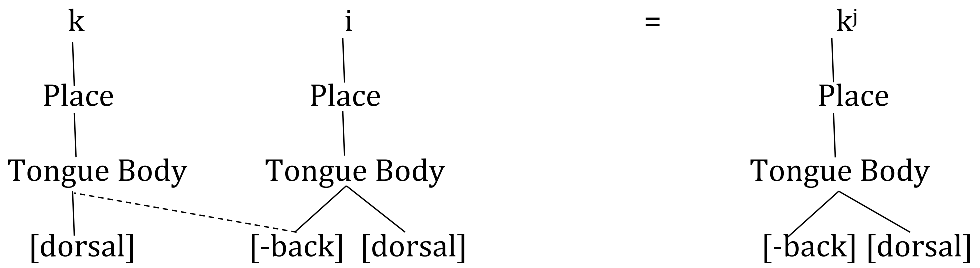


An important property of the feature tree in 1.14 is that it closely follows the anatomy of the vocal tract. Features are grouped into higher-level constituents in accordance with articulatory organs that are involved in the production of corresponding gestures. Articulators, in turn, are organized into higher-level constituents, Place and Guttural, based on their anatomical adjacency (Halle 1995, Halle, Vaux & Wolfe 2000).

In order to distinguish between primary and secondary articulations of consonants (the distinction captured by C-place and V-place nodes in UFT), (R)AT formally differentiates between major and minor articulator features (Halle 2003, Halle et al. 2000). Major articulator features are privative, and indicate the main active articulator implementing a sound. Thus, for consonants produced with a stricture formed by the tongue blade the major articulator is [coronal], and so on. Importantly, all vowels are [dorsal], because their production crucially involve the tongue body (Halle 2003). Minor articulator features, which are binary, indicate either a secondary articulation involved in the production of the sound, or the configuration of the major articulator. For instance, labialized velars are [dorsal, +round], while front vowels are [dorsal, -back].

Just as in previous approaches, the representation of secondary palatalization within this model is rather straightforward, and involves the spreading of [-back] from a vowel to a consonant, as shown below:

1.15



What is more problematic is the treatment of place-changing palatalization, by which velars surface as anterior or posterior coronals in the context of front vowels. Since both the target and the trigger in this case are specified as [dorsal], it is not immediately clear how a [coronal] segment can be the result of such interaction. Coronalization of vowels in the context of coronal consonants cannot be represented as spreading for the same reason. Halle et al. (2000:401), with a reference to Calabrese (1993), solve this problem by proposing a special set of rules that they dub "equivalency relations" (cf. marking conventions in Chomsky & Halle 1968). Thus, there is an equivalency relation between [dorsal, -back] vowels and [coronal] consonants, such that vowels that get a [coronal] feature as a result of assimilation are automatically re-written as [dorsal, -back]. Conversely, [dorsal, -back] consonants are converted to coronals. Notably, as Halle et al. (2000:401) point out, equivalency relations are not automatic. Were it the case, a configuration like the one in 1.15 would never be able to surface. Rather, as they put it, the adoption of equivalency rules is not obligatory, though "favored over adoption of other rules". It means, then, that in some sense full palatalization of velars is less costly for the grammar than secondary palatalization (despite the fact that the former involves two steps).

1.4.3 Constraint-based Accounts

The introduction of Optimality Theory (OT, Prince & Smolensky 1993) brought with it a focus on factorial typology, i.e. the idea that every possible permutation of universal markedness and faithfulness constraints must yield an attestable phonological grammar. Conversely, grammars judged as unattestable (which in practice usually meant unattested) must be impossible to express via constraint permutation. As a consequence, many constraint-based analyses of palatalization were constructed with an explicit goal to account for the findings of typological surveys (Rubach 2000, 2003, Chen 1996, Rose, 1997, Kurisu 2008, 2009, among others).

Thus, cross-linguistic regularities – including those independently explainable by acoustic/perceptual and articulatory factors - were taken by some to reflect the innate restrictions on the constraint set. For instance, the apparent absence of languages where labials undergo palatalization to the exclusion of consonants at other places of articulation (see e.g. Bateman 2007) has motivated proposals explaining the typological gap by the existence of a universally fixed ranking of markedness constraints as shown in 1.16 (Kurisu 2009:445, Rose 1997:48, Chen 1996:171).

1.16 Palatalizability Hierarchy (from Kurisu 2009:445, also Rose 1997)

$*Lab^j >> *Dors^j >> *Cor^j$

The universally fixed hierarchy in 1.16 captures the intuition that consonants at certain but not other primary places of articulation are inherently more compatible with, or susceptible to, palatalization (the asymmetry which is usually explained as motivated by various phonetic factors, see Kurisu 2009, Rose 1997 and the discussion in the previous section). It also reflects the implicational relationship between palatalization targets that is evident from a number of typological studies, namely that palatalization of labials implies palatalization of coronals and dorsals, while the languages where the reverse is true are as of yet unattested. Incorporating the fixed ranking as that in 1.16 in OT grammar renders languages where labials are palatalized to the exclusion of other places of articulation impossible: since markedness constraints that form a fixed hierarchy cannot be permuted, the insertion of a palatalization-inducing constraint (abbreviated here as PAL) may only yield one of the four scenarios illustrated below:

1.17 Factorial typology of palatalization (following Kurisu 2008, 2009)

a. $*Lab^j >> *Dors^j >> *Cor^j >>$ PAL - no palatalization
b. $*Lab^j >> *Dors^j >>$ PAL $>> *Cor^j$ – palatalization of coronals
c. $*Lab^j >>$ PAL $>> *Dors^j >> *Cor^j$ - palatalization of dorsals and coronals
d. PAL $>> *Lab^j >> *Dors^j >> *Cor^j$ – palatalization of labials, dorsals, and coronals

Thus, the factorial typology in 1.17 excludes three types of scenarios: one where only labials undergo palatalization, one where only labials and coronals do, to the exclusion of dorsals, and one where only dorsals palatalize to the exclusion of labials and coronals. The fixed constraint ranking as a formal device raises two immediate questions: first, it is a conceptual issue whether the explanation for cross-linguistic patterns should be hardwired in phonological computation (see Hale et al. 2007, Hale & Reiss 2008, also Chapter 2 for further discussion); second, it is a question of descriptive adequacy of implicational hierarchies such as that proposed in 1.16. Given that unattested does not equal unattestable, and that the number of languages that has so far been examined is a mere fraction of currently exisiting languages, which, in turn, is a small portion of possible languages, the empirical basis for the fixed hierarchy in 1.16 is rather limited. In fact, apparent counterexamples are to be found in a larger typological survey by Bateman (2007:44, 50), who found that two out of three "impossible" scenarios are, in fact, attested: first, dorsals do palatalize to the exclusion of other places of articulation; second, languages where labials and coronals undergo secondary palatalization to the exclusion of dorsals do exist.

The focus on factorial typology characteristic of many constraint-based analyses of palatalization sometimes meant the lack of attention to the phonological motivation of the process, which is most clearly seen in the formulation of the constraints that are proposed to account for palatalization. A case in point comes from Rubach (2000, 2003), who proposes a family of constraints, Palatalize-V, that demand that a consonant and the following vowel agree in backness, as defined in 1.18:

1.18 Palatalization constraints (Rubach 2000, 2003)

Palatalization-i (PAL-i): A consonant and a following high vowel agree in backness;
Palatalization-ɛ (PAL-ɛ): A consonant and a following mid vowel agree in backness;
Palatalization-æ (PAL-æ): A consonant and a following low vowel agree in backness;
Palatalization-j)$_{onset}$ (PAL-j)$_{onset}$: A consonant and a following tautosyllabic *j* agree in backness;

Arranged in a fixed ranking from PAL-j)$_{onset}$ to PAL-æ, the constraints in 1.18 capture the cross-linguistic implicational relation between palatalization triggers in 1.2a), i.e. that lower front vowels trigger palatalization in a given language only if higher ones do as well (Bateman, Chen 1973). However, the phonological motivation behind Palatalize constraints, as well their theoretical status, remains undiscussed, as does the formal connection between backness and height in vowels. Further, it remains unclear why backness agreement must be restricted to segments belonging to different major classes, and whether adjacency plays a role. Finally, directionality of the agreement is stipulated in the formulation of the constraint. On the assumption that ranked constraints defined in 1.18 are part of Universal Grammar, these questions are not at all trivial.

Another notable trend in OT-based analyses of palatalization (and assimilatory processes more generally) is the use of constraints explicitly demanding assimilation between the consonant and the following front vocoid. Examples include Kramer (2009), using PAL constraint defined as "dorsal segment has an additional link to the V-place-[coronal] of the following vocoid", as well as various accounts employing well-established constraints like AGREE [-back] (Gonzalez 2014), ALIGN[coronal] (Zubritskaya 1995), and SHARE (V-place-[coronal]) (Iosad 2012). While making it possible to account for the data at hand, the analyses using the constraints exemplified above run the risk of obscuring phonological motivations for the application of palatalization or, for that matter, other assimilatory processes (see also Uffmann 2005 for some discussion on this point). In contrast, in this dissertation I assume no constraints that directly enforce assimilation. Instead, I show that palatalization applies to satisfy high-ranking constraints penalizing certain marked structures and geometric configurations (cf. Uffmann 2005 on structural constraints, Iosad 2012 on constraint schemata in substance-free computation). As I hope to demonstrate in the following chapters, the analysis developed here is not only descriptively adequate in that it captures the palatalization processes in Latvian, but also has an explanatory value because it makes the motivation for such processes explicit.

1.5 Focus and organization of the dissertation

The goal of this dissertation is two-fold. First, it is to undertake a detailed investigation of a group of processes subsumed under the cover term "palatalization" in a single language – Modern Standard Latvian, with the view to demonstrate its interaction with other aspects of Latvian phonology and morphology. Second, it is to develop a representational and constraint-based analysis of Latvian palatalization that addresses the challenges encountered by previous approaches.

The rest of this dissertation is organized as follows. In Chapter 2, I introduce the main representational and computational assumptions that underlie the analysis developed in this work. The three core chapters – Chapters 3, 4 and 5 – are each structured around a distinct group of palatalization phenomena in Modern Standard Latvian. In Chapter 3, I consider four processes that can be characterized as classic cases of assimilatory palatalization, and namely yod-palatalization, velar affrication and velar palatalization in the context of front vocoids and vowel raising in the context of palatal/postalveolar consonants. Based on the evidence from these patterns, I argue for a feature specification of the Latvian segment inventory and then develop a representational analyses of the four processes couched within the Parallel Structures Model and the constraint-based analysis thereof in the framework of Stratal OT.

Chapter 4 examines the case of non-assimilatory palatalization triggered by the diminutive suffixes [-uk-] and [-el-]. Based on my fieldwork data supplemented by data from secondary sources, I argue that only a subset of palatalization patterns triggered by these suffixes may be construed as due to expressive palatalization, while there rest are explainable as non-surface-apparent assimilatory palatalization. Discussing instances of true expressive palatalization, I argue that these do not fall outside of the realm of phonological grammar, as has sometimes been proposed for similar cases, but indeed lend themselves to a phonological analysis. Thus, I show that palatalization patterns associated with these diminutive suffixes are triggered by the constraint that requires parsing of the floating geometric structure associated therewith.

Chapter 5 is dedicated to the analysis of palatal assimilation in consonantal clusters, which to date has been treated as entirely idiosyncratic in traditional accounts. I focus specifically on palatal assimilation in different types of word-medial sC clusters that exhibit three distinct patterns in palatalizing contexts: one group of clusters shows consistent palatalization of both component consonants, in another group, palatalization is consistently blocked, while in the third group palatalization blocking is optional. I argue that palatalization patterns in each of these cases are predictable from the syllabic status of the cluster in question, and provide a formal account of the alternations couched within Optimality Theory. Chapter 6 contains conclusions and directions for further research.

2 THEORETICAL ASSUMPTIONS

Despite the fact that the role of features as primitives of phonological representation is nearly undisputed in modern phonological literature, there is no universal agreement about their most basic characteristics. Controversial issues include the phonetic grounding of features, whether they are learned or innately present, their organization within a segment and their role in phonological computation. Before embarking on the analysis of phonological alternations, it is therefore essential to spell out the position adopted in this work with respect to the abovementioned issues.

2.1 Phonetics and phonology of features

In Chomsky & Halle´s foundational work *Sound Pattern of English* (SPE, Chomsky & Halle 1968), phonological features were seen as abstract representations[2] of a "set of phonetic properties that in principle can be controlled in speech" (e.g. the feature [coronal] represented the property of being "produced with the blade of the tongue raised from its neutral position") (Chomsky & Halle 1968:294-295). However, unlike phonetic properties themselves (which were seen as scalar, Chomsky & Halle 1968:164), phonological features were categorical and binary. Each binary feature exhaustively classified a set of segments in a given language, such that possessing the property represented by that feature meant belonging to one of the two categories defined by the feature ("+" category); not possessing the property meant belonging to the other, complementary category ("-" category). Crucially, in the SPE framework phonological features were seen as a part of UG, and the 'phonological feature ~ phonetic property' pairing was

[2] Although the terms "abstract" and "substance-free" are sometimes used interchangeably when referring to phonological features, in what follows they are not treated as synonymous. Unless otherwise indicated, in the present interpretation the term "abstract" reflects the view that phonological features are *mental representations* of physical events, and not the events themselves. On the other hand, the term "substance-free" reflects the view that phonological features "have no universally fixed phonetic content or correlates" (Blaho 2008:40).

conceived of as universal. Since SPE also assumed full specification, this meant that the phonological representation of segments in a given language could be straightforwardly inferred from their phonetic realization (and, conversely, identical feature bundles would receive identical phonetic interpretation in all languages).

In some of the subsequent research pursuing autosegmental phonology, and specifically Unified Feature Theory (UFT, Clements 1985, 1991 a, b, Hume 1992, Clements & Hume 1995), the close connection between phonological features and their phonetic interpretation was somewhat relaxed. Clements (1985:230) explicitly argued that "the justification for the categories and principles proposed for any linguistic level must be supported entirely by evidence pertaining to that level", and proposed that phonological evidence must be given primacy in determining the constituency and interpretation of features. Although phonological features were still defined through their phonetic correlates, Clements (1985) proposed that place features sharing the same labels (e.g. [coronal], [labial], [dorsal], etc.) could nevertheless be dominated by different class nodes in the feature tree. The phonetic interpretation of the feature (e.g. the degree of constriction necessary to realize it phonetically) was no longer exclusively dependent on the feature itself, but was also determined by its position in the hierarchy. For instance, when dominated by a C-place node, [coronal] was interpreted as designating the primary place of articulation in consonants, while when dominated by a V-place node the same feature was to be interpreted as designating a secondary palatal articulation. However, phonetic interpretation of phonological configurations was still seen as universally fixed, and so was the phonological representation of phonetic segments across languages.

Notably, a more abstract view of phonological features was not adopted by the proponents of the (Revised) Articulator Theory ((R)AT, Sagey 1986, Halle 1992a, 1995, Halle, Vaux & Wolfe 2000), who maintained that the organization of features in the feature tree should reflect the anatomy of the vocal tract. In contrast to UFT, in (R)AT primary and secondary articulations (i.e. consonantal and vocalic constrictions) were captured by different sets of features (e.g. [coronal] designating consonants formed by the front of the tongue, and [-back] for front vowels). However, in the attempt to account for the close affinity between coronal consonants and front vowels, Halle et al. (2000:401), with a reference to Calabrese (1993), proposed a set of rules termed "equivalency relations", by which consonants that got 'vocalic' [-back] specification as a result of feature spreading could be converted to [coronal]. Interestingly, equivalency relations were not seen as automatic, which opened up a possibility for identical phonological configurations to be treated differently in different languages. The presence of optional equivalency relations, therefore, may also be seen as a step away from the view that phonetic interpretation of phonological representations is universally fixed.

Despite the fact that the relationship between phonological representations of segments and their phonetic correlates was conceived of somewhat differently in SPE and early autosegmental models, phonetic naturalness of rewrite rules and autosegmental processes played a central role in both approaches. Importantly, the view that phonological features are phonetically grounded, i.e. have universally fixed phonetic correlates, does not necessarily entail that phonetic substance should play a role in phonological computation. A straightforward and universal mapping from phonological features to their phonetic realizations (and conversely) is also assumed in approaches explicitly embracing modularity of the phonological component. For instance, Hale et al. (2007) assume that phonological features are universal, i.e. specified as a part of UG. The mapping between a phonological feature and its articulatory and acoustic correlates – 'transduction' – is seen as deterministic, from which it follows that phonetic correlates of phonological features are universal. Although the differences in the physical instantiation of individual segments ("feature bundles") are predicted to occur, these are only expected to arise as a result of co-articulation effects and mutual influence of features, differences in physical characteristics of speakers and external forces that may influence speech production (e.g. air density). Nevertheless, Hale et al. (2007:4) state that in their view "features are simply symbolic, 'substance-free', primitives which are manipulated by the phonology" and are separated "from the physical substance". In this case, "substance-free" is apparently to be understood not as referring to the property of features themselves, i.e. not as the absence of the universally fixed "feature ~ substance" map, but as a reference to the fact that phonetic correlates of phonological features are irrelevant to phonological computation (Hale & Reiss 2008).

What the approaches outlined above have in common is that all of them assume that a phonetic realization of some segment may be straightforwardly converted into a feature bundle or a feature tree that is a phonological representation of that segment. Inherent in all these approaches is the idea that similarly sounding segments in different languages are phonologically identical, such that, e.g., [i] in Russian and [i] in Latvian share underlying representations. However, the idea that phonetically similar sounds are cross-linguistically phonologically comparable have been debated at least since Sapir (1925:47-48), who emphasized that phonological patterning of sounds in a given language need not reflect their phonetic similarity:

> "Naturally, there is no reason why the intuitive pattern alignment of sounds in a given language should not be identical with their natural phonetic arrangement and, one need hardly say, it is almost universally true that, e.g., [...] such stopped sounds as *p, t, k* form both a natural and a pattern group as opposed to the equally coherent group *b, d, g* (provided, of course, the language possesses these two series of stopped consonants). And yet it is most important to emphasize the fact, strange but indubitable, that a pattern alignment does not need to correspond exactly to the more obvious phonetic one. It is most certainly true that, however likely it is that at last analysis patternings of sounds are based on natural classifications, the pattern feeling, once established, may come to have a linguistic reality over and above, though perhaps never entirely at variance with, such classifications. "

More recently, this view has been advocated in a family of theories embracing feature underspecification, i.e. the idea that in a given language only those phonological features that are necessary to account for alternations and contrasts of that language are underlyingly present (see Archangeli 2011 and references therein for an overview of different proposals). Since languages differ in size and composition of their inventories as well as in the type and number of phonological alternations, underspecification theories predict that identical phonetic realizations may be mapped on distinct phonological configurations in different languages. However, it is important to keep in mind that in itself this does not entail the lack of a universally fixed phonetics ~ phonology map for *individual* features. For instance, Clements (2001:72), who argues that in a given language segments are specified only for those features that play a role in "distinguishing lexical items (distinctivity) or in defining regular phonotactic patterns and alternations", nevertheless assumes that the inventory of phonological features is universal, and that the features themselves are "discovered" by language learners based on the input data.

The approach advocated in this thesis takes a more decisive step towards divorcing phonological features from phonetic substance than the approaches outlined above. First, I assume that phonological representations are underspecified, such that only features necessary to encode phonological contrasts and capture phonological alternations and phonotactic patterns in a given language are present (Clements 2001, Odden 2006, 2011, Blaho 2008, Iosad 2012, Youssef 2013, among many others). However, in contrast to some other theories embracing underspecification (e.g. Active Feature Specification, Clements 2001), I postulate no universal set of phonological features encoded as a part of UG. Rather, I assume that phonological features are induced from input data in the course of language acquisition (Mielke 2008, Blaho 2008, Odden 2006, 2011, 2013, Iosad 2012, Youssef 2013). It follows that phonetic correlates of phonological features are not universally fixed, but must be determined on a language-specific basis (Blaho 2008, Odden 2006, 2011, 2013, Iosad 2012, Youssef 2013). Nevertheless, the mapping between phonological features and their phonetic correlates is still seen here as fixed within a given system, such that each individual phonological feature receives a consistent phonetic interpretation in a specific language (cf. Radically Substance Free Phonology, RSFP, Blaho 2008, Odden 2006, 2011). Importantly, however, the analysis developed here embraces the view that phonology is autonomous, in the sense that phonetic interpretation of features plays no role in phonological computation (Hale et al. 2007, Hale & Reiss 2008, Blaho 2008, Odden 2011, 2013, Iosad 2012, Youssef 2013, among many others).

2.2 Organization of features

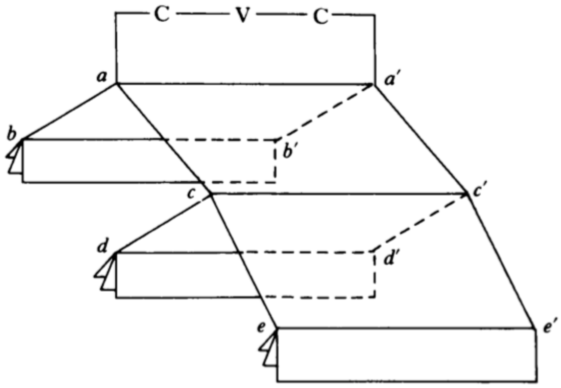
Just like there is no universal agreement about the relationship between the phonological primitives – features – and their phonetic realization, the organization of features within a segment is also a matter of ongoing debate. One school of thought, going back to SPE (Chomsky & Halle 1968) views phonological segments as discrete units characterized by an unordered set of properties – feature bundles. In contrast, the approach adopted here views phonological segments as complex structures, which are subcomposed of more primitive units – autosegments.

The inception of autosegmental phonology could be traced back at least to Cressey (1974), who observed that a formal device is needed to capture the fact that certain sets of features tend to recur in phonological processes, and these sets are non-arbitrary. However, SPE did not have a way to formally distinguish between plausible and implausible rules of equal complexity. Thus, for SPE the rule describing the assimilation of a set of place of articulation features would be as formally simple as the one referring to any arbitrary feature set (Chomsky & Halle 1968:428). To solve this problem, Cressey (1974:73) proposed an abbreviatory device, PA, as "a way to refer to all and only the point of articulation features using a single specification in a rule". With the abbreviatory device, the rules referring to PA features would become formally much more simple, and therefore could be distinguished from the formally complex "implausible rules" referring to arbitrary feature sets. Here it should be noted that Cressey´s abbreviatory device did not imply any kind of subsegmental constituency or entity-like behavior on the part of the phonological features. Features were still properties, but properties that could be classified into natural groups, which in turn could be referred to by a certain abbreviation.

The first argument for "entity-like" behavior of phonological features comes from Goldsmith´s work on tone (Goldsmith 1976a, b), where he observed that the model where an utterance is represented as a single string of segments characterized by feature columns cannot easily handle segments with sequentially ordered internal components, such as contour-toned short vowels. Thus Goldsmith (1976a, b) proposes that tonal features, rather than being the property of a vowel, form a tonal autosegment at another level, or tier, of representation. Tonal autosegments share all the characteristics of phonological segments in the sense of SPE (Chomsky & Halle 1968): namely, they are sequentially ordered atomic units possessing certain properties as reflected by binary feature specifications. In the view advocated in Goldsmith (1976a, b), then, phonological representation consists of (at least) two "parallel but co-equal rows" (Goldsmith 1981). The relationship between the tonal autosegment and the phonological autosegment (i.e. the tone-bearing unit), envisaged by Goldsmith (1976a, b) is that of temporal simultaneity between two entities, which is signaled by association lines connecting these entities. In the following years, autosegmental analysis was shown to be applicable to non-tonal phenomena, such as nasal harmony (Goldsmith 1976a, b), vowel harmony (Clements 1976) and preaspiration (Thrainsson 1978). Notably, Goldsmith (1981) goes back to Cressey´s (1974) proposal concerning using the abbreviatory device PA to refer to the group of point-of-articulation features, and suggests that it "would follow from a treatment of segmental phonology in which [...] the oral-gesture features actually formed an independent (autosegmental) tier or row".

A substantial body of work spanning two decades after the publication of SPE (Chomsky & Halle 1968) seemed to suggest that features must be organized in multi-tiered representations, with individual features and feature groups assigned to separate tiers. Most researchers embracing the autosegmental view of phonology seemed to agree that phonological representation has roughly the form of a branching hierarchy such as that in 2.1 and employs a set of primitives comprising features, class nodes, root nodes and association lines.

2.1 Hierarchical feature geometry (from Clements 1985)

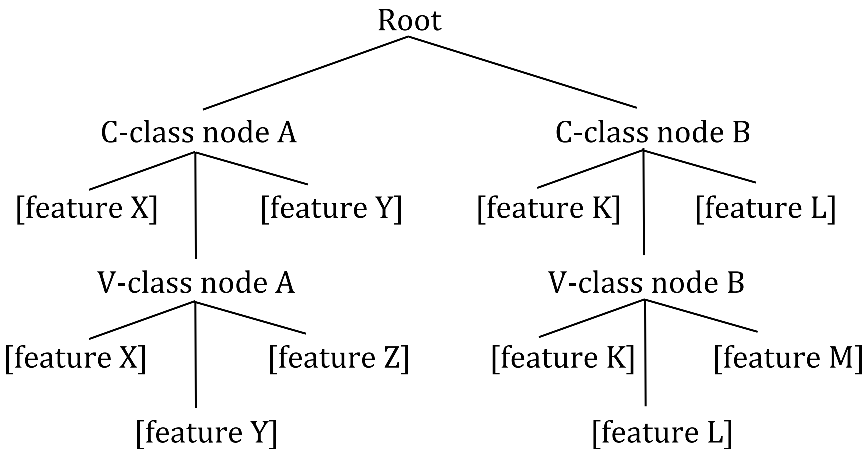


There was, however, a certain amount of disagreement concerning the content and number of phonological features, principles that should govern the organization of individual features into higher constituents, and, to some extent, operations that are permitted on different constituents of the feature tree. Representational choices made by the proponents of conflicting geometries were largely determined by what they considered to be the primary source of evidence for phonological structure. Thus, (R)AT (Sagey 1986, Halle 1995, Halle, Vaux & Wolfe 2000), maintained that the architecture of the feature tree should be constrained by the structure of the articulatory tract itself, in such a way that the grouping of terminal features into higher-level constituents would reflect which articulatory organs are involved in the production of corresponding articulatory gestures. Within this model, therefore, *phonetic plausibility* of proposed feature groupings is paramount. In contrast, UFT (Clements 1985, Hume 1992, Clements & Hume 1995) maintained that the evidence from cross-linguistic phonological patterning of individual features and feature sets should be primary in determining the structure of the feature tree. In UFT, then, the primacy is given to the *functional plausibility* of the proposed feature grouping. Further differences in detail between (R)AT and UFT are oftentimes a direct consequence of this initial – *conceptual* – choice. What proponents of the two theories agree on is that the grouping of features in the feature tree, however it was motivated, should be able to account for the cross-linguistic phonological patterning of features and feature sets.

The Parallel Structures Model adopted in this thesis builds on insights of earlier representational theories, while at the same time being different in a number of crucial respects (PSM, Morén 2003, 2006, 2007, Iosad 2012, Youssef 2013). Like UFT, PSM adopts an autonomy view of phonology and therefore maintains that featural and structural composition of phonological segments should be determined solely on the basis of the phonological patterning that these segments exhibit (cf. Clements 1985). However, while UFT uses *cross-linguistic* evidence from phonological processes in the attempt to uncover the structure of the *universal* feature tree, PSM focuses on phonological evidence from *individual* languages to arrive at *language-specific* geometric representations. This results in descriptively adequate, parsimonious and formally simple structures, which reflect the interrelation of phonological processes within a given language.

In PSM, just like in (R)AT and UFT, the phonological representation of a segment has the form of a branching hierarchy. Within this hierarchy, three classes of constituents are distinguished: root node, class nodes and individual features. Constituents of different types occupy different autosegmental tiers:

2.2 PSM geometry (from Iosad 2012:34)

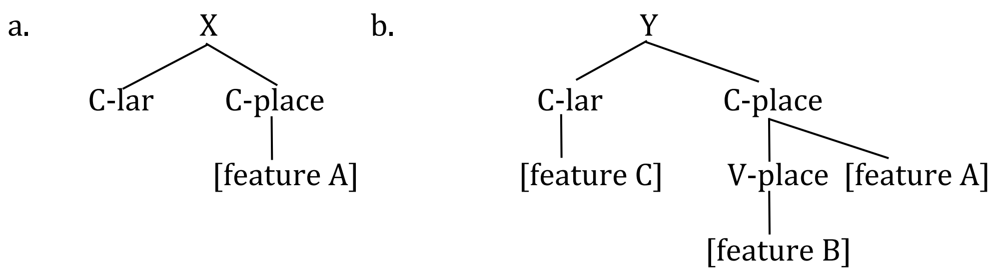


Structurally, constituents in the feature tree differ in whether or not they are terminal and in whether or not they can be recursive, i.e. dominate a constituent of the same type (cf. Clements 1991a). Individual features are always terminal and cannot dominate other features or nodes (unlike in UFT and earlier versions of AT). In PSM, all features are organized under class nodes, which implies that all features are subject to the same conditions on spreading. This is in contrast with AT and UFT, both of which allowed certain features to either link directly to the root node or to be contained within the root node itself (Sagey 1986, McCarthy 1988, Halle 1992a, 1995, Clements & Hume 1995, Halle, Vaux & Wolfe 2000)[3]. Class nodes are non-terminal in the original proposal (i.e. required to dominate features, Morén 2003), but the version of PSM adopted here also allows bare class nodes (see Blaho 2008, Krämer 2006, 2009, Iosad 2012). Class nodes in PSM may be recursive. Those class nodes that are not dominated by any other class nodes are labeled C-class nodes (C-place, C-manner, etc.), while class nodes that are

[3] The place within the root node was reserved for major class features such as [sonorant] and [consonantal], and the main motivation for such a configuration was the fact that the major class features do not assimilate or delete except in a process that affects the whole segment, as in total assimilation and deletion (McCarthy 1988). In PSM, there are no features that encode major classes. Where there is evidence for it, class-like behavior of e.g. obstruents may be captured by any shared feature or node.

dominated by one class node of the same type are labeled V-class nodes. The number of levels of recursion is not formally restricted, but only one is typically used (Iosad 2012). Typical PSM structures are illustrated in 2.3a, b), where a phonological segment in (a) may be a voiceless obstruent of some place [A], while segment in (b) may be its voiced counterpart that has an additional secondary articulation [B].

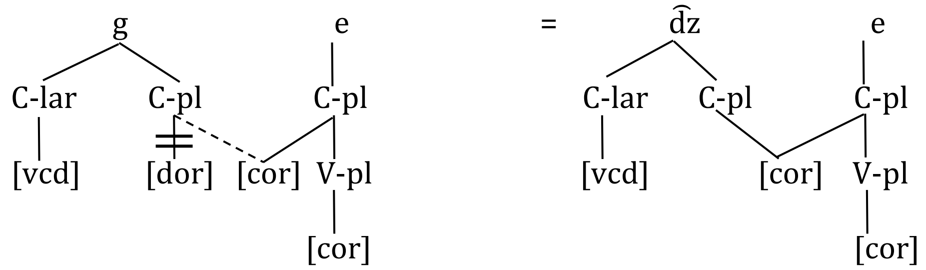
2.3



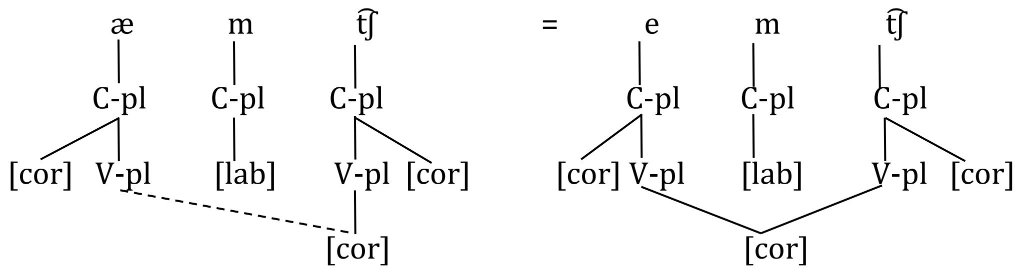
Unlike in classic geometric models, in PSM class nodes and features are assumed to be abstract entities that lack phonetic substance. In practice, however, the labels used for the nodes often refer to phonetic categories such as Place or Manner (Iosad 2012, Youssef 2013). The same applies to terminal feature labels, which in practice are often formulated in articulatory terms, e.g. [coronal], [open], [voiced]. Building on the insights of UFT (Clements 1991, Clements & Hume 1995), PSM assumes that the underlying structures of vowels and consonants are completely parallel, and identical sets of privative features are available for both. Class-node affiliation of a specific phonological feature is determined solely on the basis of the phonological behavior of that feature in a specific language. Unlike UFT, where C-class node, for instance, was reserved for consonantal features, PSM places no such restrictions on feature affiliation. Rather, C- and V- are used as mere labels to refer to the position of the feature in the hierarchical structure. The model, therefore, predicts that consonants and vowels should be able to interact directly, and allows capturing such interaction as feature spreading, illustrated in 2.4.

2.4

a.



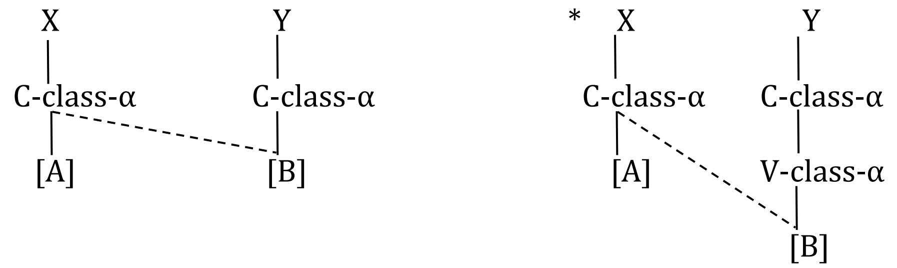
b.



In this thesis, I assume that the set of phonological operations is restricted to autosegmental spreading and delinking. Although additional operations, such as tier-promotion (i.e. feature re-association from a V-class node to a C-class node, Clements & Hume 1995), are sometimes employed in analyses using PSM (Iosad 2012), I show in subsequent chapters that no such mechanisms are necessary to account for the Latvian data. Further, I assume that spreading is always restricted to a given plane, such that V-class features may only spread to V-class nodes, and C-class features may only spread to C-class nodes (2.5a), while cross-planar spreading, i.e. direct spreading of features from the V-class node of one segment to the C-class node of another, is disallowed (2.6b) (see Hume 1992 on cross-planar spreading, cf. Youssef 2013 on cross-planar spreading in PSM).

2.5

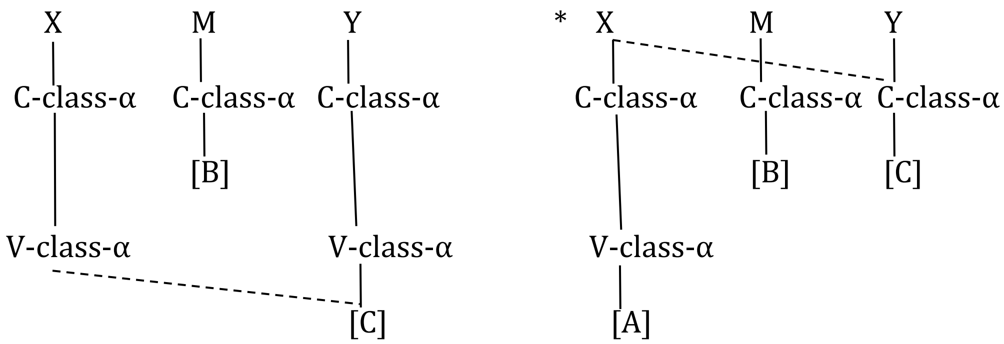
a. b.



In spreading, crossing of association lines is forbidden (Line Crossing Prohibition, see Goldsmith 1976a), as is skipping anchors. As in other autosegmental models, locality is defined on each tier. This predicts that the processes involving V-class features are more likely to operate long-distance than those involving C-class features – because segments specified for V-class nodes are a subset of segments specified for C-class nodes (first proposed by Clements 1991b to account for the asymmetries in spreading between consonantal and vocalic features).

2.6

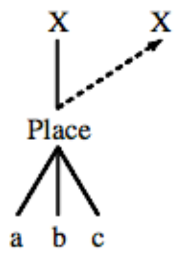
a. b.



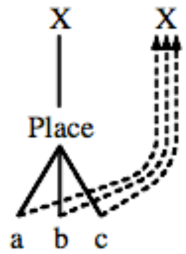
All and only the constituents in the hierarchical structure may spread and delink. In the version of PSM adopted here, several features or class nodes may spread or delink together only if they are exhaustively dominated by some superordinate class node, in which case the process affects the class node, and not individual features (see also Clements 1985, 1991, Clements & Hume 1995 on processes affecting multiple features in UFT). This view contrasts with the formalization of spreading in (R)AT (Halle 1995, Halle, Vaux & Wolfe 2000) and some other versions of PSM (e.g. Youssef 2013), where multiple terminal features may spread individually in the same process. This distinction is illustrated in (2.7 a, b):

2.7 Multiple feature spreading (from Halle, Vaux & Wolfe 2000)

a.

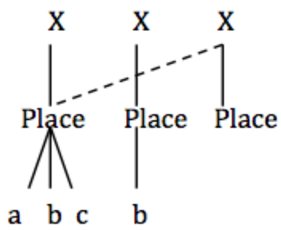


b.

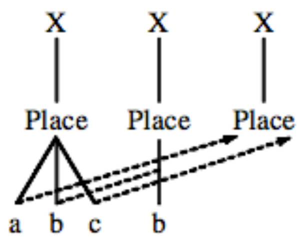


2.8 Spreading across intervening features (from Halle 1995)

a.



b.



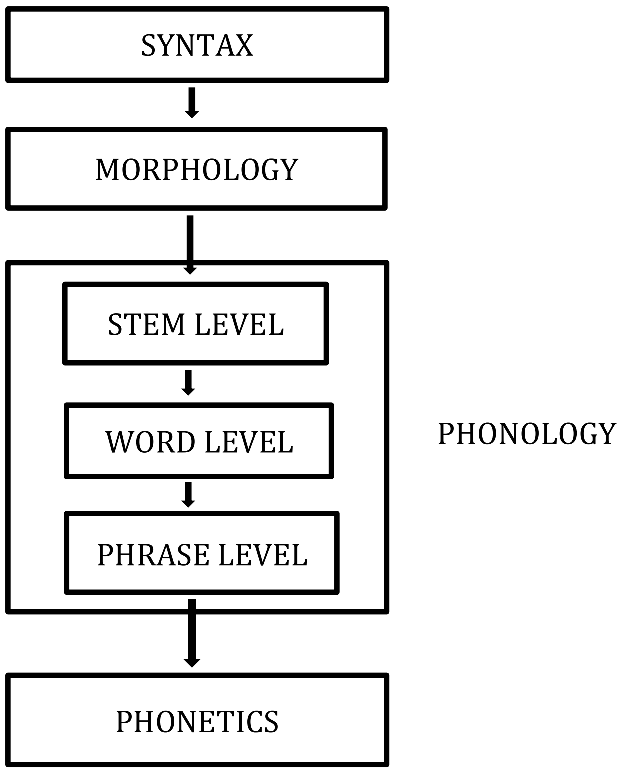
In the most general case, limiting spreading to terminal features as in (R)AT constitutes a mere notational variant of class-node spreading assumed in UFT and here. There are, however, instances where the choice of the spreading constituent crucially determines the expected outcome of the phonological process (Halle 1995, Sagey 1987, Halle, Vaux & Wolfe 2000). The UFT approach predicts that spreading of a class node dominating some features [a, b, c] should be impossible over an intervening class node on the same tier (by the line-crossing prohibition), regardless of what features the intervening node is specified for (this situation is known as "sour grapes spreading", Padgett 1995). (R)AT, on the other hand, states that since spreading affects terminal features only, all of them residing on separate tiers, if feature spreading is blocked on one tier, this does not affect spreading on other tiers (as shown in (2.8 a, b)). Whether partial spreading should be allowed is largely an empirical question that depends on the existence of processes that can be shown to behave as in (2.8b). Since the Latvian data presented in this dissertation do not bear on this issue, I adopt a more restrictive model where only constituents may spread.

2.3 Modularity of phonology

The analysis developed in this thesis crucially presupposes modularity of the language faculty. Modularity refers to the idea that perceptual systems, including the language faculty, are organized in a series of modules – genetically determined and autonomous computational sub-systems - which mediate between the physical perceptual stimuli and central cognitive systems (Fodor 1983). Fodor (1983, *Part III*) identifies a (non-exhaustive) set of nine characteristics that modules possess: (a) modules are *domain-specific*, which means that the range of information that can be accessed and manipulated by a module is unique to that module; (b) operation of modules is *mandatory*, i.e. module-specific computation is performed whenever the information over which such computation may be performed is accessible to the module; (c) there is *limited central access* to the mental representations that modules compute, so that "only such representations as constitute the final consequences of input processing are fully and freely available to the cognitive processes" (Fodor 1983:56); (d) modules are *fast* in their operation; (e) modules are *informationally encapsulated*, in the sense that a module only operates on the information that is contained in the input to that module and within the module itself, while external information is not taken into account; (f) modules have *shallow outputs*, in the sense that the information on the intervening operations that gave rise to that output is not present in the output (Elsabbagh & Karmiloff-Smith 2004); (g) modules are associated with a *fixed neural architecture*; (h) modules exhibit *characteristic and specific breakdown* patterns; (i) modules exhibit *characteristic developmental pace and sequencing*.

The faculty of language, then, is seen as organized in a set of connected but autonomous modules. The central assumption that underlies this work is that phonology and phonetics are two distinct and independent components of the language faculty, and therefore the extent and nature of their interaction is constrained by the above principles (Hale et al. 2007, Morén 2007, Hale & Reiss 2008, Iosad 2012, Youssef 2013, Odden 2013). The basic architecture of modular feedforward grammar is schematically illustrated below, incorporating the stratified model of the phonological component (from Bermúdez-Otero 2014:5, references therein):

2.9



The two properties of modules that are of crucial relevance for the conception of phonology adopted here are domain-specificity and informational encapsulation. In case of modular phonology, domain-specificity entails that the input to phonological computation and its output is encoded using a "representational alphabet" that is unique to the phonological module. That is to say, the objects that phonology manipulates are abstract features, nodes and association lines (or other phonological primitives admitted by the theory of representations one adopts), and not articulatory gestures or acoustic cues that fall under the realm of phonetics. In order to be processed in the phonetics module, therefore, phonological representations need to be translated into symbols that are interpretable by phonetics. The conversion between the representational alphabets employed by different computational modules is performed by transducers, mechanisms that preserve the informational content of their input, altering only the format in which this information is encoded (Fodor 1983:41, Hale et al. 2007:3). How straightforward this mapping from phonology to phonetics is depends on the theory of representations that is adopted. In theories that postulate a universally fixed correspondence between abstract phonological features and the physical events that they represent – e.g. SPE – such conversion is (nearly) automatic (see also the discussion in Iosad 2012:11-12). Theories that assume that such correspondence is learned and language-specific – like the Parallel Structures Model adopted here - require a more elaborate theory of the phonology-phonetics interface and the phonetics module itself (perhaps akin to the one envisaged by Chen 1996).

Further, it is assumed here that phonology is free of functional biases; i.e. typological regularities and markedness scales that are independently explainable by the structure of the human articulatory and perceptual systems do not reflect universal restrictions on the organization of the phonological module or any of its components (Hale et al. 2007, Hale & Reiss 2008, Odden 2013). This point is especially crucial here, given that constraint-based analyses of palatalization frequently declare that their goal is to capture cross-linguistic tendencies (e.g. Rubach 2003, Bateman 2007), while their failure to do so is often regarded as a weakness (Kochetov 2011).

Let us briefly consider a specific example illustrating the redundancy of functional biases in phonological computation. It was first discovered in a typological study by Chen (1973) and later confirmed by Bateman (2007) that the ability of lower front vowels to trigger palatalization in a given language entails that higher front vowels will act as triggers of the process as well. In order to account for this implicational relationship, Rubach (2003:215-216) proposed that the relative ranking of the constraints enforcing palatalization in a certain vocalic context (defined in 2.10) is universally fixed, as illustrated in 2.11:

2.10 PALATALIZATION-i (PAL-i) – a consonant and a following high vowel agree in backness

2.11 PAL-i >> PAL- ɛ >> PAL-æ

Given the universally fixed constraint hierarchy in 2.11 encoded in the constraint component, a language where [i] and [æ] act as triggers of palatalization while [ɛ] does not cannot be modeled in OT. In other words, a language that works this way is predicted to be *impossible*. In this case, a generalization over the behavior of phonetic substance is taken as a motivation for a formal restriction on one of the components of the phonological module.

However, an alternative explanation for the observed cross-linguistic pattern is not difficult to find. For instance, Guion (1998:30) have experimentally shown that "the acoustic similarity between velars and palatoalveolars is greater before high front vowels than before mid and low front vowels", which means that acoustic cues to the velar ~ palatoalveolar place contrast are weaker the higher the following front vowel is. It is reasonable to expect that phonetic facts like this one play a role in language learning: that is to say, if a contrast is analyzed correctly in a context where its acoustic cues are weaker, it will also be analyzed correctly in a context where its acoustic cues are stronger (Hale & Reiss 2008:166). Given this state of affairs, the implicational hierarchy identified by Chen (1973) and Bateman (2007) is sufficiently explained by general theory-external principles, and therefore it is redundant to formally encode it in the phonological component by means of a fixed universal constraint ranking.

2.4 The architecture of the phonological module

The constraint-based analysis developed here is couched within Optimality Theory (Prince & Smolensky 1993/2004). OT postulates that the phonological module has three components: generator function (GEN), constraint set (CON) and evaluator function (EVAL). For each input supplied by the morphosyntactic component, GEN creates a potentially infinite set of output candidates by freely applying phonological operations to the input string. The resultant set of input-output mappings is evaluated by EVAL against the set of ranked constraints contained in the CON component. Constraints have the form of statements expressing conflicting well-formedness requirements. Constraints are ordered in a strict dominance hierarchy, and satisfaction of higher-ranked constraints is prioritized. The input-output pair that incurs the least number of violations on the higher-ranked constraints is chosen as an optimal output of the evaluation.

In this work, I also adopt a stratal-cyclic model of phonological computation, Stratal OT, developed in Bermúdez-Otero (2007, 2011, 2012). Under this approach, phonology and morphology interact cyclically, such that phonological computation applies iteratively over progressively larger constituents created in the morphosyntactic component. Constituents of different types are subject to evaluation at different phonological levels, or strata. Each stratum is characterized by a separate ranked constraint set, and constraint rankings may differ across strata in a given language. As a result, different morphosyntactic constituents may be subject to different phonological processes. Three strata are typically recognized: stem-level, word-level and phrase-level. Complete utterances are subject to evaluation at the phrase-level, while fully inflected words trigger a word-level cycle. Constituents created by root-to-stem and stem-to-stem derivation are evaluated by the stem-level phonology (Bermúdez-Otero 2011:6).

Although in principle the architecture of the phonological component envisaged in OT is compatible with any theory of representations, the adoption of a specific one – in this case, the Parallel Structures Model - has a range of non-trivial consequences for the implementation of the phonological computation that have to be addressed. One of the cornerstones of classic OT is its commitment to the Richness of the Base, the principle that states that there are no universal or language-specific restrictions on the GEN component. At first glance, the Richness of the Base is inconsistent with an elaborate theory of sub-segmental representations; as we have seen above, the latter presupposes a set of very specific criteria on the structures that can be generated. This property of GEN was extensively discussed by the proponents of feature geometry (Uffmann 2005, 2007, Morén 2007, Youssef 2013, Iosad 2012). As pointed out in Uffmann (2005, 2007), unrestricted as GEN might be, there should still be a way to ensure that the candidates that it generates are valid linguistic objects. In turn, the answer to the question of what constitutes a licit linguistic object necessitates a theory of representations. At the very minimum, one needs to specify the set of phonological primitives, the relations that they can enter into, and the operations that can be performed on them. While this is usually taken for granted, the point is that *some* theory of representations is implicit even in the approaches that are claimed to be anti-representational.

Just how elaborate representations are is largely an empirical question. The arguments that led to the advancement of autosegmental approaches (class behavior of features, feature-anchor independence, asymmetries in spreading and blocking, and so on) still hold in the age of OT, and it is yet to be shown whether and how these patterns can be accounted for without hierarchical sub-segmental structures. Besides, as Uffmann (2005, 2007) notes, the articulated theory of representations leads to the simplification of CON as it obviates the need for constraints explicitly ruling out illicit configurations. Following previous research (Uffmann 2005, 2007, Morén 2007, Youssef 2013, Iosad 2012), I assume that GEN is constrained by the well-formedness conditions imposed by feature geometry in such a way that phonological operations applied to the input string never result in illicit geometric structures.

Another question that has to be addressed is the nature of phonological constraints that form the CON component. Originally, the constraint set was assumed to be universal and innate, and differences between languages were seen as resulting from language-specific constraint rankings. The innateness assumption cannot be upheld given a theory of representations maintaining that the set of phonological features is emergent and language-specific. Because phonological constraints refer to phonological features, the non-universality of the latter presupposes the non-universality of the former (Youssef 2013, Iosad 2012, Morén 2006). Phonological constraints, then, are seen here as emergent and language-specific, and are, just like phonological representations, constructed in the process of language acquisition. Following the proposal put forward in Blaho (2008:41), I assume that language-specific constraints are based on universal constraint templates, which are primitives supplied by UG (see also Hale & Reiss 2008:176). These universally available templates are filled in with language-specific phonological features when these are acquired, e.g. the *[ ] template gives rise to the constraints *[cor], *[open], and so on. Just as we need a theory of representation that would define what constitutes a licit phonological object, the theory of constraints is necessary to define what constitutes a valid constraint, i.e. a valid constraint template. This point is emphasized in Morén (2007), who calls for a research program to develop a comprehensive Theory of Constraints that would provide criteria for the constraint well-formedness. In this thesis I restrict myself to well-established basic markedness and faithfulness constraint families, whose formulations are adjusted to incorporate the hierarchical view of sub-segmental representations.

2.5 Summary

In this chapter I have presented the main theoretical assumptions that underlie this work and form the analytical foundation of the following chapters. To recapitulate, phonological representations are underspecified and only contain features needed to encode phonological contrasts and capture phonological alternations and phonotactic patterns in a given language. Phonological features are not universally present as a part of UG, but are rather induced from the input data in the course of language acquisition. Phonological features are hierarchically organized within a segment in accordance with the universal organization principles as envisaged by the Parallel Structures Model, although the set of such structures that constitutes a segment inventory of a given language is strictly language-specific. Mapping between phonological features and their phonetic correlates is language-specific as well, although it is fixed within each given language. Phonological computation is autonomous from phonetic considerations, and does not make reference to phonetic correlates of phonological features. Cross-linguistically observed regularities fall outside of the explanatory domain of phonology insofar as such regularities are independently explained by acoustic/articulatory/perceptual factors (Odden 2013, Hale et al. 2007, Hale & Reiss 2008).

3 ASSIMILATORY PALATALIZATION

3.1 Introduction

The empirical focus of this chapter is on four assimilatory processes in Modern Standard Latvian that fall under the broad definition of palatalization (Bhat 1978): 1) yod-palatalization, which produces alternations of the type /t/ → [ʃ] in the context of palatal fricatives; 2) velar affrication and 3) velar palatalization, which cause changes of the type /k/ → [t͡s] and /k/ → [c] in the context of front vowels; and 4) front vowel raising, by which front low vowel /æ/ surfaces as [e] when followed by front-non-low vocoids and palatal/postalveolar consonants. The rest of this chapter is organized as follows. In Section 3.2 I introduce the segmental inventory of Latvian. Section 3.3 introduces the four palatalization patterns. Taking these patterns as the point of departure, I establish the feature specifications for the Latvian segment inventory in Section 3.4 and provide a unified representational analysis of these processes couched within the Parallel Structures Model. In Section 3.5, I discuss the phonological motivation for each of the patterns and develop a constraint-based analysis thereof within the framework of Optimality Theory. Section 3.6 summarizes the discussion.

3.2 Segmental inventory of Modern Standard Latvian

Latvian has a symmetrical system of 6 vowel phonemes, as shown in 3.1. Vowel length is contrastive in the language, and each vowel has a short and a long version (Laua 1997, Muižniece 2002, Markus & Grigorjevs 2003). In addition, Latvian is traditionally described as having 10 phonemic diphthongs: /ɑi̯/, /ɑu̯/,

/ei̯/, /i̯e/, /u̯o/, /iu̯/, /ui̯/, /eu̯/, /ɔu̯/, /ɔi̯/. Of these, /ui̯/, /eu̯/, /ɔu̯/, /ɔi̯/ are mostly attested in borrowings (NAGL 2015:45)[4].

3.1

	Front	Back
High	i iː	u uː
Mid	e eː	ɔ ɔː
Low	æ æː	ɑ ɑː

The inventory of consonant phonemes of Modern Standard Latvian comprises 26 segments, and distinguishes four places of articulation (labial, dental/alveolar, postalveolar/palatal, and velar). Traditionally, within the set of anterior coronals, a distinction is made between the dentals and alveolars, such that only liquids are classified as the latter. In the set of posterior coronals, postalveolars and palatals are distinguished, the former set including the sibilants (cf. Laua 1997, Muižniece 2002, Markus & Grigorjevs 2003). These distinctions are ignored here, because – as I will show in the following sections - they are not phonologically relevant (note also that manner classes are complementary within the dental and alveolar series, and within the postalveolar and palatal series).

3.2

	Labial	Dental/Alveolar	Postalveolar/palatal	Velar
Plosive	p b	t d	c ɟ	k g
Fricative	f	s z	ʃ ʒ	x
Affricate		t͡s d͡z	t͡ʃ d͡ʒ	
Nasal	m	n	ɲ	
Approximant			j	
Lateral		l	ʎ	
Trill		r	(r^j)	

Dental/alveolar and postalveolar/palatal series are almost perfectly symmetrical with respect to manner of articulation. The palatal stops [c, ɟ] and the palatal sonorants [ɲ, ʎ] are true palatals, and not palatalized counterparts of the corresponding dentals/alveolars (Laua 1997). The palatalized rhotic [r^j] is the only segment in the language that has a secondary articulation. However, its

[4] Here and further, the abbreviation "NAGL" shall refer to the New Academic Grammar of Latvian, Auziņa et al. (2015).

status in Modern Standard Latvian is somewhat marginal, with few speakers still producing the contrast between plain and palatalized rhotics (Laua 1997). While palatal stops /c, ɟ/ tend to occur before front vowels (although not exclusively), the distribution of other postalveolar/palatal phonemes is not restricted to palatalizing contexts.

All obstruent phonemes come in voiced/voiceless pairs, except for the velar fricative /x/ and a labial fricative /f/ that lack voiced counterparts. Both segments have a very limited distribution in the language, and are only attested in borrowings. Traditional descriptions also typically mention the voiced fricatives /v, ʝ/ as having phonemic status in the language (NAGL 2015:57, Laua 1997:32, 63). Here, however, these are treated as positional variants of the underlying high vocoids. Given that high vocoids are crucially implicated in palatalization, this move deserves some further discussion.

It is a well-described fact that in Latvian, the vowels [i, u] stand in complementary distribution with the glides [j, ʋ] and the fricatives [ʝ, v], such that the fricatives [ʝ, v] appear before vowels, the glides [j, ʋ] surface between a long vowel/diphthong and a consonant, and the vowels [i, u] surface elsewhere (this generalization is made in Laua 1997:81-82)[5]. The relevant data are illustrated in 3.3:

3.3

a.			c.	
[tɑu̯-s][6]	'yours, Nom.sg.'	cf.	[tɑ.v-ɑ]	'yours, Gen. sg.'
[lɑi̯-s]	'layman, Nom. sg.'	cf.	[lɑ.ʝ-ɑ]	'layman, Gen. sg.'
b.			d.	
[te:ʋ-s]	'father, Nom. sg.'	cf.	[te:.v-ɑ]	'father, Gen. sg.'
[klɑ:j-s]	'deck, Nom. sg.'	cf.	[klɑ:.ʝ-ɑ]	'deck, Gen. sg.'

[5] One has to be aware of the very misleading discrepancy between Latvian traditional transcription conventions and IPA. The symbol [j] in traditional transcription refers to a palatal fricative, while the palatal glide is transcribed as [i̯], "a non-syllabic vowel". The IPA symbol for a palatal fricative, [ʝ], is not used in the traditional transcription.

[6] Laua (1997:81) notes another transcription convention that she herself calls "misleading": in words where [v, ʝ] are preceded by short vowels, their vocoid alternants are traditionally transcribed as [i̯], [u̯], as in [tɑu̯-s], instead of the expected [i], [u]. Here and further, I follow Laua (1997) in that I regard [i, u] occuring after short vowels preconsonantally as true vowels, and not glides.

Laua (1997:81) describes this process as vocalization, which indicates that for her all the forms given in 3.3 contain underlying voiced fricatives /v, ʝ/. The inventory of Latvian consonantal phonemes that she gives (Laua 1997:63) includes the voiced fricatives /v, ʝ/, but not glides /ʋ, j/ (or, in her own terms, "non-syllabic vowels"). High vowels /i, u/, on the other hand, are considered as separate phonemes (Laua 1997:12).

There is, however, convincing evidence pointing to the fact that surface the fricatives [v, ʝ] are underlying vocoids: both these segments fail to participate in the otherwise exceptionless process of regressive voicing assimilation, and may surface in heterovoiced obstruent clusters (this is discussed in some detail in Steinbergs (1977:7-9) for [v], but generalizes to [ʝ] as well). As shown in 3.4, surface fricatives [ʝ, v] pattern with sonorants, and not with obstruents, with respect to voicing assimilation:

3.4

a.					
[ɑt-.ves-t]	*[ɑd-.ves-t]	'to bring'	cf.	[ɑd-.gu:t]	'to recover'
[ɑp-.vilk-t]	*[ɑb-.vilk-t]	'to encircle'	cf.	[ɑb-.dek-t]	'to get burned'
b.					
[ɑt-.ʝu:k-t]	*[ɑd-.ʝu:k-t]	'to unharness'	cf.	[ɑt-.mes-t]	'to throw away'
[ɑp-.ʝa:-t]	*[ɑb-.ʝa:-t]	'to ride in'	cf.	[ɑp-.lik-t]	'to cover'

In the face of the data in 3.4, it seems motivated to posit underlying vocoids for surface fricatives [v, ʝ]. For Steinbergs, for instance, the surface fricative [v] derives from the underlying glide /ʋ/ by the prevocalic strengthening rule[7] (Steinbergs 1977:7-9). She does not, however, mention the alternation between fricatives and vowels, as in the forms in 3.3a).

It seems that the generalization over the data in 3.3 can be stated in a more satisfactory way if one makes reference to syllable structure rather than linear

[7] Note that Steinbergs (1977:153) explicitly states that the palatal glide [j] also surfaces as such prevocalically, i.e. she does not mention the existence of the palatal fricative [ʝ]. Consequently, she does not discuss the fricative~glide alternation for palatals, but only that between [v] and [ʋ]. I´m inclined to attribute it to the misleading discrepancy in transcription conventions, see also Footnote 5.

position within a string (see also Kariņš 1997). The generalization, in this case, is that the fricatives [ʝ, v] appear in the syllable onset, the vowels [i, u] surface in the nucleus, while the glides [j, ʊ] surface in the coda[8] (coda position of the glide in 3.3b) is, apparently, justified by the prohibition against ternary-branching nuclei). To account for this three-way complementary distribution, there is no need to assume two underlying phonemes, that is, both vowels and glides (fricatives are not an option at this point – we have established that the underlying segment is not an obstruent). Given that all syllables have nuclei, but only a subset of them have codas (which is a universally marked option), it seems reasonable to posit the allophone that appears in the nucleus as underlying.

There is a complication, however. While in most cases the surface realization of the underlying /i, u/ is entirely predictable, this does not seem to be the case when /i/ spells out a monosegmental morpheme (this does not extend to /u/, whose realization is always predictable). In the examples below, the first form in each pair reflects the syllabification consistent with the underlying segment being the vowel /i/. Thus, in 3.5a), the hiatus is resolved by syllabifying the first element in the onset – the reflection of the universal coda avoidance principle. In 3.5b), however, the seemingly identical sequence is resolved by syllabifying the second element in the coda. Similarly, in 3.6a), the hiatus is resolved by deleting the first vowel, while in 3.6b) the second element is syllabified as a coda. Finally, the post-consonantal vowel in 3.7a) predictably ends up in the nucleus, while in 3.7b) it ends up as a second element of a complex coda.

3.5

a.	/skɑp-i-i/[9]	→	[skɑ.p-ʝ-i]		'closet, Nom.pl.'
b.	/ziu-i-**i**/	→	[zi.v-i-j]	*[zi.v-ʝ-i]	'fish, Dat. sg.'

[8] Kariņš (1996:47-48) also makes reference to the syllable structure to explain the alternation between [v] and [ʊ], but, just as Steinbergs (1997), mentions neither the fate of the palatal fricative, nor the possibility for the fricative~vowel alternation.

[9] See Halle (1992b) for the motivation of underlying forms in nominal inflection (also see Chapter 4 for discussion).

3.6

a.	/luop-ɑ-i/	→	[luo.p-i]		'beast', Nom.pl.'
b.	/lɑp-ɑ-**i**/	→	[lɑ.p-ɑ-j][10]	*[lɑ.p-i]	'leaf, Dat. sg.'

3.7

a.	/glɑ:b-Ø-i/	→	[glɑ:.b-i]		'save, 2nd past'
b.	/glɑ:b-**i**-Ø/	→	[glɑ:b-j]	*[glɑ:.b-i]	'save, 3rd pres.'

Assuming that the underlying representation of the second form in each pair is as given above, such patterning is entirely unexpected, as it goes against syllable wellformedness considerations with no apparent gain. However, if we were to assume that the morpheme that surfaces as a glide in the examples above is in fact the underlying glide, this behavior could be justified by the preservation of underlying contrast. It seems, then, that at least in the cases illustrated in 3.5-3.7 the glide has to be phonemic (note, though, that if such a phonemic glide were to end up in the onset position, it would still surface as a phonetic fricative). In the face of these data, one might wonder whether it´s possible to assume that all surface glides are derived from underlying glides. Here one has to note that in Latvian, surface glides never alternate with surface vowels. That is, there are forms that surface alternately with vowels or fricatives (e.g. [la͜i-s]~[la.ʝa] ‘layman’), and there are forms that surface with glides or fricatives (e.g. [klɑ:j-s]~[klɑ:.ʝ-a] ‘deck’), but there are apparently no forms that alternate between vowels and glides[11].

Therefore, I assume here that the phonemic inventory of Latvian contains two high front vocoids: a front high vowel /i/ that can appear in the nucleus and in the onset, and a palatal glide /j/ that can appear in the onset and in the coda. Both of these phonemes have a positional variant [ʝ] that surfaces in the onset position.

---

[10] This transcription follows NAGL (2015:87). Note, however, that forms like (6b) are treated in some traditional descriptions as containing the diphthong [ai̯] and not a vowel-glide sequence (AGL 1959:55) – which also reflects the spelling. Other sources (e.g. Lauva 1997:82) note that [i] is pronounced more energetically in pre-pausal position and becomes a palatal fricative, i.e. for them the sequence is [aʝ].

[11] If the forms where glides alternate with front vowels occurred in Latvian, it would be evidence that only some surface glides are glides also underlyingly.

I also assume that there is only one high labial vocoid in the inventory, namely /u/, which has an onset allophone [v] and a coda allophone [ʋ]. Onset and coda strengthening is assumed here to be a phonetic process. That is to say, the surface prevocalic fricatives [v, ʝ] are phonological vocoids.

3.3 Phonological palatalization: data and generalizations

In this section I introduce the four assimilatory palatalization processes operative in Latvian. The data for this section are drawn mainly from the descriptive grammars and dictionaries of Modern Standard Latvian: Academic Grammar of Modern Standard Latvian (Sokols et al. 1959, further - AGL), Practical Grammar of Latvian (Ceplīte & Ceplītis 1997), Latvian Reverse Dictionary (Soida & Kļaviņa 2000; further - LRD), Morphology of Literary Latvian (Kalme & Smiltniece 2001) and Latvian Dictionary of Spelling and Pronunciation (Ceplītis et al. 2007, further - LDSP). Additional data sources, if any, are indicated separately in the text.

3.3.1 Yod-palatalization

Yod-palatalization is, perhaps, the most widespread and regular palatalization process in Latvian, and also the one that targets the widest range of segments. Yod-palatalization affects root-final non-labial consonants in stems characterized by front theme vowels in contexts where they are followed by vowel-initial inflectional or derivational suffixes (Halle & Zeps 1966, Halle 1986, 1992b, Steinbergs 1977). In this section, I introduce yod-palatalization patterns that occur in nominal inflection, while yod-palatalization in derivational contexts, as well as its interaction with expressive palatalization, will be discussed in detail in Chapter 4.

In Latvian, all nominal stems have a theme vowel immediately following the root. The phonological inventory of theme vowels comprises four segments: /i, e, a, u/

(see Chapter 4, Halle 1986, 1992b for details, Steinbergs 1977 for alternative treatment). Each of the six declensions is characterized by a certain theme vowel, as shown below (refer to Chapter 4 for details).

3.8

Decl.	Theme vowel	Nom.sg.	Dat. sg.	
I	-a-	[ma:l-s]	[ma:l-a-m]	'clay'
II	-i-	[t͡sa:l-i-s]	[t͡sa:l-i-m]	'chicken'
III	-u-	[al-u-s]	[al-u-m]	'beer'
IV	-a-	[mal-a]	[mal-a-j]	'side'
V	-e-	[za:l-e]	[za:l-e-j]	'grass'
VI	-i-	[sa:l-s]	[sa:l-i-j]	'salt'

When followed by vowel-initial inflectional suffixes, the front theme vowels /i, e/ undergo re-syllabification and surface as a palatal fricative [j̞] (see Section 3.2); note that no strengthening applies when the theme vowel is followed by a consonantal inflection. The process is illustrated in 3.9, where the palatal fricative [j̞] surfaces after labial-final roots[12]:

3.9

		Gen. pl.		Dat. sg.	
/bu͜om-i-u/	→	[bu͜om.-j̞-u]	cf.	[bu͜o.m-i-m]	'pole'
/skɑp-i-u/	→	[skɑp.-j̞-u]	cf.	[skɑ.p-i-m]	'closet'
/zi:m-e-u/	→	[zi:m.-j̞-u]	cf.	[zi:.m-e-j]	'sign'
/mɑp-e-u/	→	[mɑp.-j̞-u]	cf.	[mɑ.p-e-j]	'folder'

The situation with dental/alveolar-final roots is different. Here, the underlying front theme vowels /i, e/ fail to surface when prevocalic, while root-final consonants undergo yod-palatalization, as shown in 3.10. In the dental/alveolar series, yod-palatalization affects the obstruents /t, d, s, z, t͡s, d͡z/ and the non-rhotic sonorants /n, l/ and causes a shift to the postalveolar/palatal place of articulation. The rhotic trill /r/ normally fails to alternate in this context, due to the fact that the majority of speakers of the standard variety no longer produce

[12] The reasons for the heterosyllabicity of the sequences where the palatal fricative follows labial consonants will be made apparent in Chapter 5.

the contrast between hard [r] and palatalized [rʲ] (Laua 1997). For those who do, /r/ is targeted by yod-palatalization on a par with other sonorants.

3.10

			Gen. pl.		Dat. sg.	
a.	/zut-i-u/	→	[zu.ʃ-u]	cf.	[zu.t-i-m]	'eel'
	/bri:d-i-u/	→	[bri:.ʒ-u]	cf.	[bri:.d-i-m]	'moment'
b.	/tas-e-u/	→	[ta.ʃ-u]	cf.	[ta.s-e-j]	'cup'
	/ez-i-u/	→	[e.ʒ-u]	cf.	[e.z-i-m]	'hedgehog'
c.	/la:t͡s-i-u/	→	[la:.t͡ʃ-u]	cf.	[la:.t͡s-i-m]	'bear'
	/dad͡z-i-u/	→	[da.d͡ʒ-u]	cf.	[da.d͡z-i-m]	'thistle'
d.	/ziluo̯n-i-u/	→	[ziluo̯.ɲ-u]	cf.	[zi.luo̯.n-i-m]	'elephant'
	/pel-e-u/	→	[pe.ʎ-u]	cf.	[pe.l-e-j]	'mouse'
	/bu:r-i-u/	→	[bu:.r-u]/[bu:.rʲ-u]	cf.	[bu:r-i-m]	'cage'

As the data in 3.10 show, the voicing specification of the segments targeted by yod-palatalization remains intact, and so does the manner of articulation in sonorants and sibilant obstruents. Plosive stops, however, undergo assibilation and surface as postalveolar fricatives (although palatal plosives and postalveolar affricates are available in the inventory). Two important observations are also in order concerning the palatalization trigger: first, /i, e/ only trigger palatalization of alveolars when prevocalic (cf. dative singular forms); second, the palatal fricative [j̥] never surfaces following a palatal/postalveolar consonant. These properties will be crucial for the analysis developed in Section 3.5.

In cases where the root underlyingly ends in a palatal consonant, yod-palatalization applies vacuously. The only two segments of postalveolar/palatal series that appear root-finally in stems characterized by front theme vowels are the palatal plosives /c, ɟ/. Both surface faithfully when followed by the vocalic suffixes, while the front theme vowel still deletes:

3.11

		Gen. pl.		Dat.sg.	
/zɑc-i-u/	→	[zɑ.c-u]	cf.	[zɑ.c-i-m]	'hare'
/kɑc-i-u/	→	[kɑ.c-u]	cf.	[kɑ.c-i-m]	'cat'
/kuɟ-i-u/	→	[ku.ɟ-u]	cf.	[ku.ɟ-i-m]	'ship'
/kuɲɟ-i-u/	→	[kuɲ.ɟ-u]	cf.	[kuɲ.ɟ-i-m]	'stomach'

The situation with velar-final roots appears to be somewhat less straightforward. As we will see in Section 3.3.2, Latvian has two velar coronalization processes, by which the underlying /k, g/ surface as either [t͡ʃ, d͡ʒ] or [c, ɟ] when followed by front vowels. As a result, velar stops never surface as such in stems of palatalizing declensions, i.e. when followed by the front theme vowels /i, e/, regardless of whether or not the context for yod-palatalization is met. This has led some researchers to propose that roots containing underlying velar stops are absent from palatalizing declensions altogether. For instance, Steinbergs (1977:77, endnote 7) states: "There are no roots with underlying final velar stops in this declension [Declension 2]. Those native words which historically ended in *k* or *g* have been affected by j-palatalization (and later analogical change). Examples are [la:t͡sis] 'bear' (cf. Lithuanian *lokỹs*) and [dad͡zis] 'thistle' (cf. Lithuanian *dagỹs*)". In the cases that Steinbergs (1977) refers to, surface forms of the root that once contained an underlying velar stop never show a velar ~ coronal alternation (as illustrated in 3.12).

3.12

	Singular	Plural
Nom	[la:.t͡s-i-s]	[la:.t͡ʃ-i]
Gen	[la:.t͡ʃ-a]	[la:.t͡ʃ-u]
Dat	[la:.t͡s-i-m]	[la:.t͡ʃ-i̯em]
Acc	[la:.t͡s-i]	[la:.t͡ʃ-us]
Loc	[la:.t͡s-i:]	[la:.t͡ʃ-u̯os]

Admittedly, in cases like 3.12 there is no evidence that would suggest that the velar stop is synchronically present in the underlying representation, as the root [la:t͡s-] always surfaces with an affricate. There is, however, a number of roots appearing in stems of palatalizing declensions that do exhibit a velar ~ coronal alternation on the surface. The relevant data come from roots that may figure in nominal stems belonging to different declensions. For instance, the root /a͜ug-/ 'grow' may appear both in the nominal stem of Declension 1, where it takes the theme vowel /-a-/, /a͜ug-a-/ 'plant', and the nominal stem of Declension 5, where it takes the theme vowel /-e-/, /au̯g-e-/ 'growth'. The nominal paradigms are illustrated below (for discussion of underlying forms for nominal stems and inflectional suffixes, see Chapter 4, also Halle 1986, 1992b):

3.13

a.

Decl. I			Singular			Plural
Nom	/au̯g-Ø-s/	→	[au̯g-Ø-s]	/au̯g-a-i/	→	[au̯g-i]
Gen	/au̯g-a-a/	→	[au̯g-a]	/au̯g-a-u/	→	[au̯g-u]
Dat	/au̯g-a-m/	→	[au̯g-a-m]	/au̯g-a-i̯em /	→	[au̯g-i̯em]
Acc	/au̯g-a-[+h]/	→	[au̯g-u]	/au̯g-a-us/	→	[au̯g-us]
Loc	/au̯g-a-[μ]/	→	[au̯g-a:]	/au̯g-a-u̯os/	→	[au̯g-u̯os]

b.

Decl. V		Singular		Plural
Nom	/au̯g-e-Ø/	[au̯d͡z-e]	/au̯g-e-s/	[au̯d͡z-e-s]
Gen	/au̯g-e-s/	[au̯d͡z-e-s]	/au̯g-e-u/	[au̯d͡ʒ-u]
Dat	/au̯g-e-j/	[au̯d͡z-e-j]	/au̯g-e-μm/	[au̯d͡z-e:-m]
Acc	/au̯g-e-[+h]/	[au̯d͡z-i]	/au̯g-e-s/	[au̯d͡z-e-s]
Loc	/au̯g-e-μ/	[au̯d͡z-e:]	/au̯g-μs/	[au̯d͡z-e:-s]

As shown in 3.13, the root /au̯g-/ always surfaces faithfully when it is a part of the Declension I stem, while it consistently coronalizes to [au̯d͡z-] when it forms a stem of Declension V combining with a front theme vowel /e/. Thus, learners of Latvian encounter numerous surface instances of [au̯g-] and [au̯d͡z-] in etymologically related forms. Considering that surface [au̯d͡z-e-] may be derived from the underlying /au̯g-e-/ by velar affrication, which is a productive process that is a part of the synchronic phonological grammar of Latvian, it is plausible that alternating roots of this kind have a single underlying representation containing a velar stop, rather than two allomorphs /au̯g-/ and /au̯d͡z-/[13]. If this is the case, the postalveolar affricate [d͡ʒ] in the genitive plural form [au̯d͡ʒ-u] (3.13b) is derived by yod-palatalization from the underlying velar stop, and not

[13] Steinbergs (1977:44) also describes the process of velar affrication and considers, *inter alia*, the pairs that show velar-final roots affricating when followed by front nominal theme vowels. However, she still maintains that velar-final roots are absent from Declension 2 (Steinbergs 1977:77, endnote 7).

from the alveolar affricate[14]. This gives us a system where the alveolar stops /t, d/ pattern together with the alveolar fricatives /s, z/ (both alternating with [ʃ, ʒ]) in yod-palatalization contexts, and the velar stops /k, g/ pattern with the alveolar affricates /t͡s, d͡z/ (both alternating with [t͡ʃ, d͡ʒ]) – this will be important for the representational analysis of the Latvian inventory developed in Section 3.4.1. Some further examples of yod-palatalization affecting velars are given in 3.14:

3.14

	Gen.pl.				Gen.pl.	
/sle:g-i-u/	[sle:d͡ʒ-u]	'a switch'	cf.	/at-sle:g-a-u/	[at-sle:g-u]	'a key'
/kung-e-u/	[kund͡ʒ-u]	'a lady'	cf.	/kuŋg-a-u/	[kuŋg-u]	'a master'
/pali:g-e-u/	[pali:d͡ʒ-u]	'a helper, f.'	cf.	/pali:g-a-u/	[pali:g-u]	'a helper, m.'
/sai̯m-nie̯k-e-u/	[sai̯m-nie̯t͡ʃ-u]	'landlady'	cf.	/sai̯m-nie̯k-a-u/	[sai̯m-nie̯k-u]	'landlord'
/pa:r-tvai̯k-e-u/	[pa:r-tvai̯t͡ʃ-u]	'distillation'	cf.	/tvai̯k-a-u/	[tvai̯k-u]	'steam'
/balt-ru̯ok-e-u/	[balt-ru̯ot͡ʃ-u]	'kid-glove'	cf.	/ru̯ok-a-u/	[ru̯ok-u]	'hand'

Note that in the velar series, yod-palatalization affects only the plosive stops /k, g/. The only other velar, the velar fricative /x/, has a very limited distribution in the language and is only attested in borrowings. What seems like the only stem where /x/ is followed by a front theme vowel, /psix-e-/ 'soul', fails to alternate when followed by a vocalic inflection: /psix-e-u/~[psix-u][15].

3.3.2 Velar coronalization

Modern Latvian has two synchronically active assimilatory processes that turn underlying velar plosives into coronals in the context of front vowels. The more commonly attested of these involves the alternation between the velar stops [k, g] and the alveolar affricates [t͡s, d͡z], which I am going to refer to as "velar affrication" throughout, following the terminology in Steinbergs (1977). Another, and considerably less common, coronalization process is that of velar

[14] That is, this is the case if one assumes monostratal computation. In multi-stratal analyses, the underlying velar would be affricated by a front theme vowel, and only subsequently palatalized by yod-palatalization.

[15] The velar fricative /x/ used to have a positional variant [ç] surfacing before front vowels, which only very few speakers produce nowadays (Laua 1997:61). I don´t have data showing whether or not /x/ alternates with [ç] in yod-palatalization contexts for those speakers.

palatalization, by which velar plosives surface as palatal stops [c, ɟ]. These two processes are the main focus of discussion in this section. In addition, velar stops may undergo non-assimilatory coronalization to either [c, ɟ] or [t͡ʃ, d͡ʒ] when followed by certain diminutive suffixes; diminutive palatalization in Latvian is the subject of Chapter 4.

3.3.2.1 Velar affrication

Velar affrication is a process by which the velar stops /k, g/ surface as anterior affricates [t͡s, d͡z] when followed by front vowels, e.g. [vilk-s] 'wolf' ~ [vilt͡s-iɲ-ʃ] 'wolf, dim'. At some earlier stage of development of the Latvian language, velar affrication was a fully predictable allophonic process, by which the phonemes /k, g/ were realized as [t͡s, d͡z] before front vowels and as [k, g] elsewhere (see Endzelīns 1971:60-61). However, a number of subsequent diachronic changes affecting the conditioning environment of the process have obscured the phonological reasons for its application, in many (though not all) cases resulting in it being synchronically opaque. For instance, syncopation of short vowels in final syllables affected front-vowel inflections, rendering velar affrication non-surface-apparent in forms like [sni͜ed͡z] 'reach, 2nd sg. pl.', cf. Lith. [sʲiekʲ-i] (Rudzīte 1993). In turn, velar affrication, which was once productive at the word level and applied before inflectional suffixes (as evidenced by the existence of forms like [tek-u] 'flow, 1st sg. pres' ~ [tet͡s-i] 'flow, 2nd sg. pres.', cf. Lith. [tʲekʲ-i]) became restricted to stem-level domains (see Bermúdez-Otero 2014 on the life cycle of phonological processes). The process was apparently no longer active at the word level at the stage when the word-final diphthong contraction applied in Latvian, wiping out theme vowels when these were followed by vocalic inflectional suffixes (AGL 1959:62), which explains the failure of root-final velars to affricate in forms like [vilk-i] < *[vilk-a-i] 'wolf, pl.', [sak-i] < *[sak-a-i], 'say, 2nd pres.', cf. Lith. [vilkai], [sakai].

As a result of the diachronic change, the anterior affricates [t͡s, d͡z] and velar stops [k, g] no longer stand in complementary distribution in present-day Latvian. Both [k, g] and [t͡s, d͡z] may freely surface before front and back vowels as well as word-finally, which indicates that synchronically both /t͡s, d͡z/ and /k, g/ have the status of independent phonemes.

3.15

a.

[kefi:r-s]	'kefir'	cf.	[t͡sa:l-i-s]	'chicken'
[kilogram-s]	'kilogram'	cf.	[t͡su:k-a]	'pig'
[gen-s]	'gene'	cf.	[t͡su̯op-e]	'fishing'
[git-s]	'guide'	cf.	[d͡zalkst-i:-t]	'to sparkle'

b.

[sak-i]	'say, 2nd sg. pres.'	cf.	[tit͡s-am]	'believe, 3rd sg. pres.'
[slu̯og-i]	'load, 2nd sg. pres.'	cf.	[tri:t͡s-am]	'tremble, 3rd sg. pres.'
[rau̯g-i]	'try, 2nd sg. pres.'	cf.	[red͡z-am]	'see, 3rd sg. pres.'

c.

[bæ:g]	'run, 3rd sg. pres.'	cf.	[slæ:d͡z]	'close, 3rd sg. pres.'
[na:k]	'come, 3rd sg. pres.'	cf.	[sni̯ed͡z]	'reach, 3rd sg. pres.'
[sa:k]	'begin, 3rd sg. pres.'	cf.	[bre:t͡s]	'scream, 3rd sg. pres.'

The existence of synchronically opaque forms like those in 3.15 has motivated the predominant view in the traditional descriptions of the language that velar affrication is no longer active in Latvian (AGL 1959; but see Steinbergs 1977 who treats the process as synchronically active). However, this view is challenged by the presence of productive and synchronically transparent alternations. In Modern Latvian, velar affrication consistently affects the underlying velar plosives /k, g/ when these are followed by front-vowel initial derivational suffixes (see also Steinbergs 1977:44-46, 107-113, AGL 1959:62-63, Muižniece 2002:70-73 among others). All three front vowels present in the Latvian inventory, /i, e, æ/, as well as their long counterparts /i:, e:, æ:/, may act as triggers in this context, as shown below:

3.16

a. *Velar affrication triggered by /i/*

/drɑ͜ug-a-iɲ-s/	→	[drɑ͜u.d͡z-iɲ-ʃ]	'friend, dim.'	cf.	[drɑ͜uk-s]	'friend'
/u͜o.g-a-iɲ-a/	→	[u͜o.d͡z-iɲ-a]	'berry, dim.'	cf.	[u͜o.g-a]	'berry'
/ni͜ek-a-iɲ-s]	→	[ni͜e.t͡s-iɲ-ʃ]	'trifle, dim.'	cf.	[ni͜ek-s]	'trifle'
/ru͜o.k-a-iɲ-a/	→	[ru͜o.t͡s-iɲ-a]	'hand, dim.'	cf.	[ru͜o.k-a]	'hand'

b. *Velar affrication triggered by /e/*

/drɑ͜ug-a-en-e/	→	[drɑ͜u.d͡z-e.n-e]	'friend, fem.'	cf.	[drɑ͜uk-s]	'friend'
/værg-a-en-e/	→	[verd͡z-e.n-e]	'slave, fem.'	cf.	[værk-s]	'slave, masc.'
/sarg-a-en-e/	→	[sard͡z-e.n-e]	'guard, fem.'	cf.	[sark-s]	'guard, masc.'
/vilk-a-en-e/	→	[vil.t͡s-e.n-e]	'she-wolf'	cf.	[vilk-s]	'wolf'

c. Velar affrication triggered by /æ/

/t͡su:.k-ɑ-æ:n-Ø-s/	→	[t͡su:.t͡s-æ:n-s]	'piglet'	cf.	[t͡su:.k-ɑ]	'pig'
/vilk-a-æ:n-Ø-s/	→	[vil.t͡s-æ:n-s]	'wolf cub'	cf.	[vilk-s]	'wolf'
/li:da.k-a-æ:n-Ø-s/	→	[li:da.t͡s-æ:n-s]	'pickerel'	cf.	[li:da.k-a]	'pike'
/kung-a-æ:n-Ø-s/	→	[kun.d͡z-æ:n-s]	'young lord'	cf.	[kuŋk-s]	'lord'

The relation between the underlying forms given in 3.16 and their surface correspondents deserves some further discussion. Note that vowel-initial derivational suffixes create the underlying hiatus with the preceding theme vowel (on the assumption that derivation is stem-based; see Chapter 4 for the argument specific to Latvian, Bermúdez-Otero 2013 for the stem-based vs. root-based derivation more generally). In 3.16, the hiatus is resolved by eliding the theme vowel, which creates the context for velar affrication (see also Halle 1992b on hiatus resolution in Latvian).

Synchronically, velar affrication consistently underapplies before front-vowel-initial inflectional suffixes, as shown below for nominal, adjectival and verbal inflection[16] (note that velar affrication consistently applies before front-vowel-initial stem-level morphemes in the same roots):

[16] In some High Latvian dialects, velar affrication may still be triggered by inflectional suffixes (Endzelīns 1938:55), although the process seems to be restricted to adjectival paradigms (Rudzīte 1964:306), cf. [pli͡ts-i] 'naked, Nom. pl.', [duord͡z-i] 'expensive, Nom. pl.' in Dagda dialect and [plik-i], [da:rg-i] in Standard Latvian.

3.17

a.

[vil.k-i]	*[vil.t͡s-i]	'wolf, nom.pl.'	cf.	[vil.t͡s-iɲ-ʃ]	'wolf, dim.'
[ni̯ek-i]	*[ni̯et͡s-i]	'trifle, nom. pl.'	cf.	[ni̯e.t͡s-iɲ-ʃ]	'trifle, dim.'
[drɑu̯.g-i]	*[drɑu̯.d͡z-i]	'friend, nom.pl.'	cf.	[drɑu̯.d͡z-iɲ-ʃ]	'friend, dim.'
[kuŋg-i]	*[kun.d͡z-i]	'lord'	cf.	[kun.d͡z-iɲ-ʃ]	'lord, dim.'

b.

[pælæ:k-i]	*[pæ.læ:.t͡s-i]	'gray, nom.pl.'	cf.	[pe.le:.t͡s-i:k-s]	'grayish, nom. sg.'
[trak-i]	*[tra.t͡s-i]	'crazy, nom. pl.'	cf.	[tra.t͡s-in-a:-t]	'madden, inf.'
[nabag-i]	*[naba.d͡z-i]	'poor, nom. pl.'	cf.	[na.ba.d͡z-i:b-a]	'poverty, nom. sg.'
[barg-i]	*[bar.d͡z-i]	'severe, nom. pl.'	cf.	[bar.d͡z-i:b-a]	'severity, nom. sg.'

c.

[sak-i]	*[sat͡s-i]	'say, 2nd pres.'	cf.	[sat͡s-i:-t]	'say, inf.'
[slu̯og-i]	*[slu̯od͡z-i]	'load, 2nd pres.'	cf.	[slu̯od͡z-i:-t]	'load, inf.'
[rau̯g-i]	*[rau̯d͡z-i]	'try, 2nd pres.'	cf.	[rau̯d͡z-i:-t]	'try, inf.'

3.3.2.2 Velar palatalization

Velar palatalization is a process by which the velar plosives /k, g/ surface as palatal stops [c, ɟ] when followed by front vowels across a morpheme boundary. Outside of this context, the surface instances of palatal stops are extremely few – but not unattested. Some forms where /c/ occurs outside of the palatalizing context are given in 3.18:

3.18

[cau̯c-i-s]	'warbler'
[cu:l-i-s]	'fly'
[curc-i-s]	'jug'

Just like velar affrication, velar palatalization is only triggered by derivational suffixes. Velar palatalization is much less common than velar affrication and seems to be primarily associated with the forms that are outside of the core vocabulary. Let us explore this point a bit further.

There is a number of derivational suffixes that trigger the alternation between velar stops and palatal stops – such are, for instance, the nominalizing suffixes [-i̯er-, -er-, -ij̯-] and [-ism-], and the adjectivizer [-isk-] (see AGL 1959 for descriptions and further examples). The suffix [-isk-] stands out in this list by virtue of being (i) productive and (ii) part of the core lexicon. Notably, forms derived with [-isk-] may exhibit either [k, g] ~ [c, ɟ] or [k, g]~[t͡s, d͡z] alternation. The former pattern, however, seems to be reserved for recent borrowings, while the latter affects the stems belonging to the core vocabulary (i.e. native or sufficiently nativized stems). This is illustrated below:

3.19

	Nom.sg.		**[-isk-]**	
Nativized stems	[sku̯ol.ni̯ek-s]	'schoolchild'	[sku̯ol.ni̯e.t͡s-isk-s]	'schoolchild-like'
	[kunk-s]	'lord'	[kun.d͡z-isk-s]	'lordly'
Foreign stems	[i.de.o.lok-s]	'ideologist'	[i.de.o.lo.ɟ-isk-s]	'ideologic'
	[de.mi.urk-s]	'demiurg'	[de.mi.ur.ɟ-isk-s]	'demiurgic'

Forms derived with the borrowed nominalizing suffix [-ism-] may also trigger either coronalization pattern. This suffix only combines with foreign stems, and the type of palatalization it produces is traceable to the source language (supposedly, German – see Mathiassen 1996:20). Thus, as shown in 3.20, if the [k]~[t͡s] alternation applies in German, then it also applies in Latvian, while if no alternation occurs in German, Latvian applies [k]~[c]. The patterns are also consistent with 'criticism' and 'mysticism' being more frequent, and therefore more nativized, than 'autarchism' and 'psychologism'. It has to be noted, however, that [-ism-] itself is a borrowing, and it is unclear whether forms derived with it are perceived as plurimorphemic by native speakers or stored non-analytically (not to mention that they are highly unlikely to be encountered and processed during childhood).

3.20

Nom. sg.		**Latvian**	**German**	
[ɑu̯.tark-s]	'autarch'	[ɑu̯.tɑr.c-ism-s]	[aʊtaʀk-ɪsm-ʊs]	'autarchism'
[psi.ho.lok-s]	'psychologist'	[psi.ho.lo.ɟ-ism-s]	[psyçolog-ɪsm-ʊs]	'psychologism'
[kri.ti.k-a]	'critique'	[kri.ti.t͡s-ism-s]	[kritit͡s-ɪsm-ʊs]	'criticism'
[mis.ti.k-ɑ]	'mystique'	[mis.ti.t͡s-ism-s]	[mystit͡s-ɪsm-ʊs]	'mysticism'

Nominalizing suffixes [-i̯er-, -er-, -ij̯-], while themselves being borrowings, only combine with foreign stems, where they consistently trigger [k, g] ~ [c, ɟ] alternation:

3.21

a.

Nom. sg.		**[-i̯er-]**	
[bɑŋ.k-ɑ]	'bank'	[bɑn.c-i̯e.r-i-s]	'banker'
[mɑr.k-ɑ]	'mark'	[mɑr.c-i̯e.r-i-s]	'marker'

b.

Nom. sg.		**[-er-]**	
[kru̯og-s]	'tavern'	[kru̯o.ɟ-e.r-i-s]	'tavern-keeper'
		[spiː.c-e.r-i-s]	'speaker'

c.

Nom. sg.		**[-ij̯-]**	
[ki.rurk-s]	'surgeon'	[ki.rur.ɟ-i.j̯-ɑ]	'surgery'
[ɑu̯.tɑrk-s]	'autarch'	[ɑu̯.tɑr.c-i.j̯-ɑ]	'autarchy'

Thus it appears that velar palatalization in present-day Latvian is a property of foreign stems and/or suffixes. There is, however, one notable exception to this generalization. The diminutive suffix [-el-] combines with core stems and consistently triggers velar palatalization. Consider:

3.22

		[-el-]		Dat. sg.	
/zirg-ɑ-el-i-s/	→	[zir.ɟ-e.l-is]	cf.	[zir.g-ɑ-m]	'horse'
/liːdɑk-ɑ-el-e-Ø/	→	[liː.da.c-e.l-e]	cf.	[liː.da.k-ɑ-j]	'pike'
/t͡suːk-ɑ-el-e-Ø/	→	[t͡suː.c-e.l-e]	cf.	[t͡suː.k-ɑ-j]	'pig'

However, [-el-] is exceptional for other reasons as well. For example, unlike all other vowel-initial suffixes, it also causes palatalization of alveolar sibilants (but, notably, not sonorants or plosives). Being a diminutive suffix, it is likely that irregular palatalization patterns triggered by [-el-] is a case of so-called expressive palatalization, and as such it should be distinguished from phonological palatalization proper (see Chapter 4 for a discussion and analysis of expressive palatalization in Latvian; and Kochetov & Alderete 2010 on expressive palatalization patterns cross-linguistically).

3.3.3 Vowel raising

Vowel raising is a process by which the low front vowel /æ/ raises to [e] when followed by a palatal trigger. The set of segments that trigger vowel raising includes both vocoids and consonants. The former include all front non-low vocoids, i.e. [j, i, i:, e, e:] as well diphthongs where the first component is front /e̯i̯, i̯e, i̯u, e̯u/, while the latter set comprises all postalveolar/palatal consonants, both obstruents [ʃ, ʒ, t͡ʃ, d͡ʒ, c, ɟ] and sonorants [ɲ, ʎ] (Muižniece 2002, Laua 1997, AGL 1959 etc.).

Before we look at the data, it has to be said that in present-day Latvian the distribution of [e] and [æ] is no longer always predictable from the phonological context. Originally, the height of the non-high front vowel was dependent on its quantity, with the short vowel being produced as [æ] and the long one as [e:] (AGL 1959:23, Laua 1997:113). In the course of language change, [e] and [æ:] respectively developed as their positional allophones. Front non-high vowels were produced as [e, e:] when followed by front non-low vocoids and post-alveolar and palatal consonants, and as [æ, æ:] elsewhere. Thus, at some point in the historical development of Latvian, [e, e:] and [æ, æ:] stood in complementary distribution. However, further language change obscured the phonological reasons for the [e, e:]~[æ, æ:] alternation in certain cases. For instance, diachronic syncopation of short vowels in final syllables turned infinitives **cepti*, **nesti*, **degti* 'bake', 'carry', 'burn' etc. into *cept*, *nest*, *degt*, which in Modern Latvian are still produced with [e] (Laua 1997:119). Similarly, diphthong contraction that changed word-final diphthongs from *[-ai] to [-i] erased the context for [æ, æ:] in adverbs like *lepni*, *reti*, *lēni* 'proudly', 'rarely', 'slowly' etc. (Laua 1997:112-125, Muižniece 2002:33-46). Synchronically, this has led to the situation where both instances of [æ] in palatalizing contexts and the instances of [e] outside of palatalizing contexts are attested.

However, in some cases the synchronic alternation between [e, e:] and [æ, æ:] is regular and clearly determined by the phonological context. Thus, the alternation applies productively and consistently before front-vowel-initial derivational suffixes and affects all low front vowels in the word as long as no other vowel intervenes between the target and the trigger (cf. [e.ze.r-iɲ-ʃ] ~ [æ.zær-s] 'lake dim.'~'lake, Nom. sg.').

3.23

a. Vowel raising before /i/

/bæ:rn-a-iɲ-s/		[be:r.n-iɲ-ʃ]	'child, dim.'	cf.	[bæ:rn-s]	'child, Nom.sg.'
/æ.zær-a-iɲ-s/		[e.ze.r-iɲ-ʃ]	'lake, dim. '	cf.	[æ.zær-s]	'lake, Nom.sg.'
/mæd-u-iɲ-s/		[med-iɲ-ʃ]	'honey, dim.'	cf.	[mæd-u-s]	'honey, Nom. sg.'
/sæ.k-a-i:b-a/		[se.t͡s-i:.b-a]	'sequence'	cf.	[sæ.k-a-s]	'consequence, Nom. sg.'

b. *Vowel raising before /e/*

[t͡sel.m-e.n-e]	'honey agaric'	cf.	[t͡sælm-s]	'stump'
[zve:.r-e.n-e]	'beast, fem'	cf.	[zvæ:r-s]	'beast, masc.'

c. *Raising of /æ/ blocked by intervening vowels*

[mæ.l-u̯o-.j̥-u]	'lie, 1 sg pres'	cf.	[me.l-i-s]	'liar'
[bæ:.d-ɑ:-.j̥-u]	'grieve, 1 sg pres'	cf.	[be:.d-i:k-s]	'mournful'

Let us now turn to the cases where vowel raising is triggered by consonants. As I have already mentioned, [æ] alternates with [e] when followed by all postalveolar/palatal consonants [ʃ, ʒ, t͡ʃ, d͡ʒ, c, ɟ, ɲ, ʎ]. However, in most stems that show such alternation, post-alveolar/palatal consonants in question are themselves the result of yod-palatalization, and therefore it is not immediately possible to attribute vowel raising to the palatal/postalveolar consonant rather than the underlying high front vowel. Consider the following:

3.24

/plæs-i-u/	→	[ple.ʃ-u]	'spread, 1st sg pres.'	cf.	[plæs-.tu]	'spread, cond.'
/smæl-i-u/	→	[sme.ʎ-u]	'scoop, 1st sg pres.'	cf.	[smæl-.tu]	'scoop, cond.'

An unambiguous example showing that underlying palatal/postalveolar consonants can trigger vowel raising would be one where the base-final /æ/ is followed by a non-alternating suffix starting with a palatal/postalveolar consonant. The only such suffix seems to be the nominalizing derivational suffix /-ʃan-/, which combines with verbal stems and produces names of activities and processes (AGL 1959:150). As illustrated below, /æ/ indeed raises to [e] when followed by /-ʃan-/.

3.25

/bæ:g-ʃan-ɑ/	→	/be:k-.ʃan-ɑ/	'escape'	cf.	[bæ:k-.tu]	'run, cond.'
/t͡sæp-ʃan-ɑ/	→	/t͡sep-.ʃan-ɑ/	'baking'	cf.	[t͡sæp-.tu]	'bake, cond.'

A dispreference for low mid vowels followed by palatal/postalveolar consonants is also manifested as a static phonotactic restriction on roots. The relevant data come from non-alternating roots ending in palatal/postalveolar consonants, which never surface with a low front vowel:

3.26

		Gen. pl.		*Dat. sg.*	
/ue:j-ɑ-u/	→	[ve:.ʝ-u]	cf.	[ve:ʝ.-ɑ-m]	'wind'
/me:ʒ-ɑ-u/	→	[me.ʒ-u]	cf.	[me:.ʒ-ɑ-m]	'forest'
/ueʎ-ɑ-u/	→	[ve.ʎ-u]	cf.	[ve.ʎ-ɑ-j]	'underwear'
/peʎɲ-ɑ-u/	→	[peʎ.ɲ-u]	cf.	[peʎ.ɲ-ɑ-j]	'profit'

3.4 Features and representations

In the preceding section, I have introduced distinct yet interacting palatalization processes operative in Modern Standard Latvian: (i) yod-palatalization, whereby alveolar and velar consonants surface as their postalveolar/palatal counterparts when followed by the prevocalic /i, e/ 3.27a); (ii) velar affrication, whereby the underlying velar plosive surfaces as an alveolar affricate when followed by front vowels 3.27b); (iii) velar palatalization, whereby velar plosives alternate with palatal stops in the same context 3.27c); and (iv) front vowel raising, whereby /æ/ surfaces as [i] when followed by front non-low vowels or palatal/post-alveolar consonants 3.27d).

3.27

a.	/t͡sɑ:**l**-i-u/	→	[t͡sɑ:.**ʎ**-u]	'chicken, Gen.pl.'	cf.	[t͡sɑ:.**l**-i-m]	'chicken, Dat.sg.'
	/zu**t**-i-u/	→	[zu.**ʃ**-u]	'eel, Gen. pl.'	cf.	[zu.**t**-i-m]	'eel, Dat. sg.'
	/sl**æ:g**-i-u/	→	[sle:.**d͡ʒ**-u]	‘switch, Gen.pl.’	cf.	[ɑt.-sl**æ:.g-**ɑ]	‘key, Nom. sg.’
b.	/drɑu̯**g**-ɑ-i:g-s/	→	[drɑu̯.**d͡z**-i:k-s]	'friendly'	cf.	[drɑu̯.**g**-ɑ-m]	'friend, Dat. sg.'
	/iu̯o**k**-ɑ-i:g-s/	→	[ʝu̯o.**t͡s**-i:k-s]	'jocular'	cf.	[ʝu̯o.**k**-ɑ-m]	'joke, Dat. sg.'
c.	/bɑn**k-**a-i̯er-i-s/	→	[bɑn.**c**-i̯er-i-s]	'banker, Nom. sg.'	cf.	[bɑŋ.**k**-ɑ]	'bank, Nom. sg.'
	/mɑr**k**-a-i̯er-i-s/	→	[mɑr.**c**-i̯er-i-s]	‘marker, Nom. sg.’	cf.	[mɑr.**k**-ɑ]	‘mark, Nom. sg.’
d.	/b**æ:**g-ʃan-ɑ/	→	[b**e:**k-.ʃɑn-ɑ]	'escape'	cf.	[b**æ:**k.-tu]	'run, cond.'
	/s**æ**k-a-i:b-ɑ/	→	[s**e.t͡s**-i:b-ɑ]	'sequence'	cf.	[s**æ.k**-u̯o-t]	'to follow'
	/s**æk**l-a-i:b-ɑ/	→	[s**e.k**l-i:b-ɑ]	'triviality'	cf.	[s**æ.k**l-s]	'trivial, Nom. sg.'

In fact, each of the alternations illustrated in 3.27 poses a challenge for traditional representational approaches such as the UFT and (R)AT [17], which view palatalization as the spreading of the secondary place features from the vowel to the consonant. Thus, in the traditional models, all patterns where the target consonant undergoes a shift of the primary place of articulation (a, b and c) in the context of a front vocoid would necessitate some sort of post-assimilation restructuring to ensure that the secondary –vocalic - articulation is re-interpreted as primary articulation of the target consonant (this has been accounted for by tier promotion (Clements & Hume 1995) and equivalency relations (Halle, Vaux &

[17] For a description of the (Revised) Articulator Theory, see Sagey 1986, Halle 1995, Halle, Vaux & Wolfe 2000); for Unified Feature Theory see Clements 1991 a, b, Hume 1992, Clements & Hume 1995.

Wolfe 2000)). Further, in cases where palatalization is accompanied by assibilation (a and b), the latter would have to be derived by redundancy rules (Sagey 1986, Lahiri & Evers 1991, Hume 1992). This move, apart from being stipulative, would require an explanation of why redundancy rules fail to apply in (c). Finally, the very fact that front vowels may cause three distinct changes in velar plosives (/k/~[t͡s], /k/~[c], /k/~[t͡ʃ]) is difficult to explain in models where the only relevant feature that may spread onto a consonant from a front vowel is V-place-[cor] (or [-back]). In fact, the only pattern above that may be expressed as pure spreading assuming the traditional model of feature geometry is that where raising of /æ/ is triggered by the following front vowel (d). However, the fact that vowel raising may also be triggered by postalveolar/palatal consonants cannot be captured straightforwardly. In UFT, the problem lies in the fact that the aperture features expressing vocalic height are never a property of consonants in general, while in (R)AT, the feature [+high] characterizes dorsals.

This section demonstrates that palatalization patterns that proved challenging for traditional representational theories can receive a straightforward account in the Parallel Structures Model (PSM, Morén 2003, 2006, 2007, Iosad 2012, Youssef 2013), which differs from classic feature geometric models in three crucial respects. First, it rejects the universality assumption and maintains that representations are language-specific and emergent, rather than universal and innate. Second, it maintains that vowels and consonants use the same set of features and structural primitives. Finally, it embraces modularity and maintains that phonological grammar is independent of phonetic considerations.

3.4.1 Features

In what follows I argue for the featural and structural composition of Latvian segments. I take the palatalization patterns introduced in Section 3.3 as the point of departure, and extend the analysis to all consonantal and vocoid phonemes of

Latvian. In the spirit of modularity, in doing so I only consider phonological patterns of Latvian as evidence for the language-specific underlying representations.

3.4.1.1 Place features

Let us start by considering the yod-palatalization process, since it affects the largest set of segments. Yod-palatalization targets the set of dental/alveolar consonants /t, d, s, z, t͡s, d͡z, n, l, r/ as well as velar plosives /k, g/, and outputs the set of postalveolar/palatal consonants [ʃ, ʒ, t͡ʃ, d͡ʒ, ɲ, ʎ, rʲ]. Recall that all outputs of yod-palatalization trigger front vowel raising from /æ/ to [e], while dental/alveolar targets of yod-palatalization don´t. This suggests that the feature discriminating between targets and outputs of yod-palatalization is the same feature that discriminates between /æ/ and [e]. The fact that vowel raising may apply across intervening consonants indicates that the feature in question attaches under a V-class node. Let us designate this feature as V-place-[coronal] (note that PSM features lack phonetic substance, and are intended as labels reflecting phonological patterning). Further triggers of vowel raising include palatal stops /c, ɟ/ and front non-low vocoids /j, i, e/. I therefore propose that these segments are also specified for V-place-[coronal]. This gives us a phonological class of segments characterized by the presence of V-place-[coronal] comprising /ʃ, ʒ, t͡ʃ, d͡ʒ, ɲ, ʎ, rʲ , c, ɟ, j, i, e/, which is a class of triggers of vowel raising.

Yod-palatalization, just like vowel raising, is a process by which some segment comes to share the V-place-[coronal] specification of the preceding trigger. There are, however, two important differences. First, yod-palatalization applies only where the target is immediately adjacent to the trigger, and fails to skip over the intervening consonants or vowels. Second, yod-palatalization sometimes involves a change of manner as well – plosive stops surface as postalveolar fricatives or affricates as a result of the process. Let us discuss this second property in some detail.

The propensity of palatalization processes to output sibilants is a well-known cross-linguistic tendency (Kochetov 2011, Bateman 2007, Bhat 1978). It is therefore very tempting to analyze assibilation as an assimilatory process as well. In fact, an attempt to this end was made in Clements (1985), who treated manner-changing palatalization as involving two steps, the first being spreading of [+continuant, +strident] from the triggering vocoid to the consonant. Further work within UFT gave up this solution quoting its phonetic implausibility and instead assumed that assibilation frequently accompanying place-changing palatalization is non-assimilatory and achieved through the application of redundancy rules (Hume 1992, Lahiri & Evers 1991). This is also the solution advocated in Sagey (1984) and subsequent work within (R)AT (Halle 1995, Halle, Vaux & Wolfe 2000; cf. also Chomsky & Halle (1968:422) on the role of 'marking conventions' in manner-changing palatalization). In contrast, the theoretical stance of the PSM, where features are substance-free and their phonetic correlates are determined on a language-specific basis, makes the analysis of assibilation as an assimilatory process perfectly feasible.

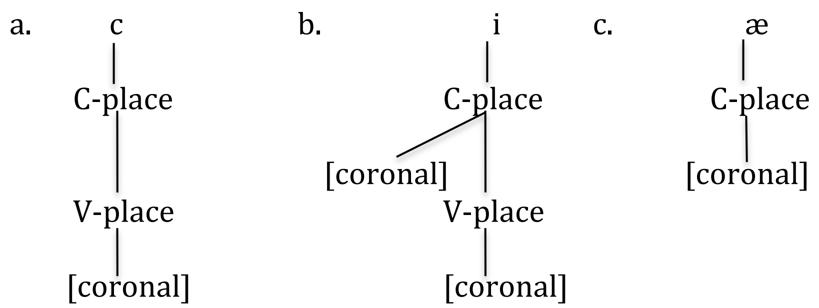
The fact that the assibilation of alveolar and velar plosives in Latvian is triggered by front vocoids is evidence supporting the postulation of some feature [X] as a shared phonological property of sibilant consonants and front vocoids[18]. Note that in yod-palatalization, the change of manner is always accompanied by a shift to postalveolar articulation, which suggests that the feature [X] forms a constituent with V-place-[coronal]. Note also that [X] never skips over intervening segments – assibilation in Latvian only applies when the trigger is string-adjacent to the target. This indicates that [X] is affiliated under the C-class

[18] Note that even though the anterior sibilants /s, z/ are never the output of assibilation, they pattern with the sibilant affricates /t͡s, d͡z/ with respect to the sibilant place assimilation process, which is not discussed here (see Chapter 5, Steinbergs 1977:11).

node. Velar affrication, where the change of manner is accompanied by coronalization, is a reason to assume that [X] is in fact C-place-[coronal]. At this point, Latvian coronals are classified into three partially overlapping sets: (i) segments specified for V-place-[coronal], i.e. /ʃ, ʒ, t͡ʃ, d͡ʒ, ɲ, ʎ, rʲ , c, ɟ, j, i, e/; (ii) segments specified for C-place-[coronal], ie. /s, z, t͡s, d͡z, ʃ, ʒ, t͡ʃ, d͡ʒ, j, i, e, æ/, and (iii) segments that are specified for both, i.e. /ʃ, ʒ, t͡ʃ, d͡ʒ, j, i, e/. Notice that the plosives /t, d/, as well as the sonorants /n, l, r/ figure in none of these sets, because they pattern with neither C-place-[cor] nor V-place-[cor] segments. Therefore, /t, d, n, l, r/ are treated here as phonologically placeless.

To recapitulate, so far we have established the following about the palatalization triggers: (i) the triggers of vowel raising are characterized by V-place-[coronal]; (ii) the triggers of velar affrication are characterized by C-place-[coronal]; and (iii) the triggers of yod-palatalization are characterized by the presence of both C-place-[cor] and V-place-[cor]. Some of the segments in question are illustrated below (manner and laryngeal specifications omitted):

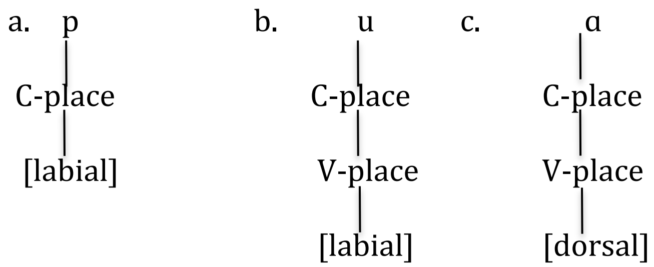
3.28



Here it is important to note that while all respective triggers of palatalization processes are specified for the features indicated above, it is not necessarily true that all segments specified for these features act as triggers. That is, while vowel raising is triggered by **all** segments that are specified for V-place-[coronal], the same does not hold for the triggers of velar affrication and yod-palatalization. For instance, of all the segments specified for C-place-[cor], only a subset in fact triggers velar affrication: /j, i, e, æ/. While at first glance this might seem like an unwelcome result, it in fact highlights the importance of the principled division of labour between representation and computation and the need to carefully consider the motivation for phonological processes in substance-free computation. We return to this question in Section 3.5.

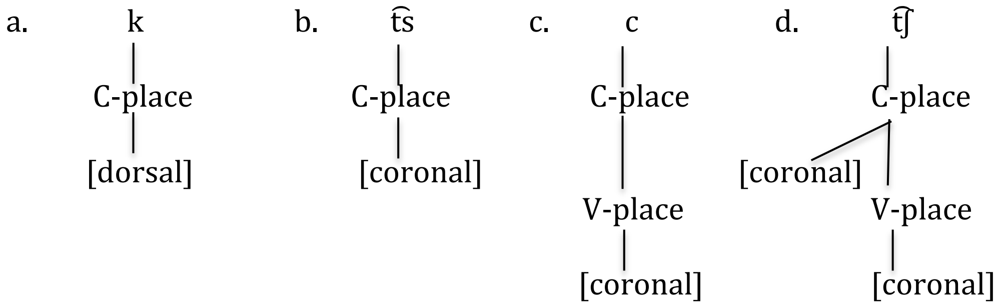
Let us now turn to place specifications of labials and velars. Recall that labial consonants fail to participate in yod-palatalization. I propose that this is due to the incompatibility between [coronal] and [labial] features (Morén 2006, Iosad 2012). This, in turn, necessitates specifying all labial consonants for C-place-[labial]. Recall further that the vowels /u, o, ɑ/ block vowel raising, which suggests that these are specified for V-place features. I suggest that /u, o/ are V-place-[labial], while /ɑ/ is V-place-[dorsal].

3.29



The evidence for place specification of the velar plosives /k, g/ comes from the fact that they trigger a nasal place assimilation process, by which the alveolar nasal /n/ surfaces as [ŋ] when followed by a velar consonant, e.g. [baŋk-a]~[bant͡s-iɲ-a] 'bank'~'bank, dim' (Laua 1997, Steinbergs 1977). Since the process is sensitive to morpheme boundaries (Steinbergs 1977:18), it can not be plausibly construed as purely phonetic. Therefore, I take it as evidence for the existence of the feature [dorsal] that resides under the C-place node. Consider now the place specifications of the target 3.30a) and outputs of velar coronalization 3.30b), velar palatalization 3.30c) and yod-palatalization of a velar 3.30d). Note that the presence of C-place-[cor] correlates with sibilancy, while V-place-[cor] indicates the posterior place of articulation.

3.30

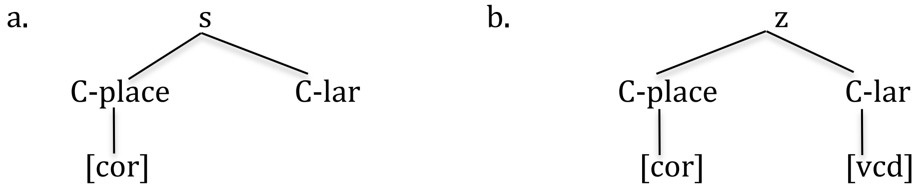


3.4.1.2 Laryngeal and manner features

As we will see shortly, in PSM laryngeal and manner features take over the functions performed by the major class features in earlier models. That is, they serve to distinguish sonority classes and as such are made reference to by syllable wellformedness constraints (as we will see in Chapter 5).

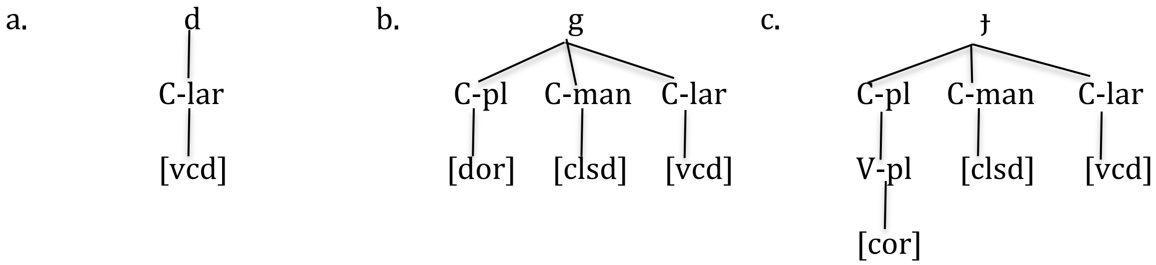
Let us first consider laryngeal specifications of the Latvian inventory. I propose that in Latvian, the presence of the laryngeal node characterizes the class of obstruents (following Blaho 2008, Iosad 2012). In voiced obstruents, the C-laryngeal node dominates the feature [voice], while in voiceless obstruents it is bare (see Iosad 2012:37 on bare nodes as contrastive non-specification). This is necessary for three reasons: First, in Latvian only obstruents can participate in voicing assimilation (Laua 1997, Steinbergs 1977), while sonorants – although phonetically voiced – neither trigger nor undergo the process. Second, Latvian obstruents as a class are excluded from the nucleus position (unlike sonorants and vowels, see below). Third, obstruents, and not sonorants, may figure as a first element of complex onsets (see Chapter 5 for discussion).

3.31



Let us now discuss the manner distinctions among the Latvian segments. The manner distinctions in obstruents are most relevant for us here, because they are crucially implicated in palatalization. Recall that in yod-palatalization, the alveolar plosives /t, d/ alternate with the postalveolar fricatives [ʃ, ʒ], while the velar plosives /k, g/ alternate with the postalveolar affricates [t͡ʃ, d͡ʒ]. This is consistent with velar plosives and affricates being phonological stops and alveolar plosives and fricatives being phonologically mannerless. This would also explain the fact that only velar plosives, but not alveolar plosives, may alternate with the palatal stops [c, ɟ]. The relevant representations are introduced below:

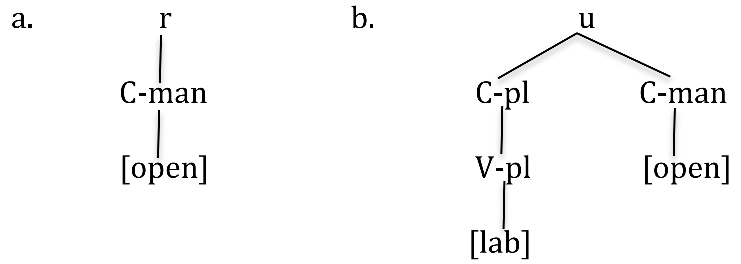
3.32



With respect to manner specifications, it is necessary to address the issue of how major class distinctions may be captured (which was the matter of some debate in the early days of feature geometry – see McCarthy 1988). Since the PSM maintains the autonomy of phonology, the traditional major-class distinctions grounded in phonetics are of no relevance here. What matters is whether the phonological patterns of Latvian in fact provide evidence for traditional dichotomies such as sonorants vs. obstruents, consonants vs. vocoids, etc.

The need for the former seems to be motivated by palatalization patterns. Recall that sonorants never assibilate as a result of yod-palatalization. Here I propose that this is due to the feature co-occurence restrictions, i.e. due to the fact that some feature associated with sonorants being incompatible with C-place-[cor]. Here I designate the feature as C-manner-[open]. Reference to the class of sonorants is also independently required by the syllable wellformedness constraints, as it allows us to capture the fact that sonorants in Latvian never occur as the first element of a complex onset – see Chapter 5). This also includes the vocoids /i, e, æ, u/, and therefore these also receive the C-manner-[open] specification.

3.33



Evidence for the irrelevance of the consonants vs. vowels dichotomy for Latvian also comes from syllable phonotactics, which indicates that the language actually cuts across this traditional distinction. As we have already seen in Section 3.2, a subset of the Latvian vocoids /j, i, e/ may be parsed into onsets and codas (the situation with /æ/ is not quite clear: to the best of my knowledge it does not appear in hiatus, where its re-syllabification as an onset would be motivated). Likewise, the position in the syllable nuclei is not exclusively reserved for vowels. In Latvian, the sonorant consonants /m, n, ɲ, l, r/ may occupy the nuclear position if preceded and followed by the tautosyllabic obstruent (the absence of /ʎ/ in this set is likely just an accidental gap). The view that a sonorant consonant forms a true nucleus in these cases is shared in most of the literature on the topic (Auziņa 2005, Muižniece 2002, Laua 1997, Kariņš 1996, Bond 1994 among others, but see Matthews 1958 for an alternative view). The relevant data are provided below:

3.34

[pu.tn̩-s]	‘bird’	[kɑ.kl̩-s]	‘neck’
[ni.kn̩-s]	‘angry’	[krɑ:.ʃɲ̩-s]	'splendid’
[mi.tr̩-s]	‘moist’	[krɑ.sn̩-s]	‘oven’
[ri.tm̩-s]	‘rythm’	[stin.gr̩-s]	‘strong’

Note now that the vowels /a, o/ are still banned from syllable margins. I propose to capture this fact by assigning them the V-manner-[open] specification. Now we are in a position to formulate the following general syllable well-formedness restrictions: "segments specified for C-lar may not occupy syllable nuclei" and "segments specified as V-manner-[open] may not occupy syllable margins".

The table below summarizes the feature specifications of the Latvian inventory (where Ø indicates the presence of a bare node); note again that "C" and "V" in node labels are intended solely to indicate the level of recursion and do not imply that only "consonantal" or "vocalic" features may be associated with the given node:

3.35

	C-place			C-manner		C-lar	V-place			V-manner		
	[lab]	[cor]	[dor]	[clsd]	[open]	[vcd]	[cor]	[dor]	[lab]	[open]	[clsd]	[nas]
p	✓			✓		Ø						
b	✓			✓		✓						
f	✓					Ø						
k			✓	✓		Ø						
g			✓	✓		✓						
x			✓			Ø						
c				✓		Ø	✓					
ɟ				✓		✓	✓					
t						Ø						
d						✓						
s		✓				Ø						
z		✓				✓						
ʃ		✓				Ø	✓					
ʒ		✓				✓	✓					
t͡s		✓		✓		Ø						
d͡z		✓		✓		✓						
t͡ʃ		✓		✓		Ø	✓					
d͡ʒ		✓		✓		✓	✓					
m	✓				✓							✓
n					✓							✓
ɲ					✓		✓					✓
l					✓						✓	
ʎ					✓		✓				✓	
r					✓							
r^j					✓		✓					
j		✓			✓		✓			✓		
i		✓			✓		✓				✓	
e		✓			✓		✓					
æ		✓			✓			Ø				
u					✓				✓			
o									✓	✓		
a								✓		✓		

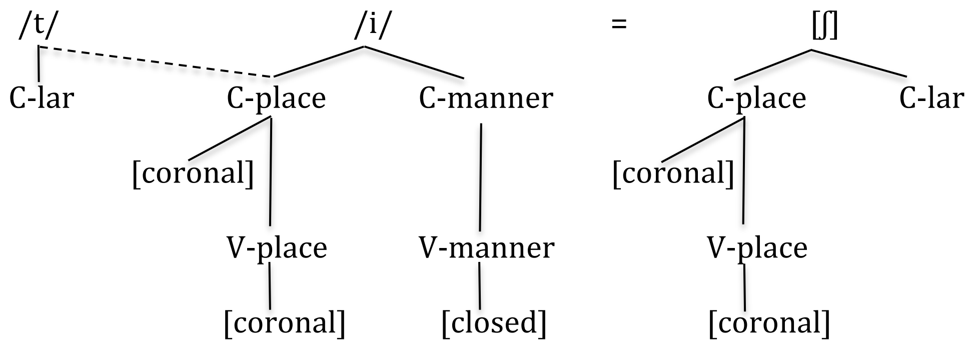
3.4.2 Representations

In this section I develop a representational analysis of Latvian palatalization couched within the Parallel Structures Model. It is important to keep in mind that while geometric representations clearly define the set of possible alternations within a given language, they are not sufficient to discriminate between theoretically possible and actually attested patterns. The output that derives from the given input is not uniquely determined by the input itself, but rather by the language-specific constraint ranking that selects the optimal output candidate from the list of available options. The goal of this section, therefore, is to demonstrate that all palatalization processes of Latvian may be captured by a non-contradictory representational analysis that does not make use of operations other than feature spreading and delinking. The phonological motivation for each of the patterns is discussed in Section 3.5, where I demonstrate that the output representations provided here are indeed selected as optimal by the constraint ranking of Latvian. I also consider some of the representationally possible but unattested patterns, and discuss the reasons for their non-application.

3.4.2.1 Yod-palatalization

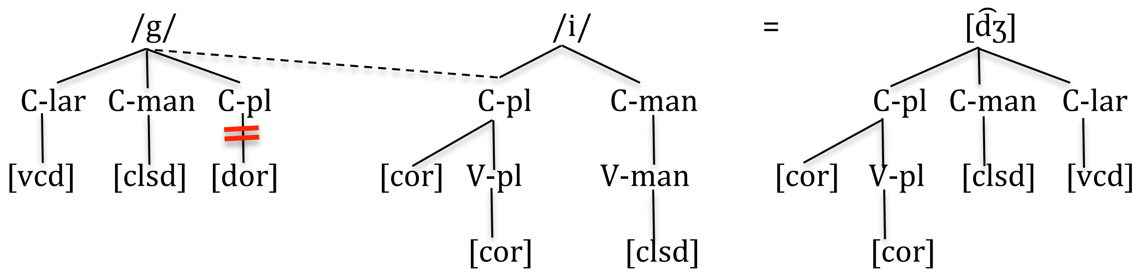
As we have seen above, yod-palatalization may target the phonologically placeless segments /t, d, n, l, r/, which as a result come to posses both C-place and V-place features. This indicates that yod-palatalization involves spreading of the constituent that may link directly under the root node, i.e. C-place-[cor]-V-place-[cor]. Note that deletion of the yod-palatalization trigger is motivated by the syllable-wellformedness considerations that are enforced in computation – these are discussed in Section 3.5.

3.36 Yod-palatalization of alveolar plosives



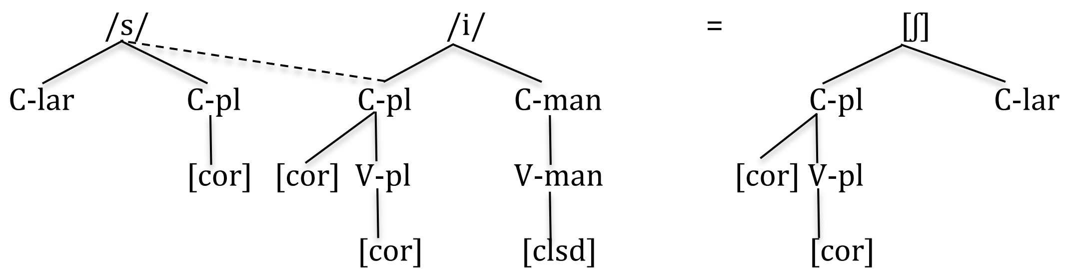
In velar targets, yod-palatalization causes delinking of the original [dorsal] feature, which reflects feature-cooccurrence restrictions. Note also that the spreading of C-pl[cor]-V-pl[cor] to the segment that is already specified for a C-place node results in a configuration where a single root node dominates two instances of C-place. I assume here that configurations where identical portions of structure are dominated by the same node are automatically repaired through fusion (this solution is also adopted in Wolf 2007:10)

3.37 Yod-palatalization of velar plosives



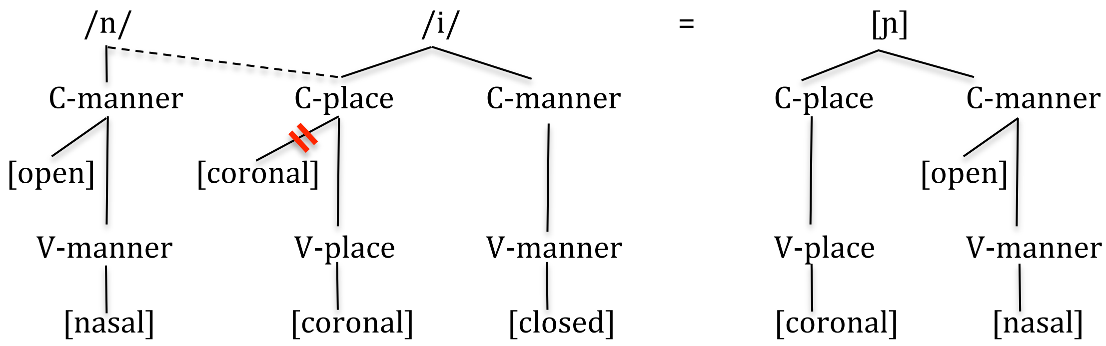
In yod-palatalization of sibilant targets, assibilation applies vacuously (here again, identical structures dominated by the same node are repaired through fusion):

3.38 Yod-palatalization of sibilants



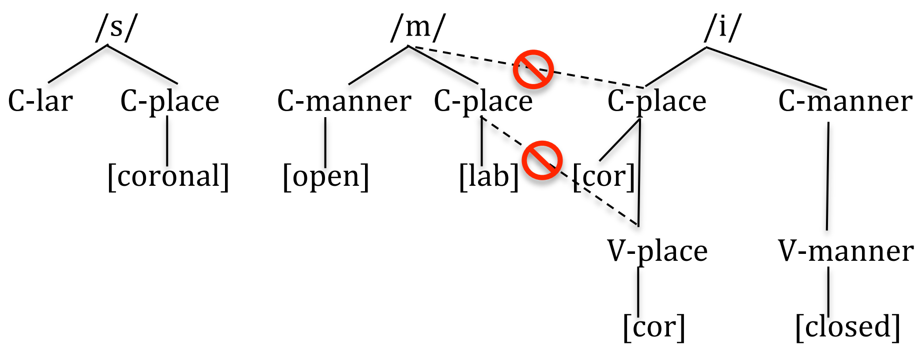
Recall that yod-palatalization of sonorants never results in assibilation. I suggest that this is due to feature co-occurrence restrictions against segments that are simultaneously specified for C-manner[open] and C-place[coronal]. The output candidates containing such structures are optimally repaired by delinking [coronal] from the C-place node.

3.39 Yod-palatalization of sonorant targets



Recall that labial consonants block yod-palatalization. In the configuration shown in 3.40, the C-place of the vocoid cannot spread across the C-place of the labial - this would mean that a valid target (root node of the labial) is skipped (see Kiparsky 1981, Archangeli & Pulleyblank 1994, Padgett 1995, among many others on skipping valid anchors). Spreading to the root-node of the labial, in turn, is forbidden due to the incompatibility between [labial] and [coronal] features. The spreading of the V-place node is blocked by the same considerations.

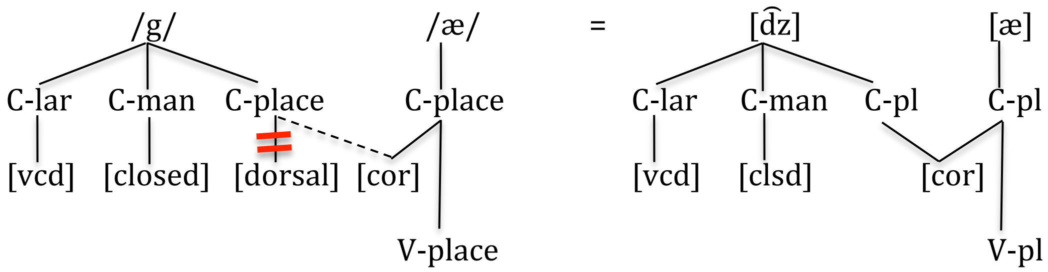
3.40 Yod-palatalization blocked by intervening labials



3.4.2.2 Velar coronalization

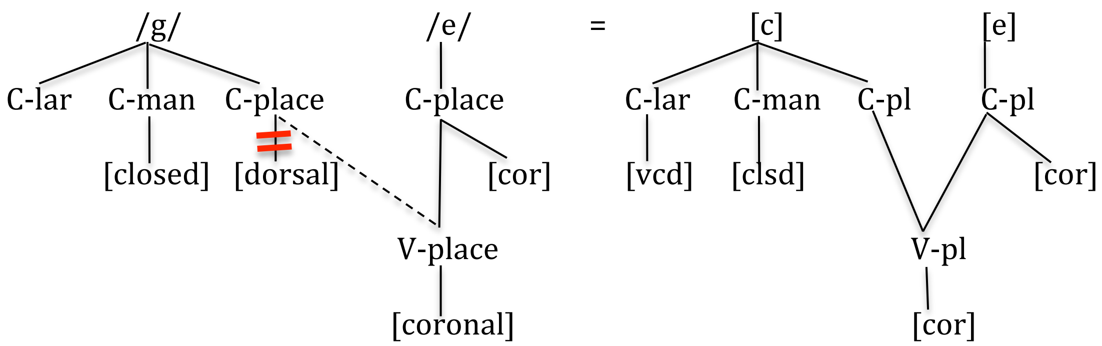
Recall that, unlike yod-palatalization, velar affrication never outputs postalveolar segments. This indicates that the structure that spreads under velar affrication is not the constituent dominated by the C-place node, but rather the individual feature [coronal] from under the C-place node. This accounts for the fact that the output of velar affrication does not trigger vowel raising, which involves the spreading of features dominated by V-place.

3.41 Velar affrication



Velar palatalization, on the other hand, involves the spreading of the V-place node dominating [coronal], as shown in 3.42. The result is a non-sibilant palatal segment, which may trigger vowel raising.

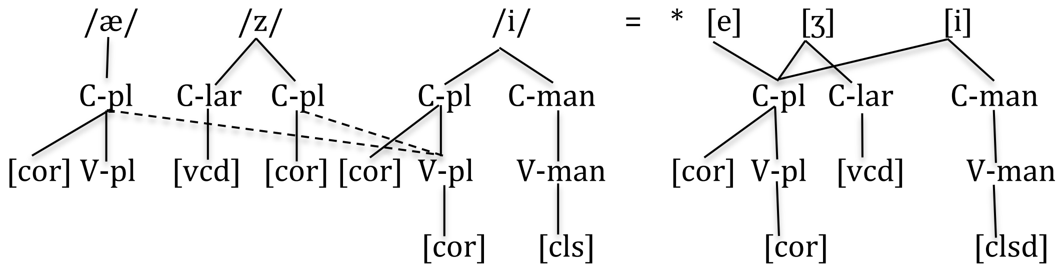
3.42 Velar palatalization



3.4.2.3 Vowel raising

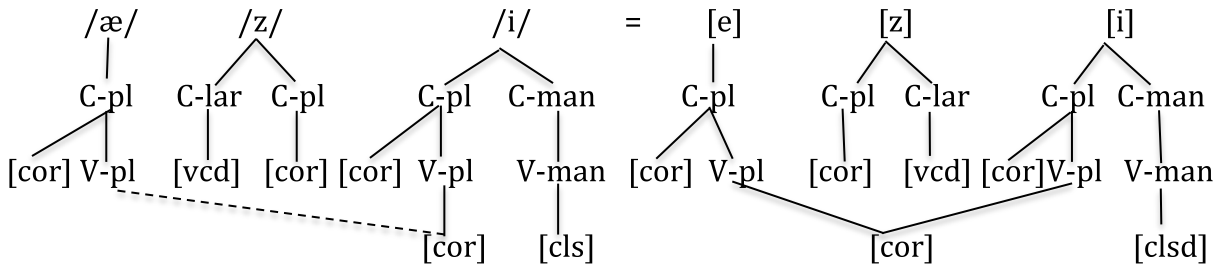
Vowel raising is triggered by all segments specified for V-place-[coronal]. This fact alone is consistent with both the spreading of the V-place-[coronal] constituent, and the spreading of the individual feature [coronal] that links under the V-place node. Recall, however, that vowel raising may apply across the intervening consonants, including those that are specified for a C-place node. If vowel raising were due to the spreading of the V-place-[coronal] constituent, we would expect it to interact with all consonants specified for a C-place node, as shown below:

3.43



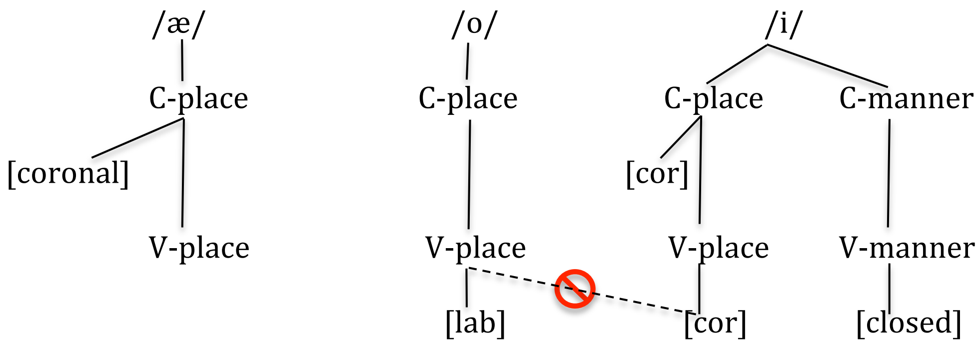
The scenario illustrated in 3.43, however, is not what happens in Latvian, where consonants that lack V-place specifications are transparent to vowel raising. This indicates that vowel raising involves the spreading of the individual feature [coronal] that links under the the V-place node:

3.44 Vowel raising applies across intervening consonants



Predictably, vowel raising across the intervening non-front vowels is blocked by a feature co-occurrence constraint that prohibits a segment from being simultaneously associated with V-place-[coronal] and V-place-labial (or V-place-[dorsal]).

3.45 Vowel raising blocked by intervening vowels



3.5 Constraint-based analysis

In this section, I develop a constraint-based analysis of palatalization processes of Modern Standard Latvian. The analysis is couched within the Parallel Optimality Theory framework (Prince & Smolensky 1993/2004). I also assume that the phonological grammar is organized in three strata – stem level, word level and phrase level - each associated with its own ranking of constraints (Stratal OT, see Bermúdez-Otero 2011, 2012). Under this view, morphosyntactic constituents created by root-to-stem and stem-to-stem derivation are subject to stem-level phonology, while fully inflected words are subject to word-level phonology. As we will see, the stratal approach makes it possible to account for the asymmetrical behavior of the derivational and inflectional suffixes with respect to the palatalization patterns that they may trigger.

Unlike many previous OT-based approaches to palatalization (e.g. Rubach 2003, Bateman 2007, Krämer 2009), I assume no constraints that explicitly ban surface strings where a non-palatal consonant is followed by a front vowel. Instead, I show that palatalization applies to satisfy high-ranking constraints penalizing certain marked structures and geometric configurations (cf. Uffmann 2005 on structural constraints, Iosad 2012 on constraint schemata in substance-free computation). Likewise, I use no constraints that explicitly enforce feature spreading (e.g. AGREE, ALIGN or SHARE). Rather, I argue that feature spreading is selected as an optimal way of satisfying structural markedness by the interaction of well-established markedness and faithfulness constraints. As I will show in the following pages, the analysis developed here is not only descriptively adequate in that it captures the palatalization processes in Latvian, but also has an explanatory value because it makes the motivation for such processes explicit.

3.5.1 Yod-palatalization

There are two crucial properties of yod-palatalization that have to be noted: first, it is triggered by high front vocoids only where they would be syllabified in the onset position (i.e. prevocalically); second, the trigger of yod-palatalization never surfaces following the palatalized segment. This leads me to believe that yod-palatalization is motivated by syllable wellformedness considerations[19].

Let us start by examining the cases where yod-palatalization fails to apply after a labial-final root, as it is in these cases that the identity of the trigger becomes apparent. As illustrated in 3.46, the underlying front vowel undergoes strengthening to fricative [j̞] when it is pre-vocalic, while surfacing as [i] preconsonantally. The strengthening of the underlying vowel reflects its syllabic affiliation: in the former case, the vowel is associated with an onset position, while in the latter case it is syllabified in the nucleus.

3.46

/buom-i-u/	→	[buom.-j̞-u]	cf.	[buo.m-i-m]	'pole'
/skɑp-i-u/	→	[skɑp.-j̞-u]	cf.	[skɑ.p-i-m]	'closet'

Re-syllabification of the front vowel is treated here as a hiatus resolution strategy motivated by a high-ranking Onset constraint. Recall that the back theme vowel

[19] The analysis developed here is largely analogous to what Iosad (2012:273-276) proposes for Bothoa Breton, where prevocalic [i] triggers palatalization of the preceding coronal. Iosad (ibid) analyzes the process as coalescence triggered by *ComplexOnset and also attributes the failure of certain segments to undergo it to feature co-occurrence constraints.

/a/ occuring in hiatus created by morpheme concatenation is deleted, rather than re-syllabified. I attribute this to the high-ranking constraint *[V-manner-open]$_{ONS}$ which militates against the vowels /a, o/ in onset position.

3.47 ONSET – assign one violation mark for every syllable that does not have an onset.

*[V-manner-open]$_{ONS}$ – assign one violation mark for a segment specified as V-manner-[open] affiliated with the onset position

Note that the surface palatal fricative [j̬] is never tautosyllabic with the preceding labial, as the onset clusters of the type [Cj̬] are banned in Latvian. For the sake of illustrative clarity, I am going to capture this fact by the general *ComplexOnset constraint. While this constraint will be sufficient for our purposes in this chapter, note that I am using it as a shorthand for a range of phonotactic constraints that will be discussed in detail in Chapter 5.

3.48

NOCODA – assign one violation mark for every syllable that has a coda.

*COMPLEXONSET – assign one violation mark for every instance where more than one segment is associated with an onset position.

3.49

	*[V-man-opn]$_{ONS}$	ONSET	*COMPLEXONSET	NOCODA
/skap-i-u/				
a. [ska.pi.u]		*!		
b. [ska.pj̬u]			*!	
☞c. [skap.j̬u]				*
/lu̯o͜p-a-u/				
a. [lu̯o͜.pa.u]		*!		
b. [lu̯o͜.pau]	*!		*	
☞c. [lu̯o͜.pu]				

Note that resolving the complex onset through re-syllabification implies violation of NoCoda. In principle, the violation could be avoided by deleting either of the two adjacent segments. I suggest that the deletion of the root-final labial is precluded by the MaxRoot constraint, which demands the preferential preservation of segments associated with morphological roots. Deletion of the underlying front vowel, in turn, is dispreferred by the family of MaxLink constraints, demanding that the place features of the front vocoid are preserved in the output candidate. In order to have the desired effect, these constraints must outrank NoCoda (this ranking is assumed here for the sake of the argument; shortly, we will see that the actual situation is a bit more complicated).

3.50

MAXLINK-C-PLACE[coronal] – assign one violation mark for every feature C-place-[coronal] in the input that does not have a correspondent in the output (Morén 2006, 1999, Blaho 2004).

MAXLINK-V-PLACE[coronal] – assign one violation mark for every feature V-place-[coronal] in the input that does not have a correspondent in the output (Morén 2006, 1999, Blaho 2004).

MAXROOT– assign one violation mark for every root segment in the input that does not have a correspondent in the output (McCarthy & Prince 1995, Casali 1997).

Note that the MaxLink constraints defined above could be satisfied if the root-final labial underwent palatalization. I suggest that this option is precluded by the feature co-occurrence constraint that militates against segments that are simultaneously specified for [labial] and [coronal] features, jointly with the MaxLink[labial] constraint that prevents the delinking of the underlying [labial] specification.

3.51

*[labial][coronal] – assign one violation mark for every root node that is simultaneously associated with features [labial] and [coronal] (see Morén 2006 on feature co-occurrence constraints in PSM).

MAXLINK-[labial] – assign one violation mark for every feature [labial] in the input that does not have a correspondent in the output (Morén 2006, 1999, Blaho 2004).

The interaction of these constraints is illustrated in 3.52.

3.52

/skap-i-a/	ONSET	*COMPLONS	MAXROOT	*[LAB][COR]	MAXLINK [LAB]	MAXLINK [C-PL-COR]	MAXLINK [V-PL-COR]	NOCODA
a. [ska.pi.a]	*!							
b. [ska.pj̯a]		*!						
c. [ska.j̯a]			*!					
d. [ska.pʲa]				*!				
e. [ska.ʃa]					*!			
f. [ska.pa]						*!	*	
☞g. [skap.j̯a]								*

Let us now turn to the cases where yod-palatalization affects non-labial targets. We start with cases where yod-palatlization applies vacuously, i.e. cases where the consonant that occurs in the palatalizing context is a palatal underlyingly. The relevant pattern is illustrated below:

3.53

/kac-i-a/	→	[ka.ca]	*[ka.t͡ʃa]	'cat, Gen. sg.'
/kuɟ-i-a/	→	[ku.ɟa]	*[ku.d͡ʒa]	'boat, Gen.sg.'

Two observations are in order about the forms in 3.53. First, in these forms the re-syllabification of the root-final consonant in the coda of the first syllable in order to avoid the violation of *ComplexOnset doesn´t apply. Second, underlying palatal stops fail to undergo assibilation. Recall from Section 3.4.2 that assibilation is analyzed here as the spreading of the C-place-[coronal] feature. The failure of the process to apply in this case can be attributed to the effect of the identity constraints, requiring that the underlying specification of the input segment is identical in the output candidate. These constraints are in conflict with the MaxLink constraints, as they always penalize the output candidates that undergoes palatalization.

3.54

IDENT(C-PLACE) – assign one violation mark for every instance where some root node x_i in the input differs from its correspondent x_o in the output with respect to the C-place specification.

IDENT(V-PLACE) – assign one violation mark for every instance where some root node x_i in the input differs from its correspondent x_o in the output with respect to the V-place specification.

The failure of assibilation to apply in the forms in 3.53 indicates that IDENT(C-PLACE) must outrank MAXLINK-C-PLACE[coronal], because preserving the underlying C-place specification of the palatal stop is more important than re-associating the C-place-[coronal] feature of the deleted front vowel. Furthermore, it indicates that MAXLINK-C-PLACE[coronal] and IDENT(V-PLACE) must be ranked below NOCODA: were it not the case, the faithful candidate with re-syllabification, *[kac.i̯a], would be selected as optimal. In turn, the mutual ranking of IDENT(C-PLACE) and NOCODA cannot be established yet, because neither is violated by the optimal candidate. This evaluation is illustrated below:

3.55

/ka c - i -a/ C-pl C-pl V-pl V-pl [cor]$_A$ [cor]$_B$ [cor]$_C$	MaxLink [V-pl-cor]	Ident (C-place)	NoCoda	MaxLink [C-pl-cor]	Ident (V-place)
a. [ka c. - i̯ -a] C-pl C-pl V-pl V-pl [cor]$_A$ [cor]$_B$ [cor]$_C$			*!		
b. [ka. t͡ʃ - -a] C-pl V-pl [cor]$_A$ [cor]$_{B, C}$		*!			
☞c. [ka .c - -a] C-pl V-pl [cor]$_{B,C}$				*	
d. [ka .c - -a] C-pl V-pl [cor]$_B$	*!			*	

Note that the way it stands, the ranking illustrated above captures yod-palatalization as being crucially motivated by the need to preserve the V-place-[coronal] specification of the underlying front vowel. On the other hand, assibilation, i.e. the preservation of the C-place-[coronal] feature, is banned by the high-ranking Ident (C-place) constraint. Nevertheless, yod-palatalization may produce sibilant outputs. Let us consider these cases in detail.

3.56

/zut-i-a/	→	[zu.ʃa]	'eel, Gen. sg.'
/las-i-a/	→	[la.ʃa]	'salmon, Gen. sg.'

The data above illustrates yod-palatalization of root-final alveolar obstruents. Note that in the case of root-final sibilants /s, z, t͡s, d͡z/ assibilation is vacuous, and the IDENT(C-PLACE) constraint is not violated by the optimal candidate. The relevant evaluation is illustrated below (less relevant constraints and candidates are omitted):

3.57

/la s -i -a / C-pl C-pl [cor]A V-pl [cor]B [cor]C	*COMPLONS	MAXLINK [V-PL-COR]	IDENT (C-PLACE)	NOCODA	MAXLINK [C-PL-COR]	IDENT (V-PLACE)
a. [la .s -j -a] C-pl C-pl [cor]A V-pl [cor]B [cor]C	*!					
b. [la s . -j -a] C-pl C-pl [cor]A V-pl [cor]B [cor]C				*!		
☞c. [la . -ʃ -a] C-pl V-pl [cor]A,B [cor]C						*

In case of the root-final alveolar plosives /t, d/, the situation is slightly different. Here, the violation of IDENT(C-PLACE) is motivated by the need to provide a docking site for the stranded V-pl-[cor] feature, the preservation of which is required by the high-ranking MaxLink constraint. The two candidates violating IDENT(C-PLACE) fare equally well on NOCODA , but the output candidate with assibilation wins on the low-ranking MAXLINK[C-PL-COR] constraint, and is, therefore, selected as optimal. Note that mutual ranking of IDENT(C-PLACE) and NOCODA is clear now: the latter must be ranked high in order to rule out the faithful candidate in (b).

3.58

/zut -i -a/ C-pl V-pl [cor]$_A$ [cor]$_B$	*COMPLONS	MAXLINK [V-PL-COR]	NOCODA	IDENT (C-PLACE)	MAXLINK [C-PL-COR]	IDENT (V-PLACE)
a. [zu.t -j -a] C-pl V-pl [cor]$_A$ [cor]$_B$	*!					
b. [zut. -j -a] C-pl V-pl [cor]$_A$ [cor]$_B$			*!			
c. [zu. -Ç -a] C-pl V-pl [cor]$_B$				*	*!	
☞d. [zu -ʃ -a] C-pl V-pl [cor]$_A$ [cor]$_B$				*		*

Let us now consider palatalization of alveolar sonorants. The relevant patterns are repeated below:

3.59

/t͡sa:l-i-a/	→	[t͡sa:ʎ-a]	'chicken, Gen. sg.'
/d͡zen-i-a/	→	[d͡zeɲ-a]	'woodpecker, Gen. sg.'

Note that sonorants fail to undergo assibilation as a result of yod-palatalization. Here I attribute this pattern to the feature co-occurrence constraint militating against segments that are simultaneously specified for C-manner-[open] and C-place-[coronal].

3.60

*C-MAN[OPEN]C-PLACE-[CORONAL] – assign one violation mark for every root node that is simultaneously associated with C-manner-[open] and C-place-[coronal]

In order to ensure that the segments specified for these features underlyingly (that is, front vocoids) are still allowed to surface, the constraint must be crucially ranked below IDENT(C-PLACE). The relevant evaluation is given below (where L denotes a hypothetical sibilant sonorant in candidate (d)):

3.61

/t͡sa: ɭ -i̯ -a/ C-m C-pl [opn]V-m V-pl [cor]$_A$ [cld] [cor]$_B$	*COMPLONS	MAXLINK [V-PL-COR]	NOCODA	IDENT (C-PLACE)	*CMAN[OP] C-PL COR]	MAXLINK [C-PL-COR]	IDENT (V-PLACE)
a. [t͡sa: . ɭ -i̯ -a] C-m C-pl [opn]V-m V-pl [cor]$_A$ [cld] [cor]$_B$	*!						
b. [t͡sa: ɭ . -i̯ -a] C-m C-pl [opn]V-m V-pl [cor]$_A$ [cld] [cor]$_B$			*!				
☞c. [t͡sa: . ʎ -a] C-m C-pl [opn]V-m V-pl [cld] [cor]$_B$				*		*	*
d. [t͡sa: . L -a] C-m C-pl [opn]V-m V-pl [cor]$_A$ [cld] [cor]$_B$				*	*!		*

Finally, let us consider the yod-palatalization of velar stops. The relevant examples are given below:

3.62

/sle:g-i-a/	→	[sle:d͡ʒ-a]	'switch, Gen. pl.'
/pus-au̯g-i-a/	→	[pus-au̯d͡ʒ-a]	'teenager, Gen. pl.'

Note that yod-palatalization of velar stops results in the delinking of the original C-place-[dorsal] specification. I attribute it here to the ill-formedness of corono-dorsal segments, enforced by the high-ranked feature co-occurrence constraint:

3.63

*[coronal][dorsal] – assign one violation mark for every root node that is simultaneously associated with [coronal] and [dorsal] features.

Just as in the case of alveolar obstruents, palatalization of velar stops produces sibilant outputs, which indicates that it involves the re-association of the C-place-[coronal] feature as well. As with the alveolar plosives, the assibilating candidate in (b) and the candidate without assibilation in (c) tie on the IDENT(C-PLACE) constaint, but the former is preferred by MAXLINK[C-PL-COR].

3.64

/sle: g -i -a/ C-pl C-pl [dor] V-pl [cor]A [cor]B	MaxLink [V-pl-cor]	NoCoda	*[cor][dor]	Ident (C-place)	MaxLink [C-pl-cor]	Ident (V-place)
a. [sle: g . -i̯ -a] C-pl C-pl [dor] V-pl [cor]A [cor]B		*!				
☞b. [sle:. d͡ʒ -a] C-pl V-pl [cor]A [cor]B				*		*
c. [sle:. ɟ -a] C-pl V-pl [cor]B				*	*!	*
d. [sle: Gʲ -a] C-pl C-pl [dor] V-pl [cor]A [cor]B			*!			*

To recapitulate, in this section we have seen that yod-palatalization is crucially motivated by complex onset avoidance, embodied in the highly-ranked *ComplexOnset constraint. While the prevocalic front vocoid deletes, the coronal features associated with it are preserved on the adjacent segment, causing it to palatalize. When the adjacent segment is incompatible with palatalization, MaxLink constraints prefer the candidate where the prevocalic front vocoid surfaces faithfully.

3.5.2 Velar coronalization

In this section I develop a constraint-based analysis of the two velar coronalization processes, velar affrication and velar palatalization. The reveant data are repeated below:

3.65

a. Velar affrication

/drau̯g-ɑ-i:g-s/	→	[drau̯d͡z-i:k-s]	'friendly'	cf.	[drau̯g-ɑ-m]	'friend, Dat. sg.'
/ʝu̯ok-ɑ-i:g-s/	→	[ʝu̯ot͡s-i:k-s]	'jocular'	cf.	[ʝu̯ok-ɑ-m]	'joke, Dat. sg.'

b. Velar palatalization

/ideolog-isk-s/	→	[ideoloɟ-isk-s]	'ideological'	[ideolok-s]	'ideologist'
/demiurg-isk-s/	→	[demiurɟ-isk-s]	'demiurgic'	[demiurk-s]	'demiurg'

Velar coronalization differs from yod-palatalization in two important respects: (i) yod-palatalization applies in all cases where the consonant comes to be followed by the prevocalic front vocoid, while velar coronalization is a morphologized process that is only triggered by derivational suffixes and theme vocoids; and (ii) outputs and targets of velar coronalization are equally well-formed from the point of view of syllable structure. The observation in (i) leads me to conclude that velar coronalization is synchronically a stem-level phenomenon.

The observation in (ii) indicates that velar coronalization is not motivated by syllable wellformedness considerations. Instead, I propose that velar coronalization is driven by a markedness constraint against the C-place-[dorsal] configuration:

3.66 *C-place-[dorsal] – assign one violation mark for every root node that dominates C-place-[dorsal].

*C-place-[dorsal] can be satisfied in two ways: by delinking the [dorsal] feature itself, or by delinking the *C-place-[dorsal] constituent. The latter option is prohibited by the MaxLink-Place constraint, which militates against the delinking of the underlying place nodes (see Morén 2006, 1999, Blaho 2004 on the MaxLink constraint family). Simple delinking of the [dorsal] feature is dispreferred by the *Bare-Place constraint that militates against empty place nodes (which is similar in spirit to the Have-Place constraint, see Lombardi 2001) – as we will see below, this constraint also plays a crucial role in vowel raising.

3.67 *BARE-PLACE – assign one violation mark to every instance of a bare place node.

MAXLINK-PLACE – assign one violation mark for every place node in the input that does not have a correspondent in the output.

When ranked above *C-place-[dorsal], these constraints ensure that the optimal candidate is the one where the original [dorsal] feature is replaced by another place feature via spreading. The tableau below illustrates velar coronalization before front vowels. In 3.68, the faithful candidate is ruled out by the *C-place-[dorsal] constraint. Candidate (b), where [dorsal] is delinked, crucially violates *Bare-Place, while candidate (c), where the entire node is delinked, is penalized by MaxLink-Place. Candidates (d), (e) and (f) all repair *C-place-[dor] by spreading. Since all of these candidates violate ID(C-place), the constraint that decides among these candidates is ID(V-place). As a result, both candidates with palatalization are ruled out, and the candidate (d), where only assibilation applies, is correctly selected as optimal.

3.68

/li:dɑ k -ɑ -iɲ-/ C-pl C-pl [dor] [cor] V-pl [cor]	MAXLINK-PLACE	*BARE-PLACE	*C-PLACE-[DOR]	ID(C-PL)	ID(V-PL)
a. li:dɑ . k -iɲ- C-pl C-pl [dor] [cor] V-pl [cor]			*!		
b. li:dɑ. T -iɲ- C-pl C-pl [cor] V-pl [cor]		*!		*	
c. li:dɑ. t -iɲ- C-pl [cor] V-pl [cor]	*!			*	
☞d. li:dɑ . t͡s -iɲ- C-pl C-pl [cor] V-pl [cor]				*	
e. li:dɑ . c -iɲ- C-pl C-pl V-pl [cor] [cor]				*	*!
f. li:dɑ . t͡ʃ -iɲ- C-pl V-pl [cor] [cor]				*	*!

Note that the ranking in 3.68 predicts that velar affrication should be the preferred strategy whenever the underlying representation contains a velar followed by a front vowel. On the one hand, this is a welcome result, because velar affrication is by far the most common alternation that affects such strings.

On the other hand, we still have to account for the fact that sometimes such sequences are repaired by velar palatalization. Note that candidate (e) in tableau 3.68 is harmonically bounded by candidate (d), since candidate (d) fares better or equally well on all the constraints. This means that no ranking of the constraints in 3.68 would prefer candidate (e) over (d). Considering that velar palatalization only applies in stems that are outside of the core vocabulary[20], one way to get the desired result is to assume that such stems are subject to a separate cophonology that contains a high-ranked *C-place-[coronal] (see Inkelas & Zoll 2007). The alternative possibility is to attribute the [k, g]~[c, ɟ] alternation to stem allomorphy. Under the latter account, the foreign stems that alternate between velar and palatal stops will have two allomorphs, e.g. /ideolog-a/ and /ideoloɟ-Ø-/. The lexical entry for such stems would also specify the phonological context where each of the allomorphs may surface, such that the one with a palatal stop may surface before front-vowel intial derivational suffixes, while the one with a velar stop may surface elsewhere. Here I remain agnostic as to which of these options is employed in Latvian.

The violation of *C-place-[dor] is never repaired by spreading V-place specifications of non-coronal vowels, as is evident from the fact that velar-final roots surface faithfully when followed by back-vowel-initial derivational suffixes, as in [lidak- u̯o-t] 'to fish for pike'. Since our analysis does not have a constraint that directly enforces the spreading of [coronal], the assimilations of this type have to be explicitly blocked. Here I attribute it to the incompatibility of C-manner-[clsd] of velar plosives and V-place features other that V-place-[coronal], embodied in the feature-cooccurrence constraints defined below:

[20] Velar palatalization triggered by the diminutive suffix [-el-] is expressive, and therefore subject to different restrictions.

3.69

*C-manner-[clsd] V-place-[dor] – assign one violation mark for every root node that is associated with C-manner-[clsd] and V-place-[dor];

*C-manner-[clsd] V-manner-[lab] – assign one violation mark for every root node that is associated with C-manner-[clsd] and V-place-[lab]

3.70

/li:dɑ k -ɑ -u̯o-/ C-pl C-pl [dor] V-pl [lab]	*C-M-[CLS] V-MA-[LAB]	MAXLINK-PLACE	*BARE-PLACE	*C-PLACE-[DOR]	ID(C-PL)	ID(V-PL)
☞a. [li:dɑ k -u̯o-] C-pl C-pl [dor] V-pl [lab]				*		
b. [li:dɑ Cʷ -u̯o-] C-pl C-pl V-pl [lab]	*!				*	*

In turn, spreading C-place-[coronal] feature from sibilants that may be adjacent to plosive stops across a morpheme boundary (e.g. in forms like [bek-ʃan-a] 'fleeing', *[bed͡z-ʃan-a]) may be attributed to CrispEdge(σ), which prohibits feature sharing between segments belonging to different syllables (Îto & Mester 1999) (we return to the role of CrispEdge constraints in Latvian in Chapter 5).

3.71

/b e k -ʃan-/ C-pl C-pl [dor] [cor]V-pl [cor]	CrispEdge(σ)	MaxLink-Place	*Bare-Place	*C-place-[dor]	ID(C-pl)	ID(V-pl)
☞a. [b e k . -ʃan-] C-pl C-pl [dor] [cor]V-pl [cor]				*		
b. [b e d͡z . -ʃan-] C-pl C-pl [cor]V-pl [cor]	*!				*	*

In present-day Latvian velar affrication occurs only in morphologically-derived environments: even where the phonological context for its application is met, the process consistently fails in tautomorphemic strings (e.g. [kino], *[t͡sino]). Here I attribute the failure of velar affrication to apply in morphologically non-derived environments to the effect of the INITIAL[F] constraint relativized to roots. Originally, INITIAL[F] and FINAL[F] constraints were proposed to enforce the directionality of spreading in assimilatory processes (McCarthy 2009). The constraints make reference to the precedence relations among segments linked to a specified feature, and penalize candidates where the output anchor of that feature precedes or follows its input anchor (based on McCarthy 2009):

3.72

> INITIAL[F] – assign one violation mark for every case where the input correspondent of the leftmost segment linked with [F] in the output precedes the leftmost segment linked with [F] in the input.

FINAL[F] – assign one violation mark for every case where the input correspondent of the rightmost segment linked with [F] in the output follows the rightmost segment linked with [F] in the input.

To give an example, INITIAL [cor] would be violated by the configuration in (b) below, because the leftmost segment associated with the feature [coronal] in the output string [t͡si] precedes the leftmost segment associated with the feature [coronal] in the input string /ki/:

3.73

/ k i / C-pl C-pl [dor] [cor] V-pl [cor]	INITIAL[CORONAL]	*C-PLACE-[DOR]
☞a. [k i] C-pl C-pl [dor] [cor] V-pl [cor]		*
b. [t͡s i] C-pl C-pl [cor] V-pl [cor]	*!	

In other words, when ranked above the constraint enforcing assimilation, INITIAL[cor] has the effect of blocking leftward spreading of the feature [coronal]. If INITIAL[cor] is relativized to the root, it will preclude leftward spreading of [coronal] (that is, palatalization), only in cases where both the input anchor and the output anchor of that feature are contained within the root domain. That is, it will block palatalization in morphologically non-derived environments, as shown in 3.75 for the word [kino] 'cinema'.

3.74

[INITIAL[coronal]]$_{RT}$ – assign one violation mark if the leftmost segment of the root linked to [coronal] in the output precedes the correspondent of the leftmost segment of the root linked to [coronal] in the input.

3.75

/ k i n o / k: C-pl – [dor]; i: C-pl – [cor], V-pl – [cor]	*BARE-PLACE	INITIAL [COR]	*C-PLACE-[DOR]	ID(C-PL)	ID(V-PL)
☞a. [k i n o] k: C-pl – [dor]; i: C-pl – [cor], V-pl – [cor]			*		
b. [t͡s i n o] t͡s: C-pl - - - [cor]; i: C-pl – [cor], V-pl – [cor]		*!		*	
c. [c i n o] c: C-pl - - - V-pl; i: C-pl – V-pl [cor], V-pl – [cor]		*!		*	*

However, as defined in 3.74, [INITIAL[coronal]]$_{RT}$ is vacuosly satisfied by candidates where palatalization applies across the morpheme boundary, because in such cases the input anchor of the spreading feature is located outside of the root domain. The relevant evaluation is illustrated below for the word [ni͜et͡s-iɲ-ʃ] 'trifle, dim.'

3.76

/ni͜ek - i ɲ -/ C-pl C-pl [dor] [cor]V-pl [cor]	*BARE-PLACE	[INITIAL [COR]]$_{RT}$	*C-PLACE-[DOR]	ID(C-PL)	ID(V-PL)
a. [ni͜ek - i ɲ -] C-pl C-pl [dor] [cor]V-pl [cor]			*!		
☞b. [ni͜et͡s - i ɲ -] C-pl C-pl [cor]V-pl [cor]				*	
c. [ni͜ec - i ɲ -] C-pl C-pl V-pl [cor] [cor]				*	*!

3.5.3 Vowel raising

Finally, let us discuss vowel raising. The relevant data are repeated below:

3.77

/mæln-i-s/	→	[meln-is]	'black horse'	cf.	[mæln-s]	'black, adj.'
/pælæ:k-i-s/	→	[pele:t͡s-is]	'gray horse'	cf.	[pælæ:k-s]	'gray, adj.'

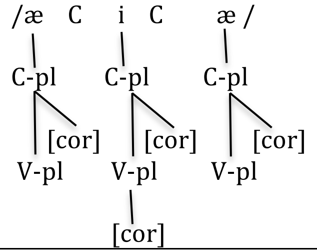
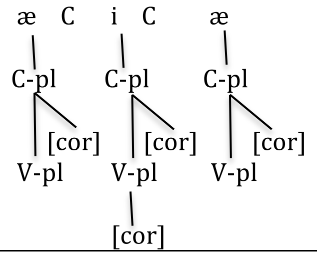
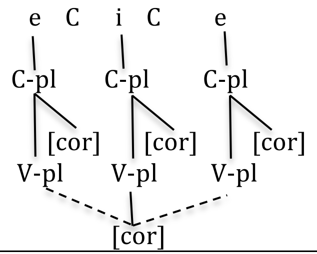
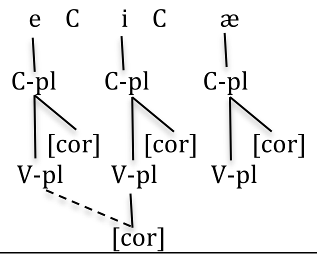
The only target of vowel raising is the front low vowel /æ/, which is also the only segment that is underlyingly specified for a bare V-place node. Therefore, I propose that vowel raising is favoured by the high-ranking *BARE-PLACE constraint (see the definition in 3.67 above). The crucial property of vowel raising is the fact that it is uni-directional: the assimilating feature only spreads to targets to the left of the trigger. Therefore, following McCarthy (2009), I suggest that the directionality of spreading should be stipulated directly by means of the FINAL[CORONAL] constraint:

3.78

> FINAL[CORONAL] – for each instance of [coronal], assign one violation mark for every case where the input correspondent of the rightmost segment linked with [coronal] in the output follows the rightmost segment linked with [coronal] in the input. (see McCarthy 2009 for the formal definition).

In other words, the constraint in 3.78 would penalize the candidate where the assimilating feature is spreading rightwards. The effect of the high-ranking FINAL[CORONAL] is illustrated below with the example of vowel raising. Consider the following (only relevant constraints are shown):

3.79

	FINAL[COR]	MAXLINK-PLACE	*BARE-PLACE	INITIAL [COR]$_{RT}$	ID(V-PLACE)
a. 			**!		
b. 	*!			*	**
☞c. 			*	*	*

Recall that vowel raising fails to apply across intervening non-front vowels, as in /bæ:d-a:-ɟ-u/ → [bæ:d-a:-ɟ-u], *[be:d-a:-ɟ-u] 'grieve, 1st pres.'. Considering that vowel raising is represented as spreading of a single feature [coronal], rather than a V-place node dominating that feature, this blocking effect may not be attributed to the crossing of association lines – the [coronal] feature of /e/ and [dorsal] feature of /a/ are, by definition, located on different autosegmental tiers. Therefore, the fact that [coronal] does not 'hop over' the V-place node of /a/ on its way to /æ/ is attributed here to the NOGAP constraint that enforces the locality of spreading (Kiparsky 1981, Archangeli & Pulleyblank 1994, Padgett 1995, among many others). NOGAP, as the name suggests, militates against gapped configurations, i.e. configurations where given a string of valid anchors XYZ, some feature F is linked to Z and X, but not Y.

3.80 NoGap – valid anchors must not be skipped.

In turn, the fact that dorsal and labial vowels do not undergo raising, i.e. the fact that they do not become associated with the [coronal] feature, is attributed to feature co-occurrence constraints. In addition, I assume high-ranking faithfulness constraints that preclude feature co-occurrence constraints from being satisfied by delinking the underlying V-place specifications of labial and dorsal vowels.

3.81

*(V-place-[dor], V-place-[cor]) – assign a violation mark if a root node is simultaneously linked to V-place-[dorsal] and V-place-[coronal] feature.

*(V-place-[lab], V-place-[cor]) – assign a violation mark if a root node is simultaneously linked to V-place-[labial] and V-place-[coronal] feature.

3.82

/æ C a C i / C-pl C-pl C-pl [cor] [cor] V-pl V-pl V-pl [dor] [cor]	*(V-PL-[DOR], V-PL-[COR])	NOGAP	FINAL[COR]	MAXLINK-PLACE	*BARE-PLACE	INITIAL [COR]$_{RT}$	ID(V-PLACE)
☞a. [æ C a C i] C-pl C-pl C-pl [cor] [cor] V-pl V-pl V-pl [dor] [cor]					*		
b. [e C A C i] C-pl C-pl C-pl [cor] [cor] V-pl V-pl V-pl [dor] [cor]	*!						**
c. [e C a C i] C-pl C-pl C-pl [cor] [cor] V-pl V-pl V-pl [dor] [cor]		*!					*

3.6 Summary

In this chapter I have developed a representational and constraint-based analysis of four distinct yet interacting processes involving palatals/postalveolars in Modern Standard Latvian: velar affrication, velar palatalization, yod-palatalization and front vowel raising. The main advantage of the representational account developed here is that it treats all of the mentioned Latvian processes as strictly assimilatory, and at the same time avoids purely stipulative mechanisms characteristic of many previous feature-geometric approaches to cross-category interactions. The chapter also provides empirical support for one of the cornerstone postulates of the PSM, as it shows that the nature of consonant-vowel interactions in Latvian requires that both classes of segments draw on the same restricted set of features and structural primitives.

The constraint-based analysis proposed here treats palatalization as motivated by the need to repair marked structures (e.g. complex onsets) and geometric configurations (e.g. bare class nodes). Unlike in many previous OT-based analyses of the process, feature spreading is not directly enforced, but rather selected as an optimal repair strategy by the well-established markedness and faithfulness constraints. The chapter also contributes to the debate on the role of geometric subsegmental representations in constraint-based computational models (Uffmann 2005), by demonstrating that a principled account of locality, transparency and blocking effects in Latvian palatalization requires reference to hierarchical autosegmental structures.

4 DIMINUTIVE PALATALIZATION

4.1 Introduction

The most general definition of palatalization is "a process by which consonants acquire secondary palatal articulation or shift to coronal place" (Kochetov & Alderete 2011:345). This output-oriented definition can be refined if one takes into account the context where the change occurs. Thus, some scholars distinguish between "phonological palatalization" and "expressive palatalization" (ibid). Phonological palatalization is the change that occurs in the context of front vocoids. It is often viewed as a straightforward example of a phonetically natural assimilatory process, where the consonantal target acquires one or several features of the vocoid trigger. The proposed phonetic motivations of this assimilation include minimization of articulatory effort (Cavar 2004) and perceptual confusability of the target and the output in the context of the front vocoid (Cavar & Hamann 2003 and references therein). Expressive palatalization, in contrast, is the change that occurs in the absence of an obvious phonological trigger – that is, a segment, whether overt or underlying, that can be plausibly assumed to have triggered the assimilatory process. Expressive palatalization frequently characterizes babytalk items, diminutives and hypocoristics, and appears to have an "iconic function, being associated with “smallness”, “childishness”, or “affection”"(Kochetov & Alderete 2011:346), supposedly grounded in human knowledge of universal sound-meaning associations (Ohala 1994, Kochetov & Alderete 2011, Czaplicki 2014).

In this chapter I develop an analysis of palatalization that occurs in the context of the Latvian diminutive suffixes [-uk-] and [-el-]. In the first part of the chapter I examine the palatalizing behavior of these suffixes across the range of morphological and phonological contexts, and demonstrate that some of the alternations they trigger cannot be attributed to assimilation. I propose that those patterns are linked to the expressive function of these diminutive suffixes and represent a case of expressive palatalization. In the second part of the chapter, I develop a representational and a constraint-based analysis of Latvian diminutive palatalization. In doing so, I argue that despite its non-assimilatory nature, Latvian diminutive palatalization is not extragrammatical, but rather the result of the application of regular phonological processes and it is subject to restrictions otherwise operative in Latvian.

The structure of this chapter is as follows. In Section 4.2 I introduce the data pertaining to phonological and morphosyntactic behaviour of the diminutive suffixes under investigation and make some generalizations. In Section 4.3 I propose a representational and a constraint-based analysis of expressive palatalization patterns. Section 4.4 contains a summary and discussion.

4.2 Data and generalizations

In this section, I examine the palatalizing behavior of two Latvian diminutive suffixes, [-uk-] and [-el-], and demonstrate that both these suffixes behave quite differently from palatalizing suffixes containing overt vocoid triggers, both in terms of the targets that they affect and the alternations that they trigger. I will show that some of these patterns cannot be plausibly attributed to assimilation, but rather represent the idiosyncratic property of these suffixes, which is linked to their expressive function.

The diminutive suffixes [-uk-] and [-el-] differ from each other with respect to frequency of use and affective import. The suffix [-el-] is very frequent (Rūķe-Draviņa 1959), and, as we will see below, does not impose strict semantic criteria on its base. Suffix [-uk-], on the other hand, is more marginal (the fact that it was not included in the list of derivational suffixes in the Academic Grammar of

Latvian, AGL 1951, may serve as some indication of this fact), and also more restrictive. Thus, it appears to prefer animate – and especially human – bases (although not exclusively; also noted in Rūķe-Draviņa 1959), while [-el-] apparently has no such preference. The two suffixes also appear to differ in their semantic import, although that of [-uk-] is not discussed in the literature in much detail. There is also some indication that the meaning of [-uk-] has undergone some changes in the course of the last sixty years. For example, Endzelīns (1951:359) notes specifically that [-uk-] only expresses diminution and not affection, while Kalme & Smiltniece (2001:74) also mention "degree of affection". Suffix [-el-] expresses diminution and may also express perjoration (Endzelīns 1959:343, Kalme & Smiltniece 2001:67). The Academic Grammar also notes "a degree of affection" as a possible meaning of [-el-] (AGL 1959:94).

Although the palatalizing behavior of [-uk-] and [-el-] have been noted before (Kalme & Smiltniece 2001, Steinbergs 1977, AGL 1959, Endzelīns 1951), the available descriptions are rather scarce. The most detailed and comprehensive source on the topic that I am aware of is a doctoral dissertation by Velta Rūķe-Draviņa (1959). The dissertation documents and discusses the use of a large range of Latvian diminutive suffixes (59 different suffixes used across dialects and regional varieties), and builds on material collected by Rūķe-Draviņa over the course of 15 years. As the author notes, the core material for her study comes from non-standard varieties and vernacular registers. While the work presented in Rūķe-Draviņa (1959) is extremely useful in that it provides insight into the variability and range of phonological phenomena that might be associated with diminutive formation, the data it presents cannot serve as a basis for developing a model of phonological competence of a Latvian speaker. This is because the data accumulated across the dialects and registers do not reflect the competence of a single individual speaker, and is not a product of an individual mental grammar.

The data pertaining to the palatalizing behavior of the diminutive suffixes [-uk-] and [-el-] presented in this section mainly come from my own fieldwork and represent written productions of one informant, a 59-year-old female, who is a native speaker of Standard Latvian and a resident of Riga. In the elicitation task, the informant was presented with a randomized list of 172 nouns, including both animate (human and non-human) and non-animate stems belonging to seven declension classes. Stems were selected so as to contain the full range of root-final consonants attested in Latvian. In two separate sessions, the informant was asked to form diminutives with [-uk-] and [-el-] for each of the items on the list. In doing so, the informant was instructed to consider a full range of contexts were such diminutives might be used, including informal and figurative language. This was done in order to elicit not only stereotypical [-el-] and [-uk-] diminutives that are relatively frequent in the standard language contexts, but also the cases of creative use of -el- and -uk- that might appear in colloquial speech.

In addition, the informant was requested to assess the acceptability of each of the resultant forms on a scale from 1 to 5 (where grade 5 was assigned to forms that are perfectly acceptable, and grade 1 to forms that are not acceptable under any circumstances). While the informant could coin the diminutive forms for all items on the list, she rated some of the diminutives as 1 and remarked that she would never use them – not even under very special circumstances – because they sound really odd. Forms like these (84 in total) were excluded from the analysis. The final dataset thus included 88 diminutive nouns derived with [-uk-], and 88 diminutives derived from the corresponding nouns with [-el-]. The list of forms produced by the informant and their rating is included as Appendix 1.

The unacceptability of certain -uk- and -el- diminutives may have various reasons. Thus, diminutives formed with -uk- might be judged unacceptable if derived from non-animate bases or from nouns that appear incompatible wih affective semantics. Frequency might also play a role, with low-frequency stems sounding odd when affixed with relatively rare diminutive suffixes.

All forms rated between 2 and 5 were also checked through the Google corpus search. This was done to ascertain that (i) phonological patterns in the obtained diminutive forms are not unique to the idiolect of my informant; and (ii) non-stereotypical -uk- and -el- diminutives may be produced by speakers of Latvian also spontaneously and do not exclusively appear in the context of an elicitation task. Appendix 2 contains the list of such forms returned by Google, in the carrier sentences providing context. Out of the 88 forms produced and rated as acceptable by my informant, 57 uk-deminutives and 52 el-deminutives were also found in Google search, which indicates that both suffixes are actively used outside of elicitation contexts.

In her discussion of -uk- diminutives Rūķe-Draviņa (1959) notes a large degree of variation in her dataset with respect to whether or not the diminutive suffix causes palatalization in a certain class of root-final consonants. Thus, she finds variation between dialects and variation among speakers of the same variety. Furthermore, she also observes that forms with and without palatalization might co-exist for the same speaker. My dataset includes a limited number of examples of the latter type, which are discussed in Section 4.3.3.4. The study of variation, whether between dialects or between individual speakers, falls beyond the scope of this dissertation and is therefore left for future research.

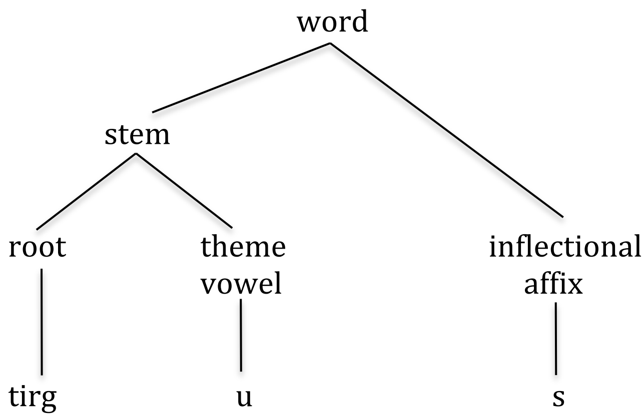
The rest of this section is organized as follows: In 4.2.1, I discuss the constituent structure of Latvian nouns and introduce the morphological assumptions of this chapter. In 4.2.2 I discuss the diminutive suffix [-uk-]: in 4.2.2.1 I give a brief overview of its morphosyntactic behaviour; in 4.2.2.2 I discuss those cases of palatalization before [-uk-] that can be attributed to yod-palatalization; in 4.2.2.3 I turn to alternations triggered by [-uk-] that have to be ascribed to expressive palatalization, and summarize the data in 4.2.2.4. In 4.2.3 I discuss the diminutive suffix [-el-]: after introducing the suffix in 4.2.3.1, I discuss the reasons for the failure of yod-palatalization before it in 4.2.3.2; in 4.2.3.3 I consider the cases of expressive palatalization triggered by [-el-], while in 4.2.3.4 I summarize the data. Sub-section 4.2.4 is dedicated to summary and discussion.

4.2.1 Background: constituent structure of Latvian noun

As some of the arguments advanced in this chapter make crucial reference to morphological notions, a brief discussion of the morphological structure of Latvian nouns is in order. The goal of this section is to provide the necessary background, and to introduce the morphological assumptions underlying the phonological analysis proposed here. Admittedly, the morphological discussion presented here is at a very general level, but should nevertheless be sufficient to explore the phonological patterns exhibited by the two diminutive suffixes under investigation.

Morphologically, Latvian nouns have a constituent structure that distinguishes between three levels: the root, the stem and the word (see Bermúdez-Otero 2013 on the constituency of lexical categories; cf. Halle 1992b:38 for the analysis of Latvian). This is schematically illustrated below for the noun [tirgus] 'market'. The root of the noun [tirgus] is [tirg-]. The root [tirg-] can be combined with a theme vowel [-u-] to give rise to a nominal stem [tirg-u-]. This stem, in turn, can be inflected for case and number to give rise to a word [tirg-u-s], a nominative singular noun, which can function independently in a syntactic context.

4.1 Constituent structure of the noun [tirgus] (adapted from Bermúdez-Otero (2013:2))



Latvian nominal stems are traditionally described as falling into six declensions, with a distinct subparadigm for each (AGL 1959: 409-410). Each declension is characterized by a certain theme vowel, although there is no one-to-one correspondence between the phonological shape of a theme vowel and a declension class. Thus, stems of Declension 1 and Declension 4 are a-stems, stems of Declension 2 and Declension 6 are i-stems, etc. Declensions 1-3 host most masculine nouns, while Declensions 4-6 group all feminine and some exceptional masculine nouns[21]. Halle (1992b) refers to these as Class A and Class B declensions respectively, and I adopt his terminology here[22]. Paradigms corresponding to these declensions are illustrated below:

4.2 Masculine declensions: Class A

a. Declension 1			*b. Declension 2*			*c. Declension 3*		
	'horn'			'salmon'			'ice'	
	Singular	Plural		Singular	Plural		Singular	Plural
Nom	[rak-s]	[rag-i]	**Nom**	[las-i-s]	[laʃ-i]	**Nom**	[led-u-s]	[led-i]
Gen	[rag-a]	[rag-u]	**Gen**	[laʃ-a]	[laʃ-u]	**Gen**	[led-u-s]	[led-u]
Dat	[rag-a-m]	[rag-i̯em]	**Dat**	[las-i-m]	[laʃ-i̯em]	**Dat**	[led-u-m]	[led-i̯em]
Acc	[rag-u]	[rag-us]	**Acc**	[las-i]	[laʃ-us]	**Acc**	[led-u]	[led-us]
Loc	[rag-a:]	[rag-u̯os]	**Loc**	[las-i:]	[laʃ-u̯os]	**Loc**	[led-u:]	[led-u̯os]

[21] Here I follow the traditional labeling of declensions, which appears, e.g. in AGL (1959).

[22] Unlike Halle (1992b), I use the terms "Class A" and "Class B" here only descriptively as convenient labels, and they do not have any theoretical status in the analysis developed here.

4.3 Feminine declensions: Class B

d. Declension 4			*e. Declension 5*			*f. Declension 6*		
	'sister'			'mouse'			'blood'	
	Singular	Plural		Singular	Plural		Singular	Plural
Nom	[ma:s-a]	[ma:s-a-s]	**Nom**	[pel-e]	[pel-e-s]	**Nom**	[asin-s]	[asin-i-s]
Gen	[ma:s-a-s]	[ma:s-u]	**Gen**	[pel-e-s]	[peʎ-u]	**Gen**	[asin-s]	[asiɲ-u]
Dat	[ma:s-a-j]	[ma:s-a:-m]	**Dat**	[pel-e-j]	[pel-e:-m]	**Dat**	[asin-i-j]	[asin-i:-m]
Acc	[ma:s-u]	[ma:s-a-s]	**Acc**	[pel-i]	[pel-e-s]	**Acc**	[asin-i]	[asin-i-s]
Loc	[ma:s-a:]	[ma:s-a:-s]	**Loc**	[pel-e:]	[pel-e:-s]	**Loc**	[asin-i:]	[asin-i:-s]

There also exist two very restricted groups of nominal stems that follow different paradigms (also see Halle 1992b, AGL 1959 on this point). One of them contains masculine stems and is traditionally grouped with Declension 2 nouns, because it partially follows the paradigm of Declension 2 (here and further I refer to it as Declension 2'). The other one contains feminine u-stems, and partially follows the paradigm of Declensions 4 and 5; note also that all nouns in this group are *pluralia tantum.* Here and further I refer to it as Declension 4', although it is traditionally grouped with masculine u-stems of Declension 3 (AGL 1959).

4.4

a. Declension 2'				*b. Declension 2*		
	'stone'		**CF.**		'salmon'	
	Singular	Plural			Singular	Plural
Nom	[akmen-s]	[akmeɲ-i]		**Nom**	[las-i-s]	[laʃ-i]
Gen	[akmen-s]	[akmeɲ-u]		**Gen**	[laʃ-a]	[laʃ-u]
Dat	[akmen-i-m]	[akmeɲ-i̯em]		**Dat**	[las-i-m]	[laʃ-i̯em]
Acc	[akmen-i]	[akmeɲ-us]		**Acc**	[las-i]	[laʃ-us]
Loc	[akmen-i:]	[akmeɲ-u̯os]		**Loc**	[las-i:]	[laʃ-u̯os]

4.5

a. Declension 4'				*b. Declension 4*		
	'sled'				'sister'	
	Singular	Plural	**CF.**		Singular	Plural
Nom		[rag-u-s]		**Nom**	[ma:s-a]	[ma:s-a-s]
Gen		[rag-u]		**Gen**	[ma:s-a-s]	[ma:s-u]
Dat		[rag-u:-m]		**Dat**	[ma:s-a-j]	[ma:s-a:-m]
Acc		[rag-u-s]		**Acc**	[ma:s-u]	[ma:s-a-s]
Loc		[rag-u:-s]		**Loc**	[ma:s-a:]	[ma:s-a:-s]

Declensions 1, 2, 4 and 5 are *open* declensions: these contain both simple and derived stems and accept new borrowings (Nau 2011:150). Declensions 2', 3, 4' and 6 are *closed* declensions: these do not contain derived stems or recent borrowings (Nau *ibid*). In addition, stems of closed declensions are very restricted in number. There are eight stems in Declension 2' (see Guļevska et al. 2002:69 for the list), 11 stems in Declension 3 (in addition to a handful of proper names, see AGL 1959:415), and only three stems in Declension 4': [pel-us] "chaff", [rag-us] "sled" and [d͡zirn-us] "mill" (AGL 1959:416). All stems of Declension 4' are regarded as obsolete, and they all have variants belonging to Declension 4: [pelav-as], [ragav-as] and [d͡zirnav-as] respectively. The number of stems in Declension 6 is somewhat larger, but also limited: the search in the tagged text corpus of Modern Latvian[23] (Levāne-Petrova 2012) returns 55 stems.

As I have already mentioned, all Latvian nominal stems have a theme vowel following a root. The phonological inventory of nominal theme vowels comprises four segments: /i, e, u, a/. In some forms, the underlying theme vowel fails to surface as such, either due to historical change or to the application of a synchronically productive phonological process. The underlying phonological shape of a nominal theme vowel is most clearly seen in the singular Locative (or plural Locative for feminine *pluralia tantum*). The distribution of theme vowels in Latvian nominal declensions is illustrated below:

4.6

Declension:	Declension 1	Declension 2	Declension 2'	Declension 3
Loc. sg.	[rag-a:]	[las-i:]	[akmen-i:]	[led-u:]
Theme Vowel:	/a/	/i/	/i/	/u/

Declension:	Declension 4	Declension 4'	Declension 5	Declension 6
Loc. sg.	[mas-a:]	[rag-u:s]	[pel-e:]	[asin-i:]
Theme Vowel:	/a/	/u/	/e/	/i/

In Latvian, the choice of a theme vowel cannot be predicted from the phonological shape of a root[24]. This is illustrated below with roots that are all monosyllables

[23] 'Līdzsvarots mūsdienu latviešu valodas tekstu korpuss' [Balanced text corpus of Modern Latvian], available at www.korpuss.lv

[24] While this is definitely true of nouns belonging to the core vocabulary, the behaviour of borrowings remains an open question. To the best of my knowledge, there currently exists no study that investigates the existence of phonological regularities in the assignment of borrowed nouns to declension classes and/or the distribution of theme vowels in borrowed items. However interesting, this question falls beyond the scope of this work, and is therefore left for future research.

ending in [-al]/[-a:l], but nevertheless follow different subparadigms (following Bermúdez-Otero (2013:12) who uses the same test to illustrate a similar pattern in Spanish):

4.7

Decl.	Theme vowel	Nom.sg.	Loc. sg.	
1	-a-	[ma:l-s]	[ma:l-a:]	'clay'
2	-i-	[t͡sa:l-i-s]	[t͡sa:l-i:]	'chicken'
3	-u-	[al-u-s]	[al-u:]	'beer'
4	-a-	[mal-a]	[mal-a:]	'side'
5	-e-	[za:l-e]	[za:l-e:]	'grass'
6	-i-	[sa:l-s]	[sa:l-i:]	'salt'

The grammatical gender associated with a root does not determine the choice of theme vowel either. So, for instance, there are both a-stems and u-stems that are masculine. Thus, the choice of theme vowel cannot be predicted from either the phonological shape or gender of a root. This raises the question of the nature of the mechanism by which roots are combined with corresponding theme vowels, i.e. the mechanism that accounts for the fact that the root /tirg-/ appears in an u-stem, while the root /las-/ appears in an i-stem, and so on.

In what follows, I will consider two alternative solutions that have been proposed in the literature. I will start with Halle (1992b), which, to the best of my knowledge, is the only work in the generative tradition that explicitly deals with theme vowel selection in Latvian declension. Halle (1992b) proposes that nominal stems in Latvian are categorized by means of two binary diacritic features, [±marginal] and [±marked]. Stems that are associated with [+marginal] all share two morphological properties that distinguish them from stems linked with a [-marginal] feature: first, they all come from closed declensions; second, they are characterized by syncretism between Nom and Gen case in the singular. Unfortunately, Halle (1992b) does not discuss his reasons for assigning [±marked] specifications. The stems he labels as [+marked] do not share any obvious characteristics allowing us to treat them as a natural class – not in terms of grammatical gender, subparadigm, phonological processes that they do or do not undergo or even the quality of a theme vowel. Halle (1992b) further proposes that the very same diacritic feature specifications determine the choice of theme vowels. Consider the following:

4.8 Diacritic features of nominal stems (from Halle 1992b:38)

Class B	u	i	e	a	
Class A	u	i_b	i_a	a	
	+	+	-	-	Marginal
	+	-	+	-	Marked

Because the diacritic features are intended to determine the choice of the theme vowel, they cannot be contained within the theme vowel itself. It follows, then, that they have to be associated with the root. Halle (1992:38) explicitly views the theme vowel as a "nominalizing morpheme", from which I infer that the root, for him, is acategorial.

It is reasonable to expect that [± marked] and [± marginal] specifications that are the property of the acategorial root should have an effect on stems derived from that root regardless of their syntactic category. Roughly speaking, one would expect to find evidence that verbal stems associated with the feature [+marginal] by virtue of being derived from [+marginal] roots, also behave as a natural class, just as nominal stems derived from the same [+marginal] roots do.

However, this prediction is not borne out, as is evident, for instance, from the distribution of verbal stems derived from [-marginal, -marked] roots. Consider:

4.9

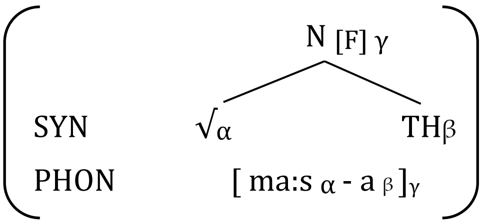
Root	Nom. stem.	Verb. stem.	Conjugation, group	1st p. sg. pres.
/aug-/	/aug-a-/ 'plant'	/aug-/ 'to grow'	I, 1	[aug-u]
/sle:g-/	/sle:g-a-/ 'lock'	/sle:g-j/ 'to lock, close'	I, 4	[sle:d͡z-u]
/maks-/	/maks-a-/ 'charge, fee'	/maks-a:-/ 'to pay'	II, 1	[maks-a:-j̥-u]
/kra:s-/	/kra:s-a-/ 'color, paint'	/kra:s-u͜o-/ 'to paint'	II, 2	[kra:s-u͜o-j̥-u]
/mæ:r-/	/mæ:r-a-/ 'measure'	/mæ:r-i:-/ 'to measure'	II, 3	[me:r-i:-j̥-u]
/pulk-/	/pulk-a-/ 'crowd'	/pult͡s-e:-/ 'to gather'	II, 4	[pult͡s-e:-j̥-u]
/ra͜ud-/	/ra͜ud-a-/ 'weeping'	/ra͜ud-a:-/ 'to cry'	III, 1	[ra͜ud-u]
/rakst-/	/rakst-a-/ 'article'	/rakst-i:-/ 'to write'	III, 2	[rakst-u]
/zi͜ed-/	/zi͜ed-a-/ 'flower'	/zi͜ed-e:-/ 'to bloom'	III, 3	[zi͜ed-u]

As the table above illustrates, verbal stems derived from [-marginal, -marked] roots can combine with any verbal theme vowel, or be athematic. That is, verbal stems derived from [-marginal, -marked] roots are to be found in every group of every conjugation. I contend that these data are inconsistent with the proposal that [±marginal] and [±marked] features are the property of the acategorial root. This essentially leaves us with two options.

The first option is that a root bearing these diacritics has an inherent syntactic category, i.e. it is a noun. This allows to account for the theme vowel selection, as well as the fact that verbal stems are apparently not sensitive to these diacritics. The second option that has to be explored is that the diacritic features are the property of a nominal stem, which is composed of an acategorial root and a nominalizer (the theme vowel). Because the acategorial root cannot contain these diacritics (see above), these would have to be specified in the lexical entry of a theme vowel. This, however, leaves us with no explanation of how roots are paired with respective theme vowels – which was the reason to postulate the diacritics in the first place.

The solution that I adopt here is different from the options considered above. Following the proposal developed in Bermúdez-Otero (2013) for Spanish, I propose that in Latvian the minimal chunk of structure that is stored in the lexicon is a thematised stem. The lexical entry for the stem minimally includes the following information (semantics aside):

4.10 Lexical entry for the nominal stem (adapted from Bermúdez-Otero (2013:43)



As illustrated in 4.10, the lexical entry of a stem specifies the properties that are relevant to the syntactic, phonological and semantic module (not considered here). With respect to the syntactic properties, here it is sufficient to say that the lexical entry specifies the category of the stem (N), its gender ([F]) and its syntactic constituents – a root (√) and a theme vowel (TH). The phonological information includes the phonological shape of the root and that of a theme vowel (see Bermúdez-Otero 2013:43-44 for a more detailed description of the structure).

For the sake of completeness, something has to be said also about the underlying representations of nominal inflectional morphemes. I assume that nominal inflectional suffixes in Latvian have the underlying phonological shapes given in 4.11. This closely follows the proposal developed in Halle (1992b), with only one exception: I propose that in Latvian, the phonological representation of certain case-number suffixes contains floating structure.

4.11 URs of nominal inflections

a. Class A case-number suffixes

	Declension 1		Declension 2		Declension 2'		Declension 3	
Theme	-a-		-i-		-i-		-u-	
	Singular	Plural	Singular	Plural	Singular	Plural	Singular	Plural
Nom	-s	-i	-s	-i	-s	-i	-s	-i
Gen	-a	-u	-a	-u	-s	-u	-s	-u
Dat	-m	-i̯em	-m	-i̯em	-m	-i̯em	-m	-i̯em
Acc	[+high]	-us	[+high]	-us	-[+high]	-us	[+high]	-us
Loc	-μ	-u̯os	-μ	-u̯os	- μ	-u̯os	-μ	-u̯os

b. Class B case-number suffixes

	Declension 4		Declension 4'		Declension 5		Declension 6	
Theme	-a-		-u-		-e-		-i-	
	Singular	Plural		Plural	Singular	Plural	Singular	Plural
Nom	-Ø	-s		-s	-Ø	-s	-s	-s
Gen	-s	-u		-u	-s	-u	-s	-u
Dat	-j	-μm		-μm	-j	-μm	-j	-μm
Acc	[+high]	-s		-s	[+high]	-s	[+high]	-s
Loc	-μ	-μs		-μs	-μ	-μs	-μ	-μs

In Latvian, certain case-number forms are marked not by means of an overt inflection, but rather by means of alternation of a theme vowel. Such are, for instance, singular Accusative and singular Locative forms. Consider:

4.12

Decl.	Theme	Acc.sg.	Loc. sg.		Dat. sg.	
1	-a-	[rag-u]	[rag-a:]	cf.	[rag-a-m]	'horn'
2	-i-	[las-i]	[las-i:]	cf.	[las-i-m]	'salmon'
2'	-i-	[sun-i]	[sun-i:]	cf.	[sun-i-m]	'dog'
3	-u-	[led-u]	[led-u:]	cf.	[led-u-m]	'ice'
4	-a-	[ma:s-u]	[ma:s-a:]	cf.	[ma:s-a-j]	'sister'
5	-e-	[pel-i]	[pel-e:]	cf.	[pel-e-j]	'mouse'
6	-i-	[asin-i]	[asin-i:]	cf.	[asin-i-j]	'blood'

As illustrated in 4.12, all Accusative sg. forms are marked by raising a theme vowel (where the underlying phonological shape of a theme vowel is /i, u/, the raising is vacuous). Similarly, all Locative sg. forms are marked by lengthening a theme vowel. In contrast, Dative sg. forms are marked by an overt inflection, [-m] for Class A stems, and [-j] for Class B stems.

Discussing these instances, Halle (1992b) proposes that Accusative sg. and Locative sg. inflection is /-Ø/, and surface alternations are due to the application of readjustment rules that respectively raise and lengthen a theme vowel in the relevant morphological context (Halle 1992b:40). In contrast, I propose that the Accusative sg. suffix is underlyingly the phonological feature [+high][25], while the Locative sg. suffix is a mora /-μ/ (see Akinlabi 2011, Zimmermann & Trommer 2013). Following the same logic, I also propose that the phonological representations of some suffixes (specifically, Dative pl. and Locative pl. markers in Class B declensions) contain both segmental material and floating structure. As a result, the respective case-number forms are marked both by overt inflection and alternation of a theme vowel.

Because of the limited scope of this work, the formulation of the spell-out rules that assign phonological shape to number-case suffixes associated with each declension will have to be left for future research (but cf. Halle 1992b for a proposal to this end).

4.2.2 The suffix [-uk-]

4.2.2.1 Background

The suffix [-uk-] is productive in forming diminutives (including hypocoristics) that express smallness and a certain degree of affection (Kalme & Smiltniece 2001:74, Steinbergs 1977:67-69, Rūķe-Draviņa 1959:276-286, Endzelīns 1951:359-360). The suffix [-uk-] seems to prefer animate - and especially human - bases, which is not unexpected given its affective semantics (Rūķe-Draviņa 1959:278; my fieldwork confirms that as well):

[25] Or any other feature that distinguishes the set of high vowels in the system. I am using familiar SPE-style features here solely for the sake of clarity.

4.13

[bra:lis]	cf.	5[bra:ʎ-uk-s]	'brother'
[ma:sa]	cf.	5[ma:ʃ-uk-s]	'sister'
[plu:me]	cf.	3[plu:mʝ-uk-s]	'plum'
[tilts]	cf.	2[tilt-uk-s]	'bridge'

The suffix [-uk-] can combine with nouns belonging to any declension[26]. However, all stems derived with [-uk-] take the theme vowel -a- and follow the sub-paradigm of Declension 1. This is illustrated in 4.14 (also noted in Rūķe-Draviņa 1959:278):

4.14

Decl.	Nom.sg.	Dat.sg.		Nom.sg.	Dat.sg.	
1	[vilk-s]	[vilk-a-m]	cf.	[viltʃ͡-uk-s]	[viltʃ͡-uk-a-m]	'wolf
2	[zut-i-s]	[zut-i-m]	cf.	[zuʃ-uk-s]	[zuʃ-uk-a-m]	'eel'
2'	[sun-s]	[sun-i-m]	cf.	[suɲ-uk-s]	[suɲ-uk-a-m]	'dog'
3	[li̯e̯t-u-s]	[li̯e̯t-u-m]	cf.	[li̯e̯t-uk-s]	[li̯e̯t-uk-a-m]	'rain'
4	[mas-a]	[mas-a-j]	cf.	[maʃ-uk-s]	[maʃ-uk-a-m]	'sister'
5	[pi:l-e]	[pi:l-e-j]	cf.	[pi:ʎ-uk-s]	[pi:ʎ-uk-a-m]	'duck'
6	[ziʋ-s]	[ziv-i-j]	cf.	[zivj-uk-s]	[zivj-uk-a-m]	'fish'

Furthermore, all stems derived with [-uk-] trigger masculine agreement, regardless of the grammatical gender of the corresponding non-diminutive noun:

4.15

a. Mans	mīļais	**znot-uk-s**	ir	atnācis.
My-masc.	dear-def-masc.	son-in-law-dim	is	come-part.-masc.
'My dear son-in-law has arrived'				
b. Mans	mīļais	**meit-uk-s**	ir	atnācis.
My-masc.	dear-def.-masc.	daughter-dim.	is	come-part.masc.
'My dear daughter has arrived'				
c. Mana	mīļā	**meit-a**	ir	atnākusi.
My-fem.	dear-def-fem.	daughter	is	come-part.-fem.
'My dear daughter has arrived'				
d. Mans	mīļais	**znot-s**	ir	atnācis.
My-masc.	dear-def.masc.	son-in-law	is	come-part.-masc.
'My dear son-in-law has arrived'				

[26] Declension 4´, which only contains three archaic stems, all of them inanimate, will not be considered.

The suffix [-uk-] is known to sometimes trigger palatalization of the preceding consonantal segment, causing the underlying alveolars (sonorants and obstruents) and velars to surface as postalveolars and palatals, as can be seen in 4.14(for more examples, see Rūķe-Draviņa 1959:276-286, also Kalme & Smiltniece 2001:74, Steinbergs 1977:67-69, Endzelīns 1951:359-360). Rūķe-Draviņa (1959) observes that in her data, at least for some speakers and some varieties, there appears to be a "general tendency" for palatalization before [-uk-] to apply if the input noun belongs to Declension 2, 5 or 6, but not otherwise (Rūķe-Draviņa 1959:282)[27]. She notes, however, that there are numerous counterexamples where palatalization before [-uk-] applies in nouns belonging to other declensions, which precludes the possibility of linking uk-palatalization with a specific declension class. She suggests that at least in those cases uk-palatalization is expressive in nature and applies to convey "emotional overtones" (the point also made in Endzelīns 1951:192). Endzelīns (1951:359), on the other hand, suggests that uk-palatalization in those cases can be explained by the analogical influence of the uk-diminutives formed from the nouns of Declension 2, 5 and 6.

In what follows, I will show that the correlation between the declension of the input noun and the applicability of uk-palatalization becomes obvious if one considers different classes of root-final segments separately. I will demonstrate that the presence of uk-palatalization is predictable from the declension of the input noun for most classes of root-final segments, such that it applies in nouns of Declension 2, 5 and 6 and not elsewhere. I argue that in these cases palatalization before [-uk-] is attributable to yod-palatalization. I also demonstrate that other classes of segments – specifically, sibilants and velars – undergo palatalization

[27] Both Rūķe-Draviņa (ibid) and Endzelīns (1951:359) apparently view uk-palatalization in nouns of Declensions 2, 5 and 6 as something that is to be expected, without explicitly stating their reasons for it. I deduce that this might be because they either (i) view uk-palatalization as being triggered by analogy (stems of Declension 2, 5 and 6 also undergo palatalization in the inflectional paradigm); or (ii) attribute it directly to yod-palatalization (as I do here as well).

before [-uk-] regardless of the declension of the input noun and argue that in these cases palatalization is best treated as expressive.

4.2.2.2 Yod-palatalization before [-uk-]

Recall that in the course of the discussion of yod-palatalization in Chapter 3, I made a distinction between palatalizing and non-palatalizing declensions. The former group includes declensions characterized by the front theme vowels /i, e/. In these declensions, the front theme vowel triggers yod-palatalization of alveolars and iotization of labials when it occurs prevocalically. The latter group includes declensions characterized by the back theme vowels /a, u/. In these declensions, the back theme vowel deletes prevocalically and no palatalization or iotization occurs. This is illustrated below:

4.16

Palatalizing Declensions				**Non-palatalizing Declensions**			
/las-i-u/	→	[laʃ-u]	'salmon, gen.pl.'	/kra:s-a-u/	→	[kra:s-u]	'paint, gen.pl.'
/vard-e-u/	→	[varʒ-u]	'frog, gen.pl.'	/pod-a-u/	→	[puo̯d-u]	'pod, gen.pl.'
/sun-i-u/	→	[suɲ-u]	'dog, gen.pl.'	/pann-a-u/	→	[pann-u]	'pan, gen.pl.'

Importantly, the distinction between palatalizing and non-palatalizing declensions is also clearly seen in forms derived with [-uk-] that contain root-final alveolar plosives and sonorants. As illustrated in 4.17, a root-final consonant undergoes palatalization before [-uk-] if the input noun belongs to a palatalizing declension and fails to do so if the input noun belongs to a non-palatalizing declension (cells corresponding to palatalizing declensions are shaded):

4.17

a. Root-final alveolar plosives

					[-uk-]		
Decl.	Nom. sg.	Gen.pl.		Decl.	Nom. sg.	Gen.pl.	
2	[zut-i-s]	[zuʃ-u]	cf.	1	[zuʃ-uk-s]	[zuʃ-uk-u]	'eel'
5	[vard-e]	[varʒ-u]	cf.	1	[varʒ-uk-s]	[varʒ-uk-u]	'frog'
1	[znot-s]	[znot-u]	cf.	1	[znot-uk-s]	[znot-uk-u]	'son-in-law'
3	[liet-u-s]	[liet-u]	cf.	1	[liet-uk-s]	[liet-uk-u]	'rain'
4	[ait-a]	[ait-u]	cf.	1	[ait-uk-s]	[ait-uk-u]	'sheep'

b. Root-final alveolar sonorants

					[-uk-]		
Decl.	Nom. sg.	Gen.pl.		Decl.	Nom. sg.	Gen.pl.	
2	[braːl-i-s]	[braːʎ-u]	cf.	1	[braːʎ-uk-s]	[braːʎ-uk-u]	'brother'
2	[ron-i-s]	[roɲ-u]	cf.	1	[roɲ-uk-s]	[roɲ-uk-u]	'seal'
5	[piːl-e]	[piːʎ-u]	cf.	1	[piːʎ-uk-s]	[piːʎ-uk-u]	'duck'
1	[deːl-s]	[deːl-u]	cf.	1	[deːl-uk-s][28]	[deːl-uk-u]	'son'
4	[stirn-a]	[stirn-u]	cf.	1	[stirn-uk-s]	[stirn-uk-u]	'doe'

In the face of the data in 4.17, we can safely discard the possibility that the phonological trigger of palatalization is [u] itself. Were it the case, we would expect palatalization to apply to all root-final alveolars followed by [-uk-], regardless of the declension of the input noun. By the same logic, uk-palatalization in these forms is clearly not expressive. On the other hand, the data in 4.17 are exactly what we expect if the diminutive suffix [-uk-] combines with a thematised stem, rather than the root[29]. In this case, palatalization before [-uk-] would be triggered by the underlying yod (a front theme vowel in the pre-vocalic position), just as in 4.16.

The additional confirmation for this analysis comes from the stems where yod-palatalization misapplies. In Latvian, certain stems idiosyncratically fail to undergo yod-palatalization, even though they come from palatalizing declension classes. Notably, as the data below shows, such stems also fail to palatalize before [-uk-]:

4.18

Decl.	Nom. sg.	Gen.pl.		-uk-		
2	[teːt-i-s]	[teːt-u]	*[teːʃ-u]	[teːt-uk-s]	*[teːʃ-uk-s]	'father'
5	[maːt-e-Ø]	[maːʃ-u]/[maːt-u][30]		[maːt-uk-s]	*[maːʃ-uk-s]	'mother'
5	[tant-e-Ø]	[tanʃ-u]/[tant-u]		[tant-uk-s]	*[tanʃ-uk-s]	'aunt'
6	[zos-s]	[zos-u]	*[zoʃ-u]	[zos-uk-s]	*[zoʃ-uk-s]	'goose'

[28] In my dataset, a small number of forms derived with [-uk-] showed palatalization of root-final alveolar sonorants even in cases where the input noun belonged to the non-palatalizing declension. In Section 4.3.3.4. I argue that individual cases of this type can be explained by diminutive palatalization and do not undermine the generalization proposed in this section.

[29] Root-based derivation would be consistent with the fact that [-uk-] imposes the masculine gender on its base, and introduces its own theme vowel.

[30] Here, the prescriptive norm requires the first variant. However, the variant without palatalization is widely attested in colloquial speech.

The behavior of labial-final roots also confirms this analysis. Recall that in Latvian, labial consonants never undergo palatalization, and configurations where a labial is underlyingly followed by yod always surface as such. This is exactly the pattern we see before [-uk-] if the input noun belongs to one of the palatalizing declensions:

4.19

					[-uk-]		
Decl.	Nom. sg.	Gen. pl.		Decl.	Nom. sg.	Gen. pl.	
2	[u:p-i-s]	[u:p-ʝ-u]	cf.	1	[u:p-ʝ-uk-s]	[u:p-ʝ-uk-u]	'eagle-owl'
5	[plu:m-e]	[plu:m-ʝ-u]	cf.	1	[plu:m-ʝ-uk-s]	[plu:m-ʝ-uk-u]	'plum'
6	[ziʊ-s]	[ziʊ-ʝ-u]	cf.	1	[ziʊ-ʝ-uk-s]	[ziʊ-ʝ-uk-u]	'fish'
1	[lop-s]	[lop-u]	cf.	1	[lop-uk-s]	[lop-uk-u]	'beast'
4	[lauv-a]	[lauv-u]	cf.	1	[lauv-uk-s]	[lauv-uk-u]	'lion'

Finally, yod-palatalization applies vacuously to root-final palatal stops /c, ɟ/ - both before vocalic inflections and before [-uk-]:

4.20

					[-uk-]		
Decl.	Nom. sg.	Gen. pl.		Decl.	Nom. sg.	Gen. pl.	
2	[zac-i-s]	[zac-u]	cf.	1	[zac-uk-s]	[zac-uk-u]	'hare'
2	[kac-i-s]	[kac-u]	cf.	1	[kac-uk-s]	[kac-uk-u]	'cat'

Once we have established that the base of the affixation of [-uk-] is a thematised stem, the remaining question is the fate of theme vowels other than front non-low, which, as we just saw, never surface before [-uk-]. Recall that in nominal inflection, hiatus avoidance triggers elision of the first of a sequence of vowels, unless the vowel in question is front non-low (Halle & Zeps 1967, Halle 1992b, also see Chapter 3). The same process apparently applies in derivation as well and accounts for the fact that back theme vowels of the stems belonging to non-palatalizing declensions never surface before [-uk-]. The table below illustrates the proposed underlying representations of the nouns derived with [-uk-]:

4.21

Decl.		Dat. sg.		Decl.			[-uk-], Dat. sg.	
1	/znot-a-/	[znot-a-m]	cf.	1	/znot-a-uk-a-m/	→	[znot-uk-a-m]	'son-in-law'
2	/zut-i-/	[zut-i-m]	cf.	1	/zut-i-uk-a-m/	→	[zuʃ-uk-a-m]	'eel'
3	/liet-u-/	[liet-u-m]	cf.	1	/liet-u-uk-a-m/	→	[liet-uk-a-m]	'rain'
4	/ait-a-/	[ait-a-j]	cf.	1	/ait-a-uk-a-m/	→	[ait-uk-a-m]	'sheep'
5	/piːl-e-/	[piːl-e-j]	cf.	1	/piːl-e-uk-a-m/	→	[piːʎ-uk-a-m]	'duck'
6	/ziʋ-i-/	[ziʋ-i-j]	cf.	1	/ziʋ-i-uk-a-m/	→	[ziʋ-ʝ-uk-a-m]	'fish'

To summarize, in this sub-section I have shown that the diminutive suffix [-uk-] takes a thematised stem, rather than a root, as its base. If the stem contains a front theme vowel, affixation of [-uk-] creates the context for yod-palatalization, which in turn causes the root-final alveolar sonorants and plosives to surface as their palatal/postalveolar counterparts. Back theme vowels are elided before [-uk-] to avoid hiatus.

4.2.2.3 Diminutive palatalization triggered by [-uk-]

In this sub-section I show that palatalization before [-uk-] also applies in contexts where it cannot be plausibly attributed to yod-palatalization. Thus, velar-final roots and roots ending with sibilants consistently palatalize before [-uk-] even where the base stem belongs to a non-palatalizing declension. I argue that in these cases palatalization before [-uk-] represents a case of so-called expressive palatalization[31] (Kochetov & Alderete 2011).

4.2.2.3.1 Diminutive palatalization of sibilants

Root-final sibilants – fricatives and affricates alike - consistently undergo palatalization before [-uk-] regardless of whether or not the base stem belongs to the palatalizing declension. This is illustrated below:

[31] Note that unlike Kochetov & Alderete (2011) I do not equate expressiveness with extragrammaticality. Please cf. Section 4.3 for discussion.

4.22 Root-final sibilants

Decl.			Dat. sg.				[-uk-]	
2	/ez-i-s/	→	[ez-i-m]	cf.	/ez-i-uk-s/	→	[eʒ-uk-s]	'hedgehog'
2	/dad͡z-i-m/	→	[dad͡z-i-m]	cf.	/dad͡z-i-uk-s/	→	[dad͡ʒ-uk-s]	'thistle'
5	/pu:t͡s-e-j/	→	[pu:t͡s-e-j]	cf.	/pu:t͡s-e-uk-s/	→	[pu:t͡ʃ-uk-s]	'owl'
1	/da:rz-a-s/	→	[da:rz-a-m]	cf.	/da:rz-a-uk-s/	→	[da:rʒ-uk-s]	'garden'
4	/ma:s-a-j/	→	[ma:s-a-j]	cf.	/ma:s-a-uk-s/	→	[ma:ʃ-uk-s]	'sister'
4	/mut͡s-a-j/	→	[mut͡s-a-j]	cf.	/mut͡s-a-uk-s/	→	[mut͡ʃ-uk-s]	'barrel'

As the table in 4.22 shows, palatalization applies as expected in the stems belonging to the palatalizing declensions (shaded) – supposedly triggered by the prevocalic front vowel. However, it overapplies in non-palatalizing declensions, where a non-front theme vowel (-a-) is deleted before /-uk-/ to avoid hiatus. In the face of these data, one first has to consider the obvious possibility that /-u-/ is, in fact, a phonological trigger of assimilatory palatalization in sibilants. Though it is certainly not typologically common, non-front high vowels are attested as palatalization triggers (Bateman 2007, Bhat 1978).

If this were indeed the case in Latvian, we could reasonably expect the same pattern to be triggered by other stem-based derivational suffixes starting with /-u-/. A good point of comparison is the denominal derivational suffix /-u̯o-/ that produces names of actions, events and states (AGL 1959:340). The suffix /-u̯o-/ lacks affective semantics and therefore allows us to disambiguate between alternations that are purely phonological in nature and alternations that might function as an expressive device of sorts. As illustrated below, /-u̯o-/ behaves just like /-uk-/ when it follows roots ending in alveolar plosives and sonorants[32]. That is to say, in these cases the presence or absence of palatalization seems to be

[32] The situation with labial-final roots appears less clear. While iotization consistently fails to occur where the input noun comes from a non-palatalizing declension (e.g. [balva]~[balvot], "prize~award"), straightforward cases where iotization applies as expected are somewhat hard to find. Some sources (e.g. Latvian Spelling Dictionary (1942[2007]), Latvian Language Dictionary (Mīlenbahs & Endzelīns 1923—1932), Latvian-English Dictionary (Zusne 2008)) give forms like e.g. [dumpis]~[dumpju̯ot] "rebellion~stir up". On the other hand, LDSP (2007) lists [dumpis]~[dumpu̯ot] as the only possibility. At the same time, there is a number of forms for which only the variant without iotization is to be found (e.g. [li:ksme]~[li:ksmu̯ot] "joy-rejoice", [straume]~[straumu̯ot] "stream~to flow", etc.). This inconsistency might be an indication of language change in progress (especially because iotized forms seem to be much less frequent in the newer sources). However, since this issue falls beyond the scope of this dissertation, it will not be considered here any further.

predictable from the declension of the input noun (palatalizing declensions are shaded):

4.23

Decl.		Gen. pl.			[-u̯o-]	
1	/burt-a-u/	[burt-u]	'letter'	cf.	[burt-u̯o-t]	'to spell'
1	/kaun-a-u/	[kaun-u]	'shame'	cf.	[kaun-u̯o-t]	'to shame'
3	/led-u-u/	[led-u]	'ice'	cf.	[led-u̯o-t]	'to ice over'
4	/su:n-a-u/	[su:n-u]	'moss'	cf.	[su:n-u̯o-t]	'to get covered in moss'
2	/zut-i-u/	[zuʃ-u]	'eel'	cf.	[zuʃ-u̯o-t]	'to fish for eels'
5	/vard-e-u/	[varʒ-u]	'frog'	cf.	[varʒ-u̯o-t]	'to hunt for frogs'
5	/se:n-e-u/	[se:ɲ-u]	'mushroom'	cf.	[se:ɲ-u̯o-t]	'to pick mushrooms'
6	/asin-i-u/	[asiɲ-u]	'blood'	cf.	[asiɲ-u̯o-t]	'to bleed'

Just as with [-uk-], this asymmetry is expected if [-u̯o-] attaches to a thematised stem, where the front theme vowel subsequently causes yod-palatalization[33]. Crucially for us, in the forms affixed with [-u̯o-], the same pattern is preserved in roots that end with sibilants. That is, unlike [-uk-], the affixation of [-u̯o-] triggers palatalization in these roots only where the input noun comes from a palatalizing declension:

4.24

Decl.		Gen. pl.			[-u̯o-]	
2	/ɟips-i-u/	[ɟipʃ-u]	'gypsum'	cf.	[ɟipʃ-u̯o-t]	'to treat with gypsum'
2	/ve:z-i-u/	[ve:ʒ-u]	'crayfish'	cf.	[ve:ʒ-u̯o-t]	'to catch crayfish'
2	/la:t͡s-i-u/	[la:t͡ʃ-u]	'bear'	cf.	[la:t͡ʃ-u̯o-t]	'to trample'
4	/kra:s-a-u/	[kra:s-u]	'paint'	cf.	[kra:s-u̯o-t]	'to paint'
4	/miz-a-u/	[miz-u]	'peel'	cf.	[miz-u̯o-t]	'to peel'
4	/vit͡s-a-u/	[vit͡s-u]	'rod'	cf.	[vit͡s-u̯o-t]	'to whip'

The sibilant palatalization that applies before [-u̯o-], then, is unmistakably due to the underlying yod – it only applies in cases where the front vowel follows the root, and not otherwise. This leads me to the conclusion that [u] itself is not a phonological trigger of sibilant palatalization. Therefore, the fact that sibilants palatalize before [-uk-] also in cases where the context for yod-palatalization is not met should have an alternative explanation.

33 The asymmetry between palatalizing and non-palatalizing declensions wrt. the affixation of [-u̯o-] is also noted in AGL (159:341), which states that "for Declension 5 nouns, the base of the derivation is plural genitive that is characterized by consonant alternation", and "in Declension 2 nouns, the plural form with a softened consonant is used". While descriptively correct, this account is highly stipulative and misses a crucial generalization.

4.2.2.3.2 Diminutive palatalization of velars

Just as sibilants, root-final velars consistently undergo palatalization to postalveolar affricates in the forms affixed with [-uk-], regardless of the declension of the stem:

4.25 Root-final velars

Decl.			Gen. pl.				[-uk-]	
5	/kuŋg-e-u/	→	[kund͡ʒ-u]	cf.	/kuŋg-e-uk-Ø-s/	→	[kund͡ʒ-uk-s]	'boss, f.'
5	/pali:g-e-u/	→	[pali:d͡ʒ-u]	cf.	/pali:g-e-uk-Ø-s/	→	[pali:d͡ʒ-uk-s]	'helper, f.'
1	/zirg-a-u/	→	[zirg-u]	cf.	/zirg-a-uk-s/	→	[zird͡ʒ-uk-s]	'horse'
4	/vilk-a-u/	→	[vilk-u]	cf.	/vilk-a-uk-s/	→	[vilt͡ʃ-uk-s]	'wolf'

Palatalization of root-final velars in the stems belonging to palatalizing declensions can be explained by yod-palatalization – note that it also applies when such stems are followed by vocalic inflections. Palatalization of root-final velars in stems belonging to Declensions 1 and 4, however, is utterly unexpected, first, because it appears in the absence of an obvious phonological trigger, and second, because [-uk-] appears to be the only back-vowel-intial suffix that triggers alternations in velars. To compare, the suffix [-u̯o-] does not cause such alternations:

4.26

Decl.	Nom. sg.	Gen. pl.			[-u̯o-]	
4	[u̯og-a]	[u̯og-u]	'berry'	cf.	[u̯og-u̯o-t]	'to pick berries'
4	[li:dak-a]	[li:dak-u]	'pike'	cf.	[li:dak-u̯o-t]	'to catch pike'
4	[bek-a]	[bek-u]	'bolete'	cf.	[bek-u̯o-t]	'to pick boletes'

Finally, this alternation triggered by [-uk-] is unexpected because [k, g] ~ [t͡ʃ, d͡ʒ] is not triggered by any other derivational suffix of Latvian ([k, g] ~[t͡s, d͡z] seems to be the regular pattern that applies before front vowels, with [k, g] ~[c, ɟ] applying in some special cases). It appears, then, that the propensity to palatalize the preceding velar to the postalveolar affricate is an idiosyncratic property of [-

uk-], which does not follow from either the phonological shape of the suffix or the base to which it attaches.

4.2.2.4 Summary

To sum up, in this section I have argued that in most cases palatalization of consonants before [-uk-] can be accounted for without appealing to expressiveness. I have shown that for root-final alveolar plosives and sonorants, the applicability of palatalization before [-uk-] is predictable from the declension of the input noun. I explained that with the fact that [-uk-] takes as its base a thematised stem, and thus creates the context for yod-palatalization in stems characterized by the front theme vowels /i, e/. Non-front theme vowels (property of non-palatalizing declensions) are elided before [-uk-] to avoid hiatus.

However, I have also shown that yod-palatalization cannot account for the palatalization of sibilants and velar plosives before [-uk-], because the latter applies also where the context for yod-palatalization is not met. I also discarded assimilation to [u] as a possible cause of velar and sibilant palatalization on the grounds that it is not triggered by other stem-based derivational suffixes that start with [u]. I concluded that the propensity to trigger palatalization in the preceding sibilants and velars is an idiosyncratic property of [-uk-] that might be analyzed as expressive palatalization (Kochetov & Alderete 2011)

4.2.3 The suffix [-el-]

4.2.3.1 Background

Let us now turn to the diminutive suffix [-el-]. In Modern Standard Latvian, the suffix [-el-] is productive in forming diminutives that may express smallness, disdain, contempt, perjoration and/or a certain degree of affection (AGL:93-95, Steinbergs 1977:67-69, Kalme & Smiltniece 2001:67-68).

4.27

[la:t͡sis]	cf.	[la:t͡ʃ-el-is]	'bear'
[pui̯sis]	cf.	[pui̯ʃ-el-is]	'boy'
[ma:j̯a]	cf.	[ma:j̯-el-e]	'house'
[galt͡s]	cf.	[gald-el-is]	'table'

When attaching to certain nominal, adjectival and verbal stems, this diminutive suffix can also derive non-diminutive person names, agents, names of objects, animals and plants, although it is no longer productive in this function (examples from AGL:93-95)[34].

4.28

[zi̯ema]	'winter'	cf.	[zi̯em-el-is]	'northern wind'
[dve:st]	'to breath'	cf.	[dve:s-el-e]	'soul'

The diminutive suffix [-el-] can combine with nouns belonging to any declension. However, the forms derived with [-el-] take thematic vowel /-i-/ or /-e-/, depending on the grammatical gender of the input noun, and consequently follow the paradigm of Declension 2 or Declension 5. This is illustrated below:

4.29

	Decl.	Nom.sg.	Dat.sg.	Nom.sg.	Dat.sg.	
Class A	1	[vilk-s]	[vilk-a-m]	[vilc-el-i-s]	[vilc-el-i-m]	'wolf'
	2	[zut-i-s]	[zut-i-m]	[zut-el-i-s]	[zut-el-i-m]	'eel'
	3	[li̯et-u-s]	[li̯et-u-m]	[li̯et-el-i-s]	[li̯et-el-i-m]	'rain'
ClassB	4	[ma:s-a]	[ma:s-a-j]	[ma:ʃ-el-e]	[ma:ʃ-el-e-j]	'sister'
	5	[vard-e]	[vard-e-j]	[vard-el-e]	[vard-el-e-j]	'frog'
	6	[ziʊ-s]	[ziv-i-j]	[ziv-el-e]	[ziv-el-e-j]	'fish'

[34] Contrary to the traditional descriptions, it might be the case that diminutive [-el-] and non-diminutive [-el-] are two different, though homophonous, suffixes. There are three main facts that point to this: first, as we will see below, diminutive [-el-] always preserves the grammatical gender of its base, while non-diminutive [-el-] might change the gender of its nominal base; second, diminutive [-el-] triggers palatalization of base-final sibilants, while its non-diminutive counterpart does not; finally, the meaning of forms derived with non-diminutive [-el-] is non-compositional. I will not treat this question in any detail, but in the subsequent discussion 'suffix [-el-]' refers to the diminutive [-el-], unless otherwise indicated.

Unlike [-uk-], the suffix [-el-] does not alter the grammatical gender of the input noun: forms derived from masculine nouns – Class A – remain masculine, while forms derived from feminine nouns – Class B – remain feminine. This is illustrated below:

4.30

a. Tā	bija	maz-a,	vec-a	**māj-el-e**
That.fem	was	small-fem	old-fem	house-dim-fem

"That was a small old house"

b. Tā	bija	maz-a,	vec-a	**māj-a**
That.fem	was	small-fem	old-fem	house-fem

"That was a small old house"

c. Tas	bija	maz-s,	vec-s	**gald-el-is**
That.masc	was	small-masc	old-masc	table-dim-masc

"That was a small old table"

d. Tas	bija	maz-s,	vec-s	**gald-s**
That.masc	was	small-masc	old-masc	table-masc

"That was a small old table"

Just like [-uk-], the suffix [-el-] triggers palatalization in some of the preceding consonants. In Modern Standard Latvian, the set of targets affected by [-el-] appears to be limited to sibilants and velar plosives (AGL 1959:94-95, also my data below), but in some Latvian dialects also other classes of segments may be affected (Rūķe-Draviņa 1959:251-256). Notably, el-palatalization does not seem to be predictable from the declension class and applies whenever a root followed by [-el-] ends in a target segment. Palatalization triggered by [-el-] has been traditionally considered expressive and phonetically unmotivated (AGL 1959:94, Rūķe-Draviņa 1959:284, Endzelīns 1951:191-192), although the reasons for this viewpoint are not explicitly discussed in the sources that I am aware of (cf. Steinbergs 1977:68 who treats velar palatalization triggered by -el- as assimilatory).

In what follows, I consider the processes that apply when [-el-] combines with stems that belong to different declensions and contain different root-final consonants. I argue that the apparent failure of yod-palatalization before [-el-] is due to the yod-deletion that applies before front vowels. I will also show that palatalization of sibilants and velars triggered by [-el-] is best treated as non-assimilatory.

4.2.3.2 Yod-deletion before [-el-]

Recall that forms derived with [-el-] preserve the grammatical gender of the input noun. I take this as an indication that [-el-] takes as its base the form that is specified for gender, i.e. a nominal stem (Bermudez-Otero 2013:19-21 on diagnostics for stem-based derivation). As I have argued in Section 4.2.1, Latvian stems are stored with corresponding theme vowels. Therefore, a form specified for gender must also be specified for a theme vowel. It follows that a base with which [-el-] combines is a thematised stem.

Given this, we would expect that affixation of [-el-] to stems characterized by front theme vowels [i, e] would create the context for yod-palatalization (just as [-uk-] did). This, however, is not what happens: as shown in 4.31-4.33, yod-palatalization and iotization consistently fail to apply when front theme vowels are followed by [-el-].

4.31 Alveolar plosives

Decl.		Gen.pl.		[-el-]		
2	/zut-i-u/	[zuʃ-u]	cf.	[zut-el-i-s]	*[zuʃ-el-i-s]	'eel'
5	/vard-e-u/	[varʒ-u]	cf.	[vard-el-e]	*[varʒ-el-e]	'frog'
1	/znot-a-u/	[znot-u]	cf.	[znot-el-i-s]		'son-in-law'
3	/liet-u-u/	[liet-u]	cf.	[liet-el-i-s]		'rain'
4	/ait-a-u/	[ait-u]	cf.	[ait-el-e]		'sheep'

4.32 Alveolar sonorants

Decl.		Gen.pl.		[-el-]		
2	/braːl-i-u/	[braːʎ-u]	cf.	[braːl-el-i-s]	*[braːʎ-el-i-s]	‘brother’
2	/ron-i-u/	[roɲ-u]	cf.	[ron-el-i-s]	*[roɲ-el-i-s]	‘seal’
5	/ziːl-e-u/	[ziːʎ-u]	cf.	*[ziːl-el-e][35]	*[ziːʎ-el-e]	‘titmouse’
1	/deːl-a-u/	[deːl-u]	cf.	*[deːl-el-i-s]		‘son’
4	/stirn-a-u/	[stirn-u]	cf.	[stirn-el-e]		‘doe’

4.33 Labials

Decl.		Gen.pl.		[-el-]		
2	/uːp-i-u/	[uːp-ʝ-u]	cf.	[uːp-el-i-s]	*[uːp-ʝ-el-i-s]	‘eagle-owl’
5	/pluːm-e-u/	[pluːm-ʝ-u]	cf.	[pluːm-el-e]	*[pluːm-ʝ-el-e]	‘plum’
6	/ziʋ-i-u/	[ziʋ-ʝ-u]	cf.	[ziv-el-e]/ [ziv-t-el-e]	*[ziʋ-ʝ-el-e]	‘fish’
1	/lop-a-u/	[lop-u]	cf.	[lop-el-i-s]		‘beast’
4	/lauv-a-u/	[lauv-u]	cf.	[lauv-el-e]		‘lion’

In what follows, I argue that the failure of yod-palatalization before [-el-] is due to the phonological process known as yod-deletion, which wipes out the trigger of yod-palatalization when it is followed by the front-vowel-initial derivational suffix.

Yod-deletion is traditionally described as a process whereby palatal fricative /ʝ/[36] is erased in cases where it follows a consonant and precedes a front vowel [i, e, i̯e] (Endzelīns 1951:182-183/1922:129, see also AGL 1959:113, Steinbergs 1977:96)[37]. The classical example of yod-deletion is the deletion of root-final yod in stems of Declension 1 and 4 before the diminutive [-iɲ-] (examples from Endzelīns 1951:183), AGL (1959:113)).

4.34

/t͡seli-a-u/	→	[t͡seʎ-u]	cf.	/t͡seli-a-iɲ-a-s/	→	[t͡sel-iɲ-ʃ]	'road'
/teli-a-u/	→	[teʎ-u]	cf.	/teli-a-iɲ-a-s/	→	[tel-iɲ-ʃ]	'calf'

[35] My informant indicated that for her, el-affixation is unacceptable in cases where it would produce sequences like [lele] or [elel].

[36] Recall that in Chapter 3, I argued (based on the data in Laua 1997) that a surface palatal fricative is underlyingly a front high vowel. In what follows, I maintain this view. For clarity, however, I refer to the process that deletes it as yod-deletion.

[37] Note that Endzelīns (1951:182-183/1922:129) refers to the phenomenon as "ʝ-loss", and apparently views it as a diachronic development, not as a synchronic process.

It has to be said that examples of this type are very few (in fact, they might be limited to the stems /t͡seli-a-/ and /teli-a-/). The reasons for this are the following: First, the number of items where yod appears root-finally is very restricted, and second, the process seems to be affected by diachronic change. For example, as early as 1922, Endzelīns (1951:183/1922:129) indicated that yod-deletion is optional in some items, while modern sources only list the option without yod-deletion for these items:

4.35

a.

/zini-a-u/	→	[ziɲ-u]	cf.	/zini-a-iɲ-a-Ø /	→	[zin-iɲ-a]	OR	[ziɲ-iɲ-a]	''message"
/vali-a-u/	→	[vaʎ-u]	cf.	/vali-a-iɲ-a-Ø/	→	[val-iɲ-a]	OR	[vaʎ-iɲ-a]	"leisure"

b.

/mu:zi-a-u/	→	[mu:ʒ-u]	cf.	/mu:ʒ-a-iɲ-a-s/	→	[mu:z-iɲ-ʃ]	OR	[mu:ʒ-iɲ-ʃ]	''life"
/mezi-a-u/	→	[meʒ-u]	cf.	/meʒ-a-iɲ-a-s/	→	[mez-iɲ-ʃ]	OR	[meʒ-iɲ-ʃ]	"forest"

I believe that the apparent failure of the yod-deletion rule in these cases can be plausibly attributed to re-interpretation of the underlying /zini-/, /vali-/ and /mezi-/ roots as /ziɲ-/, /vaʎ-/ and /meʒ-/ respectively by language learners. This seems like a reasonable move from the point of view of Identity Mapping (Prince & Tesar 2004), given that for these roots the [n, l, z] ~[ɲ, ʎ, ʒ] alternation does not occur in the nominal paradigm. Consider, for instance, the paradigm of the stem [ziɲ-a-] below:

4.36

	Singular	Plural
Nom	[ziɲ-a]	[ziɲ-as]
Gen	[ziɲ-as]	[ziɲ-u]
Dat	[ziɲ-ai]	[ziɲ-a:m]
Acc	[ziɲ-u]	[ziɲ-as]
Loc	[ziɲ-a:]	[ziɲ-a:s]

While the same is definitely true for the stems [t͡seʎ-a-] and [teʎ-a-], the existence of only two forms with yod-deletion precludes a convincing generalization. I therefore have to assume that the corresponding diminutives [t͡sel-iɲ-ʃ] and [tel-iɲ-ʃ] are somehow fossilized (possibly due to their relatively high frequency). De-palatalization in this case is not due to the application of a phonological process, but rather a case of stem allomorphy.

Although the roots that once ended with a front vowel no longer provide the context for yod-deletion, the process still affects the stems where a front vowel functions as a theme. In these stems – as we have seen in 4.31-4.33 for [-el-] - the front theme vowel is deleted when the stem is followed by some front-vowel-initial derivational suffix. Consider, for instance, also the stems derived with the diminutive suffix [-iːt-][38]:

4.37

Decl.		Gen.pl.		[-iːt-]		
2	/zut-i-u/	[zuʃ-u]	cf.	[zut-iːt-i-s]	*[zuʃ-iːt-i-s]	'eel'
5	/vard-e-u/	[varʒ-u]	cf.	[vard-iːt-e]	*[varʒ-iːt-e]	'frog'
2	/braːl-i-u/	[braːʎ-u]	cf.	[braːl-iːt-i-s]	*[braːʎ-iːt-i-s]	'brother'
2	/ron-i-u/	[roɲ-u]	cf.	[ron-iːt-i-s]	*[roɲ-iːt-i-s]	'seal'
2	/uːp-i-u/	[uːp-ʝ-u]	cf.	[uːp-iːt-i-s]	*[uːp-ʝ-iːt-i-s]	'eagle-owl'
5	/pluːm-e-u/	[pluːm-ʝ-u]	cf.	[pluːm-iːt-e]	*[pluːm-ʝ-iːt-e]	'plum'

Interestingly, yod-deletion apparently fails to affect the front theme vowel when it is followed by a front-vowel-initial inflection:

4.38

Decl.		Nom.pl.	
2	/zut-i-i/	[zuʃ-i]	*[zut-i]
2	/braːl-i-i/	[braːʎ-i]	*[braːl-i]
2	/ron-i-i/	[roɲ-i]	*[ron-i]
2	/uːp-i-i/	[uːp-ʝ-i]	*[uːp-i]

The pattern could be straighforwardly explained if yod-deletion were only triggered by derivational suffixes. There is, however, an apparent

[38] To the best of my knowledge, examples like those in 4.37 and 4.31-4.33 are not discussed in the traditional literature in the context of yod-deletion. This is likely because such discussion would necessarily presuppose that – as I argue here - the base of the derivation is a thematised stem. Although the data that we have seen in this section so far are certainly consistent with [-el-] and [-iːt-] combining with an athematic root, the assumption about stem-based derivation is independently necessary to account for the syntactic facts: both [-el-] and [-iːt-] inherit the gender of the base, which implies that the base is a gendered category, i.e. a nominal stem.

counterexample to this generalization: namely, yod-deletion is held accountable for the elision of the verbal theme /-i-/ before the plural imperative suffix /-i̯et/ (Endzelīns 1951:183, Steinbergs 1977:94-97), as illustrated in 4.39. The data in 4.39 comes from verbs that belong to Group 4 of Conjugation I, which take theme vowel /-i-/ in the present stem (Steinbergs 1977). In these verbs, /-i-/ undergoes strengthening to a palatal fricative before back inflectional suffixes of the present paradigm. However, /-i-/ fails to surface when preceded by a consonant and followed by front-vowel initial suffixes in the plural imperative forms.

4.39

		'climb'		'lift'		'ride'
1st sg pres	/ka:p-i-u/	[ka:p-ʝ-u]	/t͡sel-i-u/	[t͡seʎ-u]	/ʝa:-i-u/	[ʝa:-ʝ-u]
1st pl pres	/ka:p-i-am/	[ka:p-ʝ-am]	/t͡sel-i-am/	[t͡seʎ-am]	/ʝa:-i-am/	[ʝa:-ʝ-am]
pl imp.	/ka:p-i-i̯et/	[ka:p-i̯et]	/t͡sel-i-i̯et/	[t͡sel-i̯et]	/ʝa:-i-i̯et/	[ʝa:-ʝ-i̯et]

To account for these patterns, Steinbergs (1977:96) proposes a rule that deletes a post-consonantal yod before front vowels (actually, for her it is only /i/). The fact that yod-deletion is never triggered by nominal inflections does not receive a principled explanation in this approach, and is simply stipulated in the rule:

4.40 j → Ø / C_____+ i [-plural nouns]

I would like to propose here that the pattern illustrated in 4.39 can have an alternative - and more principled - explanation. Thus, we have three facts to account for: (i) yod does not surface before imperative [-i̯et] when the verbal root ends in a consonant; (ii) yod surfaces before imperative [-i̯et] when the verbal root ends in a vowel; and (iii) yod-deletion is not triggered by plural nominal inflections.

With respect to (i), note that the imperative forms in 4.39 present an example of yod-deletion only if the imperative is based on the present stem (the assumption that Endzelīns 1951 and Steinbergs 1977 seem to be making, albeit implicitly). If the imperative is based on the infinitive stem – which in Conjugation I lacks the phonological theme vowel – there is no underlying front vowel to start with.

If the front vowel is not underlying, the challenge is to explain its presence after vowel-final roots, i.e. (ii). The data crucial for the explanation comes from the past paradigm of Conjugation I. Here, the past stem lacks a phonological theme vowel. Yod, nevertheless, surfaces after the vowel-final athematic stems – evidently to repair the underlying hiatus. Interestingly, yod-epenthesis also applies before 2nd person [-i] (data from Steinbergs 1977:142):

4.41

		'climb'		'lift'		'ride'
1st sg past	/ka:p-u/	[ka:p-u]	/t͡sel-u/	[t͡sel-u]	/ʝa:-u/	[ʝa:-ʝ-u]
2nd sg past	/ka:p-i/	[ka:p-i]	/t͡sel-i/	[t͡sel-i]	/ʝa:-i/	[ʝa:-ʝ-i]
3rd sg past	/ka:p-a/	[ka:p-a]	/t͡sel-a/	[t͡sel-a]	/ʝa:-a/	[ʝa:-ʝ-a]

Steinbergs (1977:144) analyzes the process as yod-epenthesis:

4.42 Ø → ʝ / V + _____ V
[+ verb root]

Note, however, that the rule in 4.42– which is needed independently - would also account for the presence of yod in imperative forms like [ʝa:-ʝ-i̯et] – thus removing the need to assume that it is underlyingly present there as a part of the present stem. The explanation for (ii), then, could be yod-epenthesis as a means of hiatus resolution.

This being said, the explanation for (iii) becomes straightforward – yod-deletion is not triggered by plural nominal inflections because it is not triggered by inflections at all. Yod-deletion is a stem-level process that is triggered only by front-vowel-initial derivational suffixes. An OT-based analysis of this process is provided in Section 4.3.3.3.2.

4.2.3.3 Diminutive palatalization triggered by [-el-]

We have established that yod-deletion applies to front theme vowels when they are followed by front-vowel-initial derivational suffixes. Since yod-palatalization/iotization is triggered by prevocalic front theme vowels (see Chapter 3 for more details), it comes as no surprise that it fails to apply before the front-vowel-initial suffix [-el-] (as we saw in 4.31-4.33). However, as we will see in this section, there are two classes of segments – alveolar sibilants and velar stops - that still undergo palatalization when they are followed by [-el-]. Below I show that the front vowel [e] normally does not act as a trigger of sibilant and velar palatalization, and therefore sibilant/velar palatalization before [-el-] cannot be construed as a regular assimilatory process, but rather represents a case of expressive palatalization.

The first class of segments that undergoes palatalization before [-el-] comprises sibilant fricatives and affricates. As the data in 4.43 show, root-final alveolar sibilants always surface as their postalveolar counterparts when followed by [-el-] – regardless of the declension class of the base stem.

4.43 Sibilants

Decl.			Nom. sg.				[-el-]	
2	/ez-i-s/	→	[ez-is]	cf.	/ez-i-el-i-s/	→	[eʒ-el-is]	'hedgehog'
2	/dad͡z-i-s/	→	[dad͡z-i-s]	cf.	/dad͡z-i-el-i-s/	→	[dad͡ʒ-el-is]	'thistle'
5	/pu:t͡s-e-Ø/	→	[pu:t͡s-e]	cf.	/pu:t͡s-e-el-e-Ø/	→	[pu:t͡ʃ-el-e]	'owl'
1	/da:rz-a-s/	→	[da:rs-s]	cf.	/da:rz-a-el-i-s/	→	[da:rʒ-el-is]	'garden'
4	/ma:s-a-Ø/	→	[ma:s-a]	cf.	/ma:s-a-el-a-Ø/	→	[ma:ʃ-el-e]	'sister'
4	/mut͡s-a-Ø/	→	[mut͡s-a]	cf.	/mut͡s-a-el-a-Ø/	→	[mut͡ʃ-el-e]	'barrel'

The obvious possibility that one has to consider in the face of the pattern in 4.43 is that /e/ itself is a phonological trigger of sibilant palatalization in Latvian. Given that front vowels are typologically very common triggers of palatalization, this behavior would not be unexpected. If /e/ were indeed a phonological trigger of sibilant palatalization, we would expect other derivational suffixes that start with /e/ to trigger the same alternation in sibilants. Let us therefore consider the behavior of one such suffix, [-en-].

The suffix [-en-] combines with nominal, verbal and adjectival stems and derives mostly names of plants, mushrooms and animals, as well as names of objects. It is also productively used to derive names of feminine animates (AGL 1959:95). The suffix [-en-] can combine with nouns of all declenions. It does, however, change both the grammatical gender and the declension class of the stem it attaches to. All forms derived by [-en-] belong to either Declension 2 or Declension 5 (taking theme vowel -i- or -e- respectively), although to my knowledge there is no reliable correspondence between the gender/declension of the input noun and that of the affixed form. Consider:

4.44

Decl.	Nom. sg.			Decl.	[-en-]	
2	[la:t͡s-i-s]	'bear'	cf.	5	[la:t͡s-en-e]	'cloudberry' ("bear-berry")
6	[at͡s-s]	'eye'	cf.	5	[at͡s-en-e-s]	'spectacles'
6	[bals-s]	'voice'	cf.	5	[bals-en-e]	'larynx'
4	[kaz-a]	'goat'	cf.	5	[kaz-en-e]	'blackberry' ("goat-berry")

As shown in 4.44, [-en-] consistently fails to trigger palatalization of stem-final sibilants, regardless of whether they belong to palatalizing or non-palatalizing declensions. I take this as evidence that [e] itself is not a phonological trigger of sibilant palatalization. Therefore, the fact that [-el-] causes the preceding sibilants to palatalize requires an alternative explanation.

The only previous formal analysis of alternations triggered by [-el-] that I am aware of, Steinbergs (1977), treats sibilant palatalization as a non-assimilatory process that is an idiosyncratic property of [-el-] and formalizes it as follows (Steinbergs 1977:68):

4.45 [s, z, t͡s] → [ʃ, ʒ, t͡ʃ]/_____+{-ele, -elis}.

Another remarkable property of the sibilant palatalization triggered by [-el-] is that it may also apply non-locally, i.e. affect the sibilant target that is not string-adjacent to [-el-] (also noted in Rūķe-Draviņa 159:250). In my dataset, I attested the following examples (note that in all but two cases both the variant with non-local palatalization and that without palatalization are possible):

4.46

Decl.	Dat. sg.	Gen.pl.		[-el-]			
1	[a:kst-a-m]	[a:kst-u]		[a:kst-el-i-s]	OR	[a:kʃt-el-i-s]	'clown'
1	[a:rst-a-m]	[a:rst-u]		[a:rst-el-i-s]	OR	[arʃt-el-i-s]	'doctor'
1	[riekst-a-m]	[riekst-u]		[riekst-el-i-s]	OR	[riekʃt-el-i-s]	'nut'
1	[straus-a-m]	[straus-u]		[straus-el-i-s]	OR	[ʃtraus-el-i-s]	'ostrich'
4	[vist-a-j]	[vist-u]		[vist-el-e]	OR	[viʃt-el-e]	'chicken'
2	[resn-i-m]	[reʃɲ-u]		[resn-el-i-s]	OR	[reʃn-el-i-s]	'fatty'
2	[strupast-i-m]	[strupastu][39]		[strupaʃt-el-e]			'bobtail'
2'	[sun-i-m]	[suɲ-u]		[ʃun-el-i-s]			'dog'
5	[ast-e-j]	[ast-u]		[aʃt-el-e]	OR	[ast-el-e]	'tail'
5	[sird-i-j]	[sirʒ-u]		[sird-el-e]	OR	[ʃird-el-e]	'heart'
5	[usn-e-j]	[uʃɲ-u]		[uʃn-el-e]	OR	[usn-el-e]	'thistle'
6	[makst-i-j]	[makst-u]		[makʃt-el-e]	OR	[makst-el-e]	'womb'

The first thing to be noted about the forms above is that in all but one of them ([straus-el-i-s]), the segment that is immediately adjacent to [-el-] is not a sibilant, and therefore cannot undergo el-palatalization. All of these forms (except for [ʃunelis]) contain a root-final consonant cluster of the type sC, where the sibilant may optionally undergo non-local palatalization across the intervening consonant. Two forms - [ʃtraus-el-i-s] and [ʃun-el-i-s] – stand out in this list because in both, sibilant palatalization applies across multiple intervening consonants and vowels.

Notably, non-local assimilation is considerably more rare in forms affixed with [-uk-]. In my dataset, it only appears in three items (all of them rated "1" by the informant): [aʃtuks], [a:rʃtuks] and [strupaʃtuks]. In my dataset there are no examples where non-local diminutive palatalization affects non-sibilants.

[39] In forms shaded in green, yod-palatalization that could in principle apply is blocked because it would have resulted in an illicit cluster. Refer to Chapter 5 for the analysis of sC clusters in palatalizing contexts.

Let us now consider the alternations that the affixation of [-el-] triggers in stem-final velars. As shown below, underlying velar stops consistently surface as palatal stops when followed by [-el-]:

4.47

Decl.			Nom. sg.				[-el-]	
1	/zirg-a-s/	→	[zirk-s]	cf.	/zirg-a-el-i-s/	→	[zirɟ-el-is]	'horse'
4	/li:dak-a-Ø/	→	[li:dak-a]	cf.	/li:dak-a-el-e-Ø/	→	[li:dac-el-e]	'pike'
4	/t͡su:k-a-Ø/	→	[t͡su:k-a]	cf.	/t͡su:k-a-el-e-Ø/	→	[t͡su:c-el-e]	'pig'

The very fact that the underlying velar stop fails to surface as such before a front vowel is not surpirising at all - recall from Chapter 3 that velar coronalization before front vocoids is very common in Latvian. Actually, all derivational suffixes that start with front vowels can trigger velar coronalization. For instance, the suffix [-en-], which we looked at before, consistently causes the preceding velar stops to surface as coronal affricates:

4.48

Decl.	Nom. sg.			[-en-]	
1	[drau̯k-s]	'friend, masc.'	cf.	[drau̯d͡z-en-e]	'friend, fem.'
4	[t͡su:k-a]	'pig'	cf.	[t͡su:t͡s-en-e]	'ugly milkcap', a.k.a. 'pig mushroom'

What is unusual is the type of velar coronalization that [-el-] triggers. As we saw in Chapter 3, the far more common way of repairing velar-front vowel sequences is velar affrication, while velar palatalization of the type [k, g] ~ [c, ɟ] seems to be primarily associated with the forms that are outside of core vocabulary. For Steinbergs (1977:49), velar palatalization triggered by [-el-] is due to assimilation of the velar to the following front vowel. However, she treats it as a marginal process and formulates a minor phonological rule that is restricted to a rather idiosyncratic set of morphological contexts:

4.49 [k, g] → [c, ɟ] /_______ + {i, e}
{[-ele/-elis], [-e] for loanwords[40], [nelaicis, etc.][41]}

[40] Steinbergs (1977) refers here to stems denoting feminine names of professions that are derived from borrowed roots by means of a theme vowel [-e], e.g. [biolog-s] ~[bioloɟ-e] 'biologist'.

In contrast, I propose that velar palatalization triggered by [-el-] is non-assimilatory and should rather be explained with a reference to the expressive function of [-el-] as a diminutive suffix (see also AGL 1959:94, Rūķe-Draviņa 1959:284, Endzelīns 1951:191-192 for the same intuition). In that, it is similar to the velar palatalization triggered by the diminutive suffix [-uk-] that we considered above. This approach seems preferable for two reasons: first, it accounts for both the sibilant and velar palatalization triggered by [-el-]; and second, it explains why [-uk-] and [-el-] pattern together with respect to exceptional sibilant and velar palatalization.

The additional support for this claim comes from non-diminutive uses of [-el-]. Recall that [-el-] is also used to derive non-diminutive person names, agents, names of objects, animals and plants. If it were indeed true that sibilant and velar palatalization triggered by [-el-] is an expressive device of sorts, we would not expect the same alternations in non-diminutive forms derived by [-el-]. In fact, there is some indication that this is exactly the case, and that sibilant and velar palatalization do not apply when the form derived with [-el-] is not a diminutive. Although the data are scarce[42], AGL (1959:94) provides the forms [dve:s-t]~[dve:s-el-e] 'breathe~soul' and [velg-s]~[ve:dz-el-e] 'moist~eel-pout'. Another example could be the pair [va:k-t]~[va:t͡s-el-e] 'to collect~container'. The former example illustrates a non-application of sibilant palatalization before [-el-]. The latter two show the application of velar affrication, which is a 'default' velar coronalization rather than a more restricted velar palatalization. In Section 4.3, I provide a representational and constraint-based analysis of expressive palatalization triggered by suffixes [-el-] and [-uk-].

---

[41] Refer to Chapter 3 for the discussion of root-final velars in palatalizing declensions.

[42] Suffix [-el-] is no longer productive in non-diminutive derivation, and Modern Latvian has only a limited number of non-diminutive nouns derived with it (AGL 1959:93). It is therefore difficult to find non-diminutive nouns derived with [-el-] and etymologically related forms that can with reasonable certainty be claimed to have been the input to such a derivation.

4.2.3.4 Summary

To sum up, in this section I have shown that failure of yod-palatalization before [-el-] is due to the phonological process of yod-deletion, which deletes front theme vowels before front-vowel-initial suffixes. I have argued that yod-deletion is only triggered by derivational suffixes, which allowed me to explain why yod-palatalization still applies before front-vowel-initial inflections in nominal declension. I have also considered the palatalization of sibilants and velar plosives that applies before [-el-] and argued that it is best treated as non-assimilatory and should rather be viewed as a case of expressive palatalization.

4.2.4 Discussion

In the preceding sections I have demonstrated that root-final sibilants and velar plosives undergo palatalization when followed by the diminutive suffixes [-uk-] and [-el-], also in cases where there is no apparent phonological reason for it. The relevant data are summarized below:

4.50

a.

Stem	Dat. sg.	Gen. pl.		[-uk-]	[-el-]	
/daːrz-a-/	[daːrz-a-m]	[daːr**z**-u]	cf.	[daːr**ʒ**-uk-s]	[daːr**ʒ**-el-is]	‘garden’
/maːs-a-/	[maːs-a-j]	[maː**s**-u]	cf.	[maː**ʃ**-uk-s]	[maː**ʃ**-el-e]	‘sister’
/mut͡s-a-/	[mut͡s-a-j]	[mu**t͡s**-u]	cf.	[mu**t͡ʃ**-uk-s]	[mu**t͡ʃ**-el-e]	‘barrel’

b.

Stem	Dat. sg.	Gen. pl.		[-uk-]	[-el-]	
/zirg-a-/	[zirg-a-m]	[zir**g**-u]	cf.	[zir**d͡ʒ**-uk-s]	[zir**ɟ**-el-i-s]	‘horse’
/vilk-a-/	[vilk-a-m]	[vil**k**-u]	cf.	[vil**t͡ʃ**-uk-s]	[vil**c**-el-i-s]	'wolf'
/lːdak-a-/	[liːdak-a-j]	[liːda**k**-u]	cf.	[liːda**t͡ʃ**-uk-s]	[liːda**c**-el-e]	‘pike’

This exceptional palatalizing behavior seems to be an idiosyncratic property of the diminutive suffixes [-uk-] and [-el-] which distinguishes them both from (i) non-diminutive stem-level suffixes starting with [u] and [e]; and (ii) diminutive suffixes that do not convey strong emotional overtones and have a purely quantitative meaning (-i:t-/-iɲ-). This leads me to the conclusion that the exceptional palatalization patterns triggered by [-uk-] and [-el-] are linked to the expressive function of these diminutive suffixes (see also Rūķe-Draviņa 1959:282, Endzelīns 1951:192 for similar intuitions).

Latvian diminutive palatalization possesses a number of properties that distinguish it from 'phonological' yod-palatalization. The set of segments that are affected by expressive palatalization – sibilants and velar plosives - cannot be construed as a natural class. With the exception of expressive palatalization, they neither undergo nor target phonological processes to the exclusion of other segments. Likewise, we cannot say that sibilants and velar plosives are more prone than other segments to palatalization in general. As we have seen, 'phonological' yod-palatalization affects all non-labial segments of Latvian, with no apparent preference for sibilants and velars. Finally, we have also seen that in certain cases, diminutive palatalization applies non-locally. These properties of expressive palatalization alone might speak in favor of regarding it as an extragrammatical phenomenon that falls outside of the regular phonology of Latvian and requires some special treatment (see Kochetov & Alderete 2010 on extragrammaticality).

However, it also has a number of properties that are characteristic of regular morpho-phonological processes. First, we have seen that Latvian diminutive palatalization is non-exhaustive and unidirectional, i.e. it only affects the segment (almost always adjacent) to the left of the trigger and not all potential targets within a word. Second, it is morphologically conditioned and apparently limited to [-uk-] and [-el-]. Third, it has lexical exceptions. Fourth, it only produces alternations that are otherwise attested in the Latvian language (i.e. as outputs of yod-palatalization), and does not produce alternations that are otherwise banned – for instance, it never results in palatalized labials. Fifth, expressive palatalization of velars results in different outputs –[t͡ʃ, d͡ʒ] or [c, ɟ]- depending on whether it is triggered by [-uk-] or [-el-]. This is to be expected if [-uk-] and [-el-] were to contain a certain trigger that causes the change, and very surprising under the view that what conditions the change is the expressive context itself. This leads me to the conclusion that it is worth exploring whether expressive palatalization triggered by diminutive suffixes [-uk-] and [-el-] is a part of the core phonological grammar of Latvian.

Any analysis of Latvian diminutive palatalization has to answer a number of non-trivial questions. First, why diminutive palatalization seems to be limited to sibilants and velar plosives. Second, what its trigger is and how the process itself can be formalized. Third, why [-uk-] and [-el-] produce different changes in velars, but identical changes in sibilants. Finally, how diminutive palatalization interacts with other phonological processes, especially yod-palatalization and yod-deletion. The following sections are dedicated to answering these questions.

4.3 Analysis

Expressive palatalization has been analyzed as a partially extragrammatical phenomenon, on a par with ludlings and language games (Czaplicki 2014, Kochetov & Alderete 2010, Ito et al., 1996). Under this view, the phonological operations involved in expressive palatalization are not constrained in the same way as the processes that are part of the core phonological competence of native speakers. Rather, their application requires that the reference to extra-linguistic information be made in the phonological computation. Within the OT formalism, this can be implemented, for instance, by formulating a set of constraints that explicitly refer to expressive/language-game contexts (Kochetov & Alderete 2010 for expressive palatalization, Ito et al. 1996 for Japanese reversing argot).

As discussed in 4.2.4, Latvian diminutive palatalization possesses a number of properties that are more characteristic of core phenomena (notably, locality and morphological conditioning). Therefore, while recognizing that the origins of Latvian diminutive palatalization might indeed be traceable to sound-meaning iconicity, the analysis developed here treats it as a regular morphophonological process that is subject to all constraints and restrictions that are operative in the phonological component.

This Section is organized as follows. In 4.3.1 I discuss some analytical possibilities applicable to Latvian diminutive palatalization. In 4.3.2, I develop a representational analysis of Latvian diminutive palatalization cast within the Parallel Structures Model. In 4.3.3, I develop a constraint-based analysis of the process set within the Optimality Theory framework.

4.3.1 Expressive palatalization as linking of the floating structure

The analysis developed here crucially builds on the insights of the analysis developed by Mester & Ito (1989) for Japanese mimetic palatalization, which is perhaps one of the most widely cited and extensively analyzed cases of expressive palatalization (see also Kochetov & Alderete 2011, Kurisu 2009 and references therein). Mimetic vocabulary of Japanese consists of reduplicated bimoraic roots that are sound- and manner-symbolic (e.g. *poko-poko* 'up and down movement', *zabu-zabu* 'splashing'; see Mester & Ito 1989, *inter alia*, for further examples and discussion). Some of the mimetic roots also have counterparts where one of the consonants is palatalized. Such palatalization adds an additional meaning of uncontrolledness to the root, that might be interpreted as "childishness, immaturity, instability", etc. depending on the meaning of the base (e.g. *p^{y}oko-p^{y}oko* 'jumping around imprudently', *z^{y}abu-z^{y}abu* 'splashing indiscriminately'; Mester & Ito 1989 and references therein). Importantly, mimetic palatalization applies in the absence of any obvious phonological trigger. Its other properties include a restriction of one palatalized segment per root, a preference for coronal palatalization and avoidance of rhotics.

In contrast to the extragrammaticality approach advocated in Kochetov & Alderete (2011), Mester & Ito (1989) regard mimetic palatalization as a part of the core phonological grammar, and propose that palatalization in sound-symbolic forms is due to an "independent autosegmental micromorpheme" consisting of a certain feature complex that is mapped onto the mimetic root. In their approach, the preference for coronal palatalization directly follows from the geometric representations: the feature [-anterior], which is the content of the micromorpheme, docks on the segments that are underlyingly specified for the Coronal node (see also Clements 1985). If no segment with the Coronal node is available, the landing site for the floating feature is provided via node insertion, which is computationally more costly.

Along the same lines, in what follows I propose that the diminutive suffixes [-uk-] and [-el-] contain in their underlying representation a floating component consisting of a chunk of geometric structure. Diminutive palatalization in Latvian, just like mimetic palatalization in Japanese, is formalized as the association of this floating structure to the rightmost segment of the root, if such segment has a valid anchor for the floating structure to dock to. The additional twist in the Latvian data is the fact that the segments that undergo expressive palatalization do not form a phonetically natural class to the exclusion of other segments. Partly, this behavior follows from the representations: the notion of the phonetically natural class (e.g. alveolars, stops, consonants, etc.) is irrelevant in substance-free phonology, and it is fully possible (and indeed true in Latvian) that phonological natural classes do not match up with the phonetically natural ones.

Non-local application of sibilant palatalization triggered by [-el-] (and an apparent dispreference of non-local interactions in uk-palatalization) can likewise be captured representationally. Even though the target of non-local sibilant palatalization is not string-adjacent to [-el-], it might still be adjacent to the palatalization trigger at some lower tier of the representation.

However, there is more to the Latvian story. As we will see below, diminutive palatalization affects only a subset of the segments that are representationally compatible with it. That is, representations alone can distinguish between possible and impossible patterns, but not between those that are actually attested and those that are only potentially possible.

The crucial choice between the representationally available options is therefore left to the constraint-based computation. The observation that some segments are more likely to palatalize than others is frequently attributed to the universal palatalizibility hierarchy (Bateman 2007, Chen 1973), which in OT-based analyses is usually embodied in a fixed hierarchy of markedness constraints against palatalized consonants of different places (Rose 1997, Kurisu 2009, Kochetov & Alderete 2011, Bradley 2015). The source of the hierarchy is usually ascribed to phonetic factors, i.e. to the fact that segments of certain places and manners of articulation can carry relatively more salient acoustic cues to palatalization contrast (Kurisu 2009, Padgett 2001). In the substance-free model of phonology, the failure of certain segments to palatalize might be captured by feature co-occurrence constraints that ban configurations were the specified features co-exist within some domain (Moren 2006). The restriction on feature co-occurence would correctly rule out labials as targets of expressive palatalization (in fact, any palatalization in Latvian), but it still does not explain the failure of expressive palatalization to target non-sibilant alveolars. The fact that these routinely undergo yod-palatalization is evidence that they are fully compatible with the triggering features. In principle, feature co-occurence constraints might be tagged to apply in specific contexts (cf. Kochetov & Alderete 2011:38 for markedness constraints that are specific to expressive contexts). This move, however, would defeat the goal of maintaining strict modularity, because it would entail that notions like "expressiveness" are of relevance for the phonological computation.

The solution developed here exploits the analytical possibilities afforded by the multi-stratal model of phonology. Specifically, I propose that expressive palatalization and "phonological" yod-palatalization apply in different phonological strata and are enforced by different constraint rankings. In what follows, expressive palatalization is viewed as applying in a stem-level cycle (which follows from the fact that it occurs in stem-to-stem derivation), while yod-palatalization applies in a word-level cycle (which accounts for the fact that it is triggered by both inflectional and derivational suffixes). On the one hand, this allows us to explain why the two processes affect different sets of segments – in my analysis, this is due to the variable ranking of faithfulness on the two levels. On the other hand, it allows us to formalize the intution that the two processes have different motivations. In my analysis, expressive palatalization is primarily motivated by the Parse(F) constraint that militates against floating structure and thus favors its linking or erasure. Yod-palatalization, on the other hand, is one of the ways to satisfy *ComplexOnset, which is highly ranked in the word-level cycle.

4.3.2 A representational analysis

In what follows I will develop a representational analysis of expressive palatalization triggered by the diminutive suffixes [-uk-] and [-el-], based on the assumption that the process is due to the linking of the floating structures associated with these suffixes.

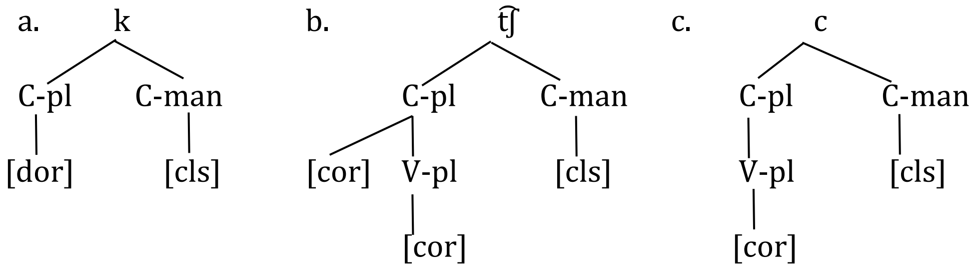
Let us start the discussion by establishing the featural content of floating structures associated with [-uk-] and [-el-]. The featural content of the floating structure can be deduced based on the changes that the respective suffixes trigger in contexts where yod-palatalization does not apply (i.e. in stems of non-palatalizing declensions). Recall that in such stems both diminutive suffixes affect the same targets, sibilants and velar stops (the relevant patterns are repeated below):

4.51

UR	-uk-	-el-	
/vilk-a-/	[viltʃ͡-uk-s]	[vilc-el-i-s]	'wolf'
/ma:s-a-/	[ma:ʃ-uk-s]	[ma:ʃ-el-e]	'sister'
/muts͡-a-/	[mutʃ͡-uk-s]	[mutʃ͡-el-e]	'barrel'

As illustrated above, velar stops behave differently depending on whether the stem is followed by -uk- or -el-, while sibilants undergo the same changes. On the assumption that diminutive palatalization is due to feature linking, this indicates that the floating structures associated with each of these suffixes partially overlap in their featural content. Let us therefore consider the alternations triggered by the affixation of -uk- and -el- from the point of view of feature-geometric representations. The structures below show geometric representations of targets (a), and outputs (b) and (c), of diminutive velar palatalization (see Chapter 3 for the independent motivation of underlying representations):

4.52



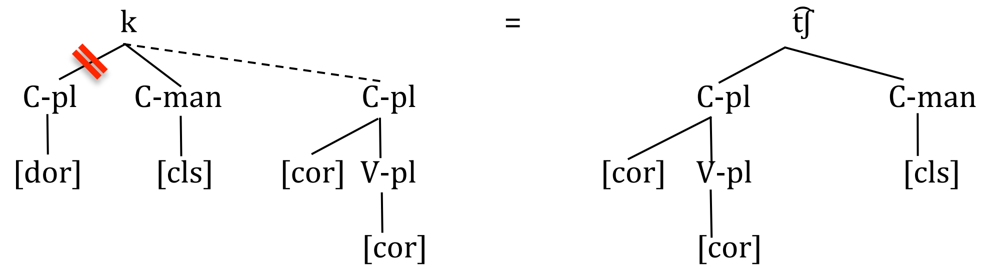
Comparing the representation of the velar target in (a) with the output of uk-palatalization in (b), we can see that the latter differs by the presence of C-pl[cor]V-pl[cor] structure. If expressive palatalization is due to the linking of the floating structure, this is the structure that has to be supplied by -uk-.

On the other hand, the output of the el-palatalization in (c) differs from the velar stop by the presence of V-pl[cor] structure. By the same logic, we conclude that V-pl[cor] is a featural content of the floating structure associated with -el-.

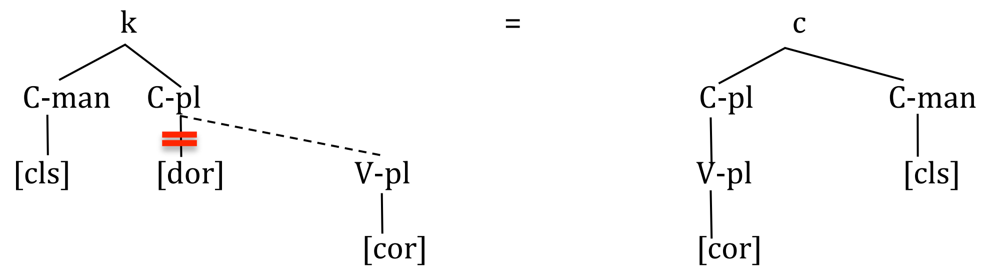
Thus, the diminutive palatalization of velars triggered by -uk- and that triggered by -el- can be represented as shown in 4.53 (laryngeal specifications ignored):

4.53

a.



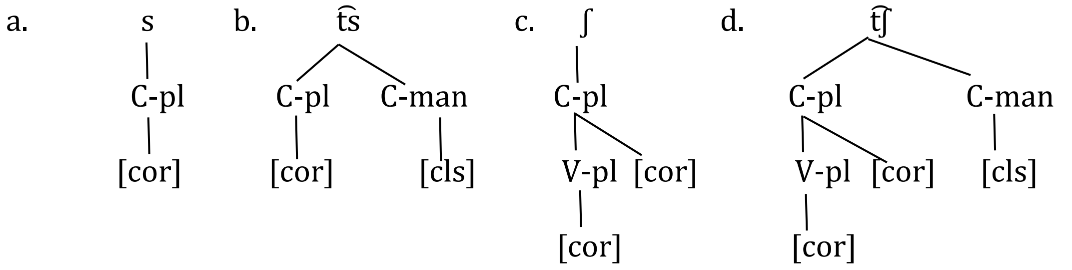
b.



In (a), the floating structure links to the root node of the velar segment. The resulting corono-dorsal segment is repaired by the delinking of the original C-place node (see Section 4.3.3 below for an OT analysis that motivates the delinking). The result is a structure that corresponds to the postalveolar affricate. In (b), the floating structure is linked to the C-place node of the velar stop. This again triggers the deletion of the original [dorsal] specification. The resulting C-manner[closed] segment has a V-place[coronal] feature, but no terminal features dominated by the C-place node, which in the Latvian inventory corresponds to the palatal stop [c].

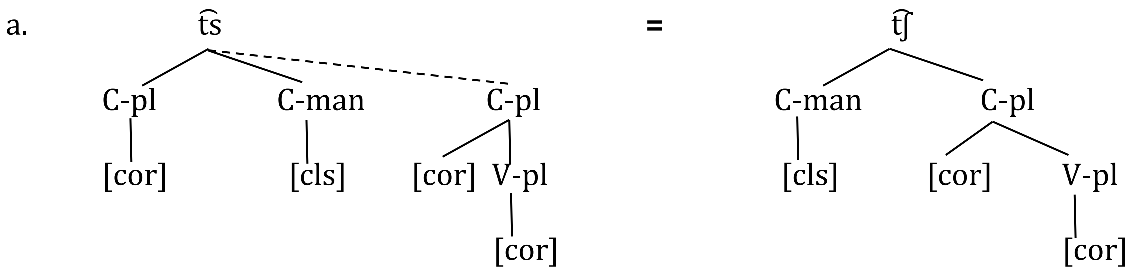
Let us now turn to the expressive palatalization of sibilants. The relevant geometric representations of targets (a) and (b) and the corresponding outputs (c) and (d) are illustrated in 4.54:

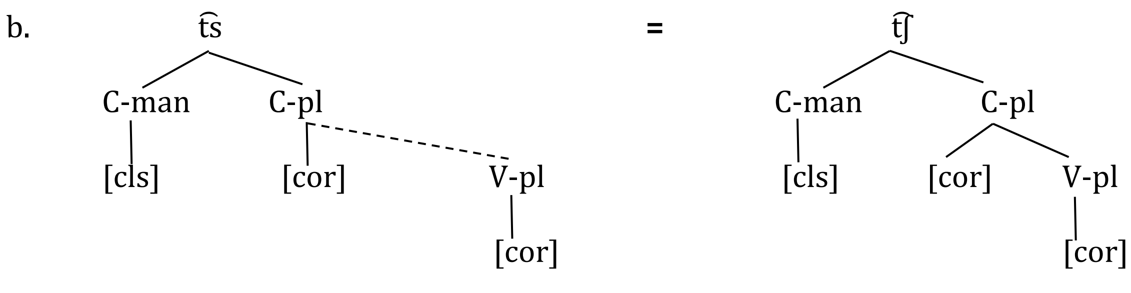
4.54



As we see, sibilant targets and outputs of expressive palatalization differ in the presence of the V-place node dominating the [coronal] feature. Crucially for us, V-pl-[cor] is present in both the floating structure associated with -uk- and that associated with -el-, which means that both -uk- and -el- can trigger palatalization of sibilants. Representationally, sibilant palatalization triggered by -uk- and -el- can be analyzed as shown below:

4.55





In (a), the linking of the C-pl[cor]V-pl[cor] structure to the root-node of /t͡s/ triggers its fusion with the original C-pl[cor] specification (to repair the double specification for C-pl-[cor]; see the following section for discussion). In (b), the linking of V-pl[cor] does not result in double specification, so no fusion applies. The result in both cases is a segment that is specified for both C-place[coronal] and V-place[coronal], which in Latvian corresponds to the postalveolar sibilant. In both cases, original manner specifications of palatalization targets remain unaffected.

Thus we have established that the featural content of the floating structure associated with -uk- is that in (a), while the floating structure associated with -el- is that in (b):

4.56

a. C-place
[cor] V-place
[coronal]

b. V-place
[coronal]

Given the geometric model that allows for the underspecified subsegmental configurations and limits the set of permissible operations to linking, delinking and fusion (i.e. excludes tier promotion, cross-planar spreading, etc.), the representational analysis proposed above goes a long way in constraining the set of potential outputs and targets of diminutive palatalization.

Recall from Chapter 3 that the C-place-[coronal] feature correlates with phonetic sibilancy, while V-place-[cor] correlates with the post-alveolar place of articulation. The structures in 4.56 therefore imply that it is only /-uk-/ that may trigger the assibilation of the palatalization target, while /-el-/ may only trigger change of place.

Further, it is predicted that el-palatalization may only target segments that are specified for the C-place node – because it is the C-place node that provides the docking site for the floating V-pl-[cor] structure. Given the representational analysis of the Latvian inventory adopted here (see Chapter 3), this correctly excludes plain alveolars /t, d, n, l, r/ from the set of targets of el-palatalization.

Then, we predict that – at least potentially – the set of targets of uk-palatalization should be a superset of the targets of el-palatalization. This is because the docking site of the C-pl-[cor]V-pl-[cor] structure is the root node itself, and all segments, by definition, are associated with a root node. In this connection, recall that uk-palatalization may exceptionally affect alveolar sonorants /l, n/ yielding [ʎ, ɲ], while this never happens in el-palatalization:

4.57

a.	/de:l-a-uk-Ø-s/	→	[de:l-uk-s]	OR	[de:ʎ-uk-s]	'son'
	/be:rn-a-uk-Øs/	→	[be:rn-uk-s]	OR	[be:rɲ-uk-s]	'child'

b.	/de:l-a-el-i-s/	→	[de:l-el-i-s]	*[de:ʎ-el-i-s]	'son'
	/be:rn-a-el-Øs/	→	[be:rn-el-i-s]	*[be:rɲ-el-i-s]	'chil'

Finally, let us briefly address the issue of the locality of spreading. Recall that affixation of [-el-] sometimes causes non-local palatalization of sibilants across the intervening /t/ or /n/. The relevant data are given below:

4.58

/vist-a-el-e/	→	[vist-el-e]	OR	[viʃt-el-e]	'chicken'
/resn-i-el-i-s/	→	[resn-el-i-s]	OR	[reʃn-el-i-s]	'fatty'

However, palatalization of sibilants across an intervening non-sibilant alveolar is only non-local if we consider the tier on which the root nodes reside. In fact, if the floating structure associated with [-el-] is indeed the trigger of palatalization, and its featural content is V-pl-[cor], the alternation illustrated above is perfectly local and fully expected. Recall that non-sibilant alveolars are not specified for a C-place node, and therefore do not have the anchor for V-pl-[cor] to attach to. The closest available anchor is the C-place node of the sibilant, and this is exactly where V-pl-[cor] docks, causing palatalization.

Even though the representational analysis can clearly discriminate between possible and impossible alternations within a given language, it is not sufficient to distinguish between those that are representationally possible and those that are actually attested. Thus, for instance, nothing in the representational system would preclude us from modeling diminutive palatalization of labials as a process that links V-pl-[cor] under the C-place node specified for [labial] yielding [m^j], but this does not happen in Latvian. The fact that only some of the representationally available options are realized in a given language is attributable to the language-specific ranking of OT constraints that defines the phonological grammar of that language. The following section is dedicated to the discussion of the computational model of Latvian that accounts for the attested diminutive palatalization patterns.

4.3.3 Constraint-based analysis

In this section I develop a constraint-based analysis of diminutive palatalization and discuss its interaction with yod-palatalization. The analysis is couched within Optimality Theory (Prince & Smolensky 1993), and incorporates a multi-stratal view of phonological grammar (Bermúdez-Otero 2012) (see also Chapter 2 for a discussion of the computational assumptions adopted here).

4.3.3.1 Key Constraints

As I have argued in the previous section, diminutive palatalization in Latvian is due to the linking of the floating structure that is present in the lexical entry of the diminutive suffixes -uk- and -el-. I propose here that the linking of the floating structure is crucially motivated by the constraint Parse(F), which penalizes candidates containing unparsed structures. Here, "unparsed structure" is understood as a feature or a node that is not dominated by some root node.

4.59 Parse(F) – assign one violation mark for every structure where the highest-level constituent is not associated to a root node (after Uffmann 2005)[43].

A fully faithful stem-level output candidate containing a diminutive suffix -uk- or -el- always violates Parse(F). I assume that Parse(F) is undominated, which implies that candidates containing unparsed structures are never allowed to surface in Latvian. Parse(F) can be satisfied in two ways: first, by linking the floating structure under some root node; second, by erasing the floating structure.

The linking scenario is preferred by the faithfulness constraint militating against the deletion of features associated with certain morphological positions (see McCarthy & Prince 1995 for the original formulation of the MaxAffix and MaxRoot constraints, and Walker 1997:111 for the version relativized to specific features):

4.60 MaxAffix(F) – assign one violation mark for every feature dominated by a root node associated with an affix in the input that does not have a correspondent in the output.

The deletion scenario is preferred by the faithfulness constraints that require identity between the underlying place specifications of an input segment and its output correspondent:

4.61 IDENT(C-place) – assign one violation mark for every instance where some root node x_i in the input differs from its correspondent x_o in the output with respect to the C-place specification.

IDENT(V-place) – assign one violation mark for every instance where some root node x_i in the input differs from its correspondent x_o in the output with respect to the V-place specification.

Recall from Chapter 2 that in this work all features associated with a C-level node are treated as a constituent to the exclusion of nodes and features at the lower levels of recursion. This implies that the IDENT(C-place) constraint is not violated

[43] The definition of Parse(F) proposed in Uffmann(2005) is "Features are parsed into segments". The definition adopted here, although very similar in spirit, incorporates the hierarchical view of subsegmental structure and the distinction between features and nodes inherent in PSM.

by the candidates with non-identical V-place specifications. As we will see shortly, this property of IDENT(C-place) is crucial for the analysis developed here.

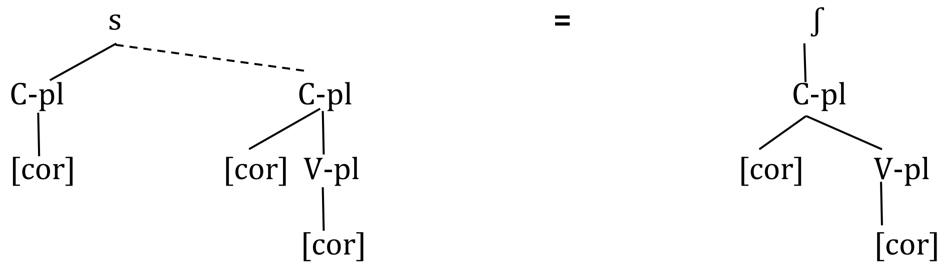
As it is defined here, IDENT(C-place) is sensitive to the presence vs. absence of the C-place node and the identity of C-place features associated with the input segment and its output correspondent (1). Evaluation of the candidates with non-identical V-place specification is shown in (2).

4.62

	IDENT(C-PLACE)
1. / x /	
a. [x] C-pl [cor]	*!
b. [x] C-pl	*!
2. / x / C-pl [cor]	
a. [x] C-pl [cor] V-pl [cor]	
b. [x] C-pl V-pl [cor]	*!

Recall from 4.55 that diminutive palatalization of sibilants results in a configuration where a root node dominates two instances of C-place[coronal]:

4.63



I assume here that such structures are ill-formed, and identical portions of structure that are dominated by the same constituent are automatically repaired through fusion at no cost to faithfulness (this solution is also adopted in Wolf 2007:10). Here, I conceive of this restriction as a constraint on GEN. In other words, I assume that structures that violate it are not included in the set of output candidates.

In what follows, I show how the constraints introduced in this section interact to derive correct surface representations in case of [-uk-] and [-el-] palatalization.

4.3.3.2 Palatalization in uk-suffixed nouns

4.3.3.2.1 Diminutive palatalization triggered by [-uk-]

In this section I develop an analysis of the alternation patterns that are attributable to the expressive palatalization triggered by the diminutive suffix /-uk-/. Therefore, in this section I focus exclusively on the stems that come from non-palatalizing declensions – i.e. those where the context for yod-palatalization is not met. The behavior of the stems from palatalizing declensions with respect to the affixation of /-uk-/ is treated in Section 4.3.3.2.2. The patterns relevant to the discussion are repeated in 4.64:

4.64

a. Sibilant alveolars

/maːs-a-uk-Ø-s/	→	[maːʃ-uk-s]	‘sister’
/mut͡s-a-uk-Ø-s/	→	[mut͡ʃ-uk-s]	‘barrel’

b. Non-sibilant alveolars

/ait-a-uk-Ø-s/	→	[ait-uk-s]	*[aiʃ-uk-s]	'sheep'
/znuot-a-uk-Ø-s/	→	[znuot-uk-s]	*[znuoʃ-uk-s]	‘son-in-law’

c. Labials

/luop-a-uk-Ø-s/	→	[luop-uk-s]	*[luop^j-uk-s]	‘beast’
/lauv-a-uk-Ø-s/	→	[lauv-uk-s]	*[lauv^j-uk-s]	‘lion’

d. Velars

/zirg-a-uk-s/	→	[zird͡ʒ-uk-s]	‘horse’	/zirg-a-uk-s/
/liːdak-a-uk-s/	→	[liːdat͡ʃ-uk-s]	‘pike’	/liːdak-a-uk-s/

Let us consider these patterns in turn. Stem-level evaluation based on input containing a root-final sibilant is illustrated in 4.65 (candidates with hiatus are ignored; please refer to Chapter 3 for analysis of hiatus resolution in Latvian). The fully faithful candidate in (a) violates the high-ranking Parse (F) constraint and is eliminated. Candidate (b), where the floating structure is deleted, incurs two violations on the MaxAffix constraint. As a result, palatalizing candidate (c) is correctly chosen as optimal. Note that candidate (c) does not violate the ID(C-pl) constraint – this is because the surface correspondent of the underlying sibilant /s/ is also associated with the C-place[coronal] feature.

4.65

/ma: s -a -uk-/ C-pl [cor]$_A$ C-pl [cor]$_B$ V-pl [cor]$_C$	PARSE(F)	ID(C-PL)	MAXAFFIX	ID(V-PL)
a. [ma: . s -uk-] C-pl [cor]$_A$ C-pl [cor]$_B$ V-pl [cor]$_C$	*!			
b. [ma: . s -uk-] C-pl [cor]$_A$			*!*	
☞c. [ma:. ʃ -uk-] C-pl [cor]$_{A, B}$ V-pl [cor]$_C$				*

The evaluation of the output candidates for the input containing non-sibilant alveolars in given in 4.66. Recall from Chapter 3 that non-sibilant alveolars are underlyingly placeless – that is, they lack C-place specification altogether. Thus the palatalizing candidate in (c) crucially violates the ID(C-pl) constraint, because the input correspondent of the surface sibilant is not associated with a C-pl-[cor] structure. The fully faithful candidate (a) violates the high-ranking Parse(F) constraint because it still contains the floating structure, and so it is eliminated. As a result, deletion candidate (b) is predicted to surface, regardless of violations incurred on the MaxAffix constraint.

4.66

/znuot-a -uk-/ C-pl [cor] V-pl [cor]	PARSE(F)	ID(C-PL)	MAXAFFIX	ID(V-PL)
a. [znuo.t-uk] C-pl [cor] V-pl [cor]	*!			
☞b. [znuo.t-uk]			**	
c. [znuo.ʃ-uk] C-pl [cor] V-pl [cor]		*!		*

Let us now turn to labials. Recall from Chapter 3 that palatalization of labial segments in Latvian is ruled out by a feature co-occurrence constraint *[labial][coronal] (see Morén 2006 on feature co-occurrence constraints):

4.67 *[labial][coronal] – assign one violation mark for every configuration where a root node is simultaneously associated with [coronal] and [labial]

In 4.68 the palatalizing candidate in (c) violates the feature co-occurrence constraint, because it contains both [coronal] and [labial] specification. The palatalizing candidate in (d), where the co-occurrence is avoided by delinking the underlying [labial] specification, violates ID(C-place). As a result, the deletion candidate in (b) is correctly selected as optimal.

4.68

/luop-a -uk-/ C-pl C-pl [lab] [cor] V-pl [cor]	PARSE(F)	*[LAB][COR]	ID(C-PL)	MAXAFFIX	ID(V-PL)
a. /luop -uk-/ C-pl C-pl [lab] [cor] V-pl [cor]	*!				
☞b. /luop -uk-/ C-pl [lab]				**	
c. /luop^j -uk-/ C-pl [cor] [lab] V-pl [cor]		*!	*		*
d. /luo-t͡ʃ -uk-/ C-pl [cor] V-pl [cor]			*!		*

Let us now consider the evaluation of output candidates for the inputs containing root-final velars. Recall from Chapter 3 that velar stops are specified for C-place-[dorsal]. The high-ranking ID(C-pl) in the tableau above ensures that the winning candidate is the one that preserves the underlying C-place specification, even at the expense of violating MaxAffix. Thus, as it stands, the current constraint ranking would incorrectly predict the C-place[dorsal]V-place[coronal] candidate to surface.

However, recall that I argued in Chapter 3 that velar segments in Latvian are generally dispreferred. This is evidenced by the fact that velars is the only class of consonants that undergoes change of place when followed by a front vowel in the nuclear position – a violation of faithfulness that cannot be motivated by the syllable wellformedness considerations. I attributed velar avoidance to the markedness constraint *C-place-[dorsal][44]:

4.69 *C-place-[dorsal] – assign one violation mark for every root node that dominates C-place-[dorsal].

As shown in 4.70, when ranked above ID(C-place), *C-place-[dorsal] ensures that the violation of ID(C-place) is tolerated in the optimal candidate. Candidates (c), (d) and (e) all exemplify the different ways in which the violation of *C-place-[dorsal] can be repaired. Candidate (e) is selected as optimal because it fully satisfies MaxAffix.

[44] Recall from Chapter 3 that *BarePlace and MaxLink-place ensure that *C-place-[dorsal] is repaired by spreading, and not by simply delinking the offending [dorsal] feature or C-place node.

4.70

/li:da k -a -uk-/ C-pl C-pl [dor] [cor]$_A$ V-pl [cor]$_B$	Parse(F)	*C-place-[dor]	ID(C-pl)	MaxAffix	ID(V-pl)
a. li:da k -a -uk- C-pl C-pl [dor] [cor]$_A$ V-pl [cor]$_B$	*!	*			
b. li:da . t -uk-			*	*!*	
c. li:da t͡s -uk- C-pl [cor]$_A$			*	*!	
d. li:da c -uk- C-pl V-pl [cor]$_B$			*	*!	*
☞e. li:da t͡ʃ -uk- C-pl [cor]$_A$ V-pl [cor]$_B$			*		*

For the sake of comparison, let us consider here the phonological palatalization of velar stops triggered by the suffix /-iɲ-/. Unlike /-uk-/ and /-el-/, the suffix /-iɲ-/ is not underlyingly associated with the floating structure. Therefore, the Parse(F) and MaxAffix constraints do not play a crucial role in the evaluation, and the velar palatalization in this case is motivated solely by the need to repair the underlying

C-place-[dorsal] specification. As shown in 4.71, candidate (b), which repairs the markedness violation by delinking the C-place node of the velar segment, violates the MaxLink-Place constraint. Candidate (d) crucially violates the ID(V-pl) constraint, and as a result candidate (c) is correctly selected as optimal.

4.71

/li:da k -a -iɲ-/ C-pl C-pl [dor] [cor]$_A$ V-pl [cor]$_B$	PARSE(F)	*C-PLACE-[DOR]	ID(C-PL)	MAXAFFIX	MAXLINK-PLACE	ID(V-PL)
a. li:da . k -iɲ- C-pl C-pl [dor] [cor]$_A$ V-pl [cor]$_B$		*!				
b. li:da. t -iɲ- C-pl [cor]$_A$ V-pl [cor]$_B$			*		*!	
☞c. li:da . t͡s -iɲ- C-pl C-pl [cor]$_A$ V-pl [cor]$_B$			*			
d. li:da . c -iɲ- C-pl C-pl V-pl [cor]$_A$ [cor]$_B$			*			*!
e. li:da . t͡ʃ -iɲ- C-pl V-pl [cor]$_A$ [cor]$_B$			*			*!

To sum up, in all cases of diminutive palatalization considered above, violations incurred on the ID(C-place) constraint played a crucial role in the evaluation. In all cases, except for the independently motivated [dorsal] avoidance, the winning candidate was the one that satisfied the ID-(C-place) constraint, even at the expense of deleting the floating structure.

Recall from Chapter 3 that the situation with yod-palatalization is exactly the opposite. There, the preservation of C-place-[cor] and V-place-[cor] specifications of the underlying front vowel is given priority over faithfulness to the underlying place specifications. As a result, non-sibilant alveolars /t, d, n, l, r/ - which, as we have seen, do not undergo diminutive palatalization due to high-ranking ID(C-place) – all undergo yod-palatalization. In what follows, I consider the interaction between yod-palatalization and diminutive palatalization triggered by the suffix /-uk-/

4.3.3.2.2 Interaction between uk-palatalization and yod-palatalization

Before we discuss the interaction between diminutive and yod-palatalization, it will be useful to briefly recapitulate the analysis of the latter developed in Chapter 3. As I argued at length there, yod-palatalization is motivated by syllable-welformedness considerations – namely, hiatus prohibition and complex onset avoidance. Recall that yod-palatalization/iotization applies in contexts where the stem from a palatalizing declension is followed by a vowel-initial suffix – whether inflectional or derivational. That is, yod-palatalization/iotization applies in cases where a front theme vowel forms an underlying hiatus with a following segment.

As I showed in Chapter 3, hiatus avoidance in Latvian is motivated by a high-ranking Onset. The way of satisfying Onset without violating any faithfulness constraints is resyllabification, where the first of the sequence of vowels is parsed in the onset position. Re-syllabifying the underlying front vowel creates a complex onset, which is resolved by deleting the second element of the onset cluster (a theme vowel), while preserving its features on the root-final alveolar consonant.

4.72

/zut -i -a/ C-pl V-pl [cor]A [cor]B	ONSET	*COMPLONS	MAXLINK [V-PL-COR]	IDENT (C-PLACE)	MAXLINK [C-PL-COR]	IDENT (V-PLACE)
a. [zu.t -i . -a] C-pl V-pl [cor]A [cor]B	*!					
b. [zu.t -i̯ -a] C-pl V-pl [cor]A [cor]B		*!				
☞c. [zu -ʃ -a] C-pl V-pl [cor]A [cor]B				*		*

In 4.72 violations that the output candidates incur on the ID(C-pl-F) constraint are not crucial for the evaluation. The ranking in 4.72 predicts, therefore, that yod-palatalization can potentially affect all root-final segments – including non-sibilants - as long as it is not blocked by some higher-ranking constraint on feature co-occurrence (as is the case with root-final labials).

As we have just seen in Section 4.3.3.2.1, in the diminutive palatalization triggered by /-uk-/, on the other hand, satisfaction of ID(C-place) is given priority. That is, diminutive palatalization will only apply if it does not imply violation of ID(C-place) (unless it is outranked by the markedness constraint penalizing a specific C-place feature, as in the case of velars). The ranking shown in 4.73 , where MaxAffix and MAxLink-V-place-[cor] dominate ID(C-place), makes the wrong predictions for uk-palatalization. Consider:

4.73

/znuot-a -uk-/ C-pl [cor] V-pl [cor]	PARSE(F)	MAXAFFIX	MAXLINKV-PL[COR]	ID(C-PL)	MAXLINKC-PL[COR]	ID(V-PL)
a. [znuo.t-uk] C-pl [cor] V-pl [cor]	*!					
☜b. [znuo.t-uk]		*!*	*		*	
☞c. [znuo.ʃ-uk] C-pl [cor] V-pl [cor]				*		*

Thus, in monostratal OT we would have arrived at a ranking paradox: in order to select the correct candidates in yod-palatalization and diminutive palatalization, contradictory constraint rankings are required. In Stratal OT, however, the problem does not arise: diminutive palatalization that is triggered by derivational suffixes applies at the stem-level cycle, while yod-palatalization – which also applies before inflections - is a word-level phenomenon. Because each cycle may be characterized by different constraint rankings, the ranking paradox does not arise.

Keeping in mind the motivations for yod-palatalization, let us now consider how the evaluation proceeds in cases when -uk- attaches to stems belonging to palatalizing declensions. The relevant examples are repeated below:

4.74

a.	/zut-i-uk-Ø-s/	→	[zuʃ-uk-s]	'eel'
	/vard-e-uk-Ø-s/	→	[varʒ-uk-s]	'frog'
b.	/ez-i-uk-Ø-s/	→	[eʒ-uk-s]	'hedgehog'
	/dad͡z-i-uk-Ø-s/	→	[dad͡ʒ-uk-s]	'thistle'
c.	/braːl-i-uk-Ø-s/	→	[braːʎ-uk-s]	'brother'
	/ron-i-uk-Ø-s/	→	[roɲ-uk-s]	'seal'
d.	/pluːm-i-uk-Ø-s/	→	[pluːm-j̥-uk-s]	'plum'
	/uːp-i-uk-Ø-s/	→	[uːp-j̥-uk-s]	'eagle-owl'
e.	/kuɟ-i-uk-Ø-s/	→	[kuɟ-uk-s]	'ship'
	/kac-i-uk-Ø-s/	→	[kac-uk-s]	'cat'

As shown in 4.74, palatalization/iotization always applies in stems belonging to palatalizing declensions when followed by /-uk-/ (note that when the postalveolar segment is underlying, palatalization is vacuous). At first glance, it might appear that all surface forms in 4.74 are derived by diminutive palatalization (i.e. by linking the floating structure associated with –uk- to the root-final consonant). However, as we will see shortly, this is not the case.

Tableau in 4.75 illustrates the stem-level evaluation based on input containing a sibilant. The crucial property of the stems of palatalizing declensions is the presence of the front theme vowel, which survives the hiatus resolution by syllabifying in the onset position. The front vowel provides an anchor to the floating features associated with /-uk-/ - this means that in the stems of palatalizing declensions Parse(F) can be satisfied at no cost to faithfulness. In 4.75, the faithful candidate violates Parse(F) and is eliminated. Palatalizing candidates (c) and (d) fatally violate ID(V-pl), and as a result the fusion candidate (b) is selected as optimal and becomes the basis for the word-level evaluation.

4.75 Stem-level evaluation

/e z -i -uk-/ C-pl C-pl C-pl [cor]A [cor]B [cor]D V-pl V-pl [cor]C [cor]E	PARSE(F)	ID(C-PL-F)	MAXAFFIX	ID(V-PL)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. /e . z -j -uk-/ C-pl C-pl C-pl [cor]A [cor]B [cor]D V-pl V-pl [cor]C [cor]E	*!				*		
☞b. /e . z -j -uk-/ C-pl C-pl [cor]A [cor]B, D V-pl [cor]C, E					*		
c. /e . ʒ -j -uk-/ C-pl [cor]A, B, D V-pl [cor]C, E				*!	*		
d. /e . ʒ -uk-/ C-pl [cor]A, B, D V-pl [cor]C, E				*!			

Consider now how the word-level evaluation proceeds (the word-level cycle is triggered by case-number inflections, which are not indicated below as they are not relevant for the problem at hand). Candidate (a), faithful to the input of the word-level evaluation, violates *ComplexOnset, which now outranks both ID constraints. Candidate (b), where *ComplexOnset is resolved by deletion, crucially violates the high-ranking MaxLink(V-pl[cor]) constraint. As a result, the palatalizing candidate in (c), where *ComplexOnset is resolved by delinking the front vowel and preserving the coronal features, is selected as optimal.

4.76 Word-level evaluation

/e . z -j̥ -uk-/ C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl [cor]$_C$	Parse(F)	MaxAffix	*CmplxOns	MaxLink V-pl[cor]	ID(C-place)	MaxLink C-pl[cor]	ID(V-place)
a. /e . z -j̥ -uk-/ C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl [cor]$_C$			*!				
b. /e . z -uk-/ C-pl [cor]$_A$				*!		*	
☞c. /e . ʒ -uk-/ C-pl [cor]$_{A, B}$ V-pl [cor]$_C$							*

The situation with stems ending in non-sibilant alveolars is essentially the same. Recall that these segments lack C-place specifications. Therefore, palatalization of a non-sibilant alveolar would imply violation of ID(C-place) and is blocked in the stem-level cycle. In 4.77, the faithful candidate in (a) violates the Parse(F) constraint. Palatalizing candidates (c) and (d) violate high-ranking ID(C-place). As a result, candidate (b) is selected as optimal and becomes the basis of the word-level evaluation.

4.77 Stem-level evaluation

/zu t -i -uk-/ C-pl [cor]$_A$ V-pl [cor]$_B$ C-pl [cor]$_C$ V-pl [cor]$_D$	PARSE(F)	ID(C-PL)	MAXAFFIX	ID(V-PL)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. zu . t -j -uk- C-pl [cor]$_A$ V-pl [cor]$_B$ C-pl [cor]$_C$ V-pl [cor]$_D$	*!				*		
☞b. zu . t -j -uk- C-pl [cor]$_{A, C}$ V-pl [cor]$_{B, D}$					*		
c. zu . ʃ -j -uk- C-pl [cor]$_{A, C}$ V-pl [cor]$_{B, D}$		*!		*	*		
d. zu . ʃ -uk- C-pl [cor]$_{A, C}$ V-pl [cor]$_{B, D}$		*!		*	*		

Word-level evaluation of the non-sibilant alveolar stems is illustrated in 4.78. The faithful parse in (a) crucially violates *ComplexOnset. Candidate (c), where violation is resolved by the deletion of the front vowel and all its features, is ruled out by MaxLinkV-pl-[cor]. As a result, the palatalizing candidate in (b) is correctly predicted to win.

4.78 Word-level evaluation

zu . t -j̥ -uk- C-pl [cor] V-pl [cor]	PARSE(F)	MAXAFFIX	*CMPLXONS	MAXLINK V-PL[COR]	ID(C-PL-F)	MAXLINK C-PL[COR]	ID(V-PLACE)
a. zu . t -j̥ -uk- C-pl [cor] V-pl [cor]			*!				
☞b. zu . ʃ -uk- C-pl [cor] V-pl [cor]					*		*
c. zu . t -uk-				*!		*	

Stem-level evaluation of velar-final stems of palatalizing declensions proceeds essentially in the same way as that of alveolar-final stems. The difference is that at the stem-level, the optimal candidate does violate ID(C-pl) due to the high-ranking *C-place-[dor]. The onset cluster formed by the root-final segment and the re-syllabified theme vowel is likewise not resolved in this cycle due to the low-ranked *ComplexOnset, and therefore there is no motivation for yod-palatalization to apply.

4.79 Stem-level evaluation

/pus-aug -i -uk-/ C-pl [dor] · C-pl [cor]A V-pl [cor]B · C-pl [cor]C V-pl [cor]D	PARSE(F)	*C-PLACE-[DOR]	ID(C-PL)	MAXAFFIX	MAXLINK-PLACE	ID(V-PL)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. pus-au.g -i̯ -uk- C-pl [dor] · C-pl [cor]A V-pl [cor]B · C-pl [cor]C V-pl [cor]D	*!	*					*		
b. pus-au.g -i̯ -uk- C-pl [dor] · C-pl [cor]A,C V-pl [cor]B,D		*!					*		
☞ c. pus-au.d͡z -i̯ -uk- C-pl · C-pl [cor]A,C V-pl [cor]B,D			*				*		
d. pus-au.d͡ʒ -i̯ -uk- C-pl [cor]A,C V-pl [cor]B,D			*			*!			

At the word-level cycle, *ComplexOnset is ranked high, and therefore the onset cluster has to be resolved. Candidate (b), where the front vowel deletes with its V-place features, violates MaxLinkV-pl[cor]. Candidate (c), where V-pl[cor] is re-linked to the root-final segment, is correctly predicted to win.

4.80 Word-level evaluation

pus-au. d͡z -j̥ -uk- C-pl C-pl $[\text{cor}]_A$ V-pl $[\text{cor}]_B$	Parse(F)	MaxAffix	*CmplxOns	MaxLink V-pl[cor]	ID(C-pl-F)	MaxLink C-pl[cor]	ID(V-place)
a. pus-au. d͡z -j̥ -uk- C-pl C-pl $[\text{cor}]_A$ V-pl $[\text{cor}]_B$			*!				
b. pus-au. d͡z -uk- C-pl $[\text{cor}]_A$				*!			
☞c. pus-au. d͡ʒ -uk- C-pl $[\text{cor}]_A$ V-pl $[\text{cor}]_B$							*

Finally, let us consider the stems that contain palatal stops. The tableau illustrating stem-level evaluation is given in 4.81. Here, the faithful candidate in (a) violates Parse(F), and the deletion candidate in (c) violates MaxAffix. Candidate (d) crucially violates ID(C-place), and therefore the fusion candidate in (b) is selected as optimal and becomes the base for the word-level evaluation.

4.81 Stem-level evaluation

/ka ç - i -uk-/ C-pl C-pl C-pl [cor]B [cor]D V-pl V-pl V-pl [cor]A [cor]C [cor]E	PARSE(F)	ID(C-PL-F)	MAXAFFIX	ID(V-PL)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. /ka ç - i -uk-/ C-pl C-pl C-pl [cor]B [cor]D V-pl V-pl V-pl [cor]A [cor]C [cor]E	*!						
☞b. /ka . ç - i̯ -uk-/ C-pl C-pl [cor]B, D V-pl V-pl [cor]A [cor]C, E					*		
c. /ka . ç - -uk-/ C-pl V-pl [cor]A, C, E			*!				
d. /ka . t͡ʃ -uk-/ C-pl [cor]B, D V-pl [cor]A, C, E		*!					

At the word-level, the fully faithful candidate in (a) crucially violates the high-ranking *ComplexOnset. Candidate (b), where the C-place feature of the deleted front vowel is preserved on the preceding element, violates ID(C-pl). Asd a result, candidate (c) is correctly selected as optimal.

4.82 Word-level evaluation

/ka . ç - j̥ -uk-/ C-pl C-pl [cor]$_B$ V-pl V-pl [cor]$_A$ [cor]$_C$	Parse(F)	MaxAffix	*CmplxOns	MaxLink V-pl[cor]	ID(C-pl)	MaxLink C-pl[cor]	ID(V-place)
a. /ka . ç - j̥ -uk-/ C-pl C-pl [cor]$_B$ V-pl V-pl [cor]$_A$ [cor]$_C$			*!				
b. /ka . t͡ʃ -uk-/ C-pl [cor]$_B$ V-pl [cor]$_{A, C}$					*!		
c. /ka . ç - -uk-/ C-pl V-pl [cor]$_{A, C}$						*	

Conceptually, uk-palatalization is similar to yod-palatalization in that in both cases, palatalization itself is motivated by the pressure to preserve the underlying features of the original anchor that is banned from surfacing by some high-ranked constraint. The pressure is embodied by the MaxLink-[cor] and MaxAffix constraints, and counteracted by ID(C-place) and ID(V-place).

The crucial difference between the two lies in how these contradicting requirements are prioritized. In the case of uk-palatalization, the features associated with the anchor that does not get to surface are preserved only to the extent that it does not imply violating ID(C-place). The only exception are cases where violation of ID(C-place) is unavoidable and independently motivated by high-ranking markedness (*C-pl-[dorsal]). In such instances, the optimal candidate fully satisfies MaxAffix.

In yod-palatalization, violations of ID(C-place) are tolerated, but only to the extent that they are necessary to satisfy MaxLink(V-place) – that is, only in cases where the target is not already specified for the C-place node. Where the potential target is already specified for the C-place node (palatal stops), violations of ID(C-place) are not allowed.

In cases where the pressure from MaxLink and MaxAffix constraints is removed – i.e. where no high-ranking constraint demands the eradication of the original anchor of [coronal] features – violations of ID constraints are avoided. Thus, alveolar stops do not undergo palatalization when followed by front vowels in the nuclear position. Where the underlying place specification is marked (as in the case of dorsal), spreading will apply to repair the marked structure with minimal faithfulness violation.

4.3.3.3 Palatalization in el-suffixed nouns

4.3.3.3.1 Diminutive palatalization triggered by [-el-]

In this section I develop an analysis of diminutive palatalization triggered by the suffix /-el-/ as it applies in stems of non-palatalizing declensions. Just as uk-palatalization, diminutive palatalization triggered by /-el-/ only applies to velar and sibilant targets. The relevant data are illustrated below:

4.83
a. Sibilant alveolars

/maːs-a-el-e/	→	[maːʃ-el-e]	'sister'
/mut͡s-a-el-e/	→	[mut͡ʃ-el-e]	'barrel'

b. Non-sibilant alveolars

/ait-a-el-e/	→	[ait-el-e]	*[aiʃ-el-e]	'sheep'
/znuot-el-i-s/	→	[znuot-el-i-s]	*[znuoʃ-el-i-s]	'son-in-law'

c. Labials

/luop-a-el-i-s/	→	[luop-el-i-s]	*[luopʲ-el-i-s]	'beast'
/lauv-a-el-e/	→	[lauv-el-i-s]	*[lauvʲ-el-e]	'lion'

d. Velars

/zirg-a-el-i-s/	→	[zirɟ-el-i-s]	'horse'
/li:dak-a-el-e/	→	[liːdac-el-e]	'pike'

While in the case of uk-palatalization, the failure to target non-sibilant alveolars /t, d, n, l, r/ had to be attributed to the high-ranking ID(C-place) constraint, in the case of el-palatalization it follows directly from the representations. This is because the floating structure associated with the suffix /-el-/, V-pl-[cor], may only attach to segments specified for the C-place node. Since all non-sibilant alveolars are underlyingly placeless (see Chapter 3 for discussion and motivation), they are automatically excluded from the set of potential targets. I assume that insertion of the place node that would provide the landing site for the floating V-place-[cor] structure is ruled out by the DEP constraint relativized to nodes that are undominated in Latvian. This is illustrated in the tableau in 4.84 (candidates with hiatus are ignored).

4.84

/znuot-a -el-/ V-pl | [cor]	PARSE(F)	DEP(PLC)	ID(C-PL-F)	MAXAFFIX	ID(V-PL-F)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. [znuo.t-el-] V-pl | [cor]	*!							
☞b. [znuo.t-el-]				*				*
c. [znuo.c-el-] C-pl | V-pl [cor]		*!			*			

In 4.84, the faithful candidate violates the Parse(F) constraint and is eliminated. Candidate (c), with node insertion, violates DEP. Candidate (b), where the floating structure has been erased, is selected as optimal. In the same fashion, this scenario also applies to root-final /d, n, l, r/ when followed by -el-.

Let us now consider the evaluation of a candidate that contains a sibilant target which is underlyingly specified as C-place-[cor]. In 4.85, the faithful candidate (a) violates the Parse(F) constraint. Candidate (b) incurs violation of MaxAffix, which is not motivated by the avoidance of ID(C-place) violations. Therefore, palatalizing candidate (c) is preferred. This scenario applies to all remaining alveolar sibilants /z, t͡s, d͡z/. Note that in cases where the root-final segment in underlyingly specified for both C-place[cor] and V-place[cor] (i.e. in case of underlying postalveolar sibilants), the el-palatalization applies vacuously.

4.85

/ma: s -a -el-/ C-pl [cor] V-pl [cor]	PARSE(F)	ID(C-PL)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. ma: s -el- C-pl [cor] V-pl [cor]	*!						
b. ma: s -el- C-pl [cor]			*!				*
☞c. ma: ʃ -el- C-pl [cor] V-pl [cor]				*			

The evaluation of forms containing root-final labials would follow a different scenario. In this case, palatalization is blocked by the feature-co-occurrence constraint that prohibits configurations where the same root node dominates [labial] and [coronal] and the MaxLink-[lab] constraint that precludes such configurations from being repaired by the delinking of [labial]. The relevant tableau is given in 4.86.

4.86

/luo p- a -el-/ C-pl [lab] V-pl [cor]	PARSE(F)	*[LAB][COR]	MAXLINK[LAB]	ID(C-PL-F)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. luo p- -el- C-pl [lab] V-pl [cor]	*!								
☞b. luo p- -el- C-pl [lab]					*				*
c. luo pʲ- -el- C-pl [lab] V-pl [cor]		*!				*			
d. luo c- -el- C-pl V-pl [cor]			*!			*			

Let us now turn to the evaluation of forms containing velar-final roots. Recall from the previous section that an ID(C-place) violation is motivated in this case by avoiding violation of the high-ranking *C-place-[dorsal] constraint. Candidate (b), where *C-place-[dorsal] is satisfied by simply delinking the [dorsal] feature is ruled out by *Bare-Place. Thus candidate (d), where spreading applies in addition, is selected as optimal. Note that, unlike in the case of uk-palatalization, candidates with [t͡s] and [t͡ʃ] are not feasible here – this is because palatalization resulting in these segments cannot be motivated by the satisfaction of MaxAffix constraints given the input in 4.87.

4.87

/li:da k -a -el-/ C-pl [dor] V-pl [cor]	PARSE(F)	*BARE-PLACE	*C-PLACE-[DOR]	ID(C-PL-F)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]
a. li:da k -a -el- C-pl [dor] V-pl [cor]	*!		*						
b. li:da . t -el- C-pl		*!		*	*				*
c. li:da kʲ -el- C-pl [dor] V-pl [cor]			*!						
☞d. li:da c -el- C-pl V-pl [cor]				*		*			

To sum up, we have seen that diminutive el-palatalization affects only two classes of segments: sibilants and velar plosives. According to the analysis developed here, sibilants are prone to diminutive palatalization because /s/~[ʃ] mapping does not involve violation of ID(C-place), which is ranked high at the stem-level cycle. In velars, palatalization violating ID(C-place) is tolerated because of high-ranking *C-place-[dor]. Note that the outcome of velar palatalization triggered by [-uk-] and that triggered by [-el-] is determined by MaxAffix, which forces the floating structure to be maximally accommodated on the root-final segment.

4.3.3.3.2 Interaction between el-palatalization and yod-palatalization

Recall that suffixes /-uk-/ and /-el-/ behave differently when they combine with stems of palatalizing declensions. Yod-palatalization/iotization consistently applies before /-uk-/, but fails before /-el-/, as illustrated in 4.88.

4.88

a. Non-sibilant alveolars

/zut-i-el-i-s/	→	[zut-el-i-s]	*[zuʃ-el-i-s]	cf.	[zuʃ-uk-s]	'eel'
/sun-i-el-i-s/	→	[sun-el-i-s]	*[suɲ-el-i-s]	cf.	[suɲ-uk-s]	'dog'

b. Labials

/pluːm-e-el-e/	→	[pluːm-el-e]	*[pluːm-ʝ-el-e]	cf.	[pluːm-ʝ-uk-s]	'plum'
/uːp-i-el-i-s/	→	[uːp-el-i-s]	*[uːp-ʝ-el-i-s]	cf.	*[uːp-ʝ-uk-s]	'eagle-owl'

In Section 4.2.3.2, I attributed the failure of yod-palatalization in forms derived with /-el-/ to yod-deletion – a stem-level process that applies before derivational suffixes that start with front vowels (see Steinbergs 1977:96 for an alternative account; see Endzelīns 1951:182-183/1922:129, AGL 1959:113 for more examples). In what follows, I develop a constraint-based analysis of yod-deletion in Latvian.

The deletion of a palatal fricative or glide before front vowels is not an infrequent pattern cross-linguistically (see Lipski 1990 for Spanish, Kang & Hong 2009 and references therein for Korean). Because the palatal fricative – underlyingly a front vowel - shares a large portion of its structure with other front vowels, yod-deletion before front vowels is likely a consequence of the OCP (see also Lipski 1990):

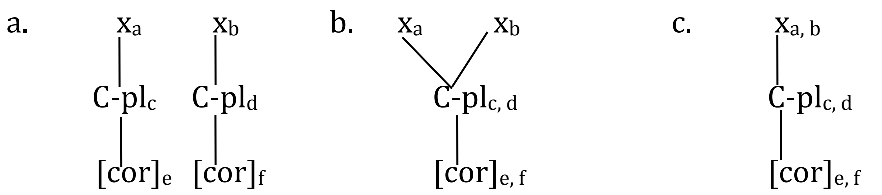
4.89 OCP – adjacent identical elements are prohibited (McCarthy 1988:88).

As noted in McCarthy (1988), within the autosegmental theory of phonology, "elements" are to be understood as referring to all types of subsegmental constituents – that is, terminal features, structures dominated by class nodes, and structures dominated by root nodes. In the case of Latvian yod-deletion, the relevant OCP constraint has to be relativized to refer to the constituents at the highest level, i.e. structures dominated by the adjacent root nodes. Informally, it penalizes adjacent *segments* that are too similar.

4.90 OCP_{RN} – adjacent identical root nodes are prohibited.

There are two ways to repair a violation of the OCP: first, delinking one of the identical elements; second, avoiding adjency by fusing the two identical elements into one. As we have seen above, Latvian allows fusion at the level of terminal features and class nodes. The OCP_{RN} , however, cannot be satisfied by fusing lower-level constituents. This is because in this case, the adjacent root nodes would still be dominating identical structures, i.e. would still be identical and violate OCP_{RN}. Violation of the OCP_{RN} can only be repaired by fusing the root nodes themselves, as shown in (c).

4.91

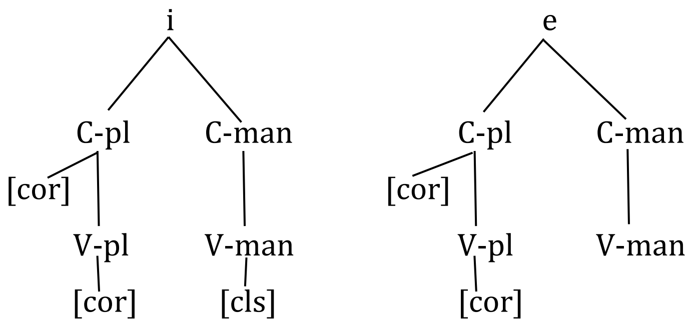


This option is not available in Latvian – segmental fusion does not apply to resolve identical sequences of high vowels. I attribute it to a version of the Uniformity constraint militating against fusion (McCarthy & Prince 1995) that is relativized to root nodes. This constraint would not be violated by fusion of lower-level constituents, like that in (b), but would ban output candidates that contain root nodes with multiple input correspondents. To ensure that deletion is less costly than violation of root-node uniformity, Uniformity$_{RN}$ should outrank MAX.

4.92 Uniformity$_{RN}$ – no root node of the output has multiple correspondents in the input (Elzinga 1999:83).

Recall that in Latvian, yod-deletion applies not only before /i/, but also before other front non-low vowels. This indicates that full identity between the two adjacent root nodes is not necessary to incur an OCP_{RN} violation – sequences of non-identical root nodes that have some structural overlap are repaired as well (see Lipski 1990 for some examples from Spanish).

4.93 a. b.



The degree of structural overlap can be evaluated by OCP_{RN} constraints relativized to refer to individual constituents dominated by the adjacent root nodes (see Coetzee & Pater 2006 on OCP constraints relativized to nodes and features). If locally conjoined, such OCP_{RN} constraints would penalize output candidates where the degree of structural overlap between the adjacent segments is too large.

4.94 OCP_{RN}(C-pl-[cor]V-pl[cor]) – assign one violation mark for every instance where adjacent root nodes dominate C-pl-[cor]V-pl[cor].

4.95 OCP_{RN}(V-man) – assign one violation mark for every instance where adjacent root nodes dominate V-manner.

As illustrated in 4.96, yod-deletion is only triggered by derivational suffixes. In OT terms, this means that the OCP_{RN} constraint is high-ranked only at the stem-level cycle. At the word-level cycle, OCP_{RN} should be ranked below MAX. The interaction of these constraints is illustrated in 4.97 and 4.98.

4.96

/bu̯om-i-s/	→	[bu̯om-i-s]	'pole, Nom. sg.'
/bu̯om-i-i:t-i-s/	→	[bu̯om-i:t-i-s]	'pole, dim. Nom. sg.'
/bu̯om-i-i/	→	[bu̯om-i̯-i]	'pole, Nom. pl.'

At the stem-level cycle, the high-ranked OCP_{RN} constraint penalizes sequences of high vowels that come to be adjacent as a result of stem-to-stem derivation. In 4.97, it rules out the faithful parse in (a) and the candidate with sub-segmental fusion in (b). Candidate (c), where the identical segments are fused into one, incurs a fatal violation of the root-node uniformity. As a result, the deletion candidate in (d) is selected as optimal, despite the violations incurred on MaxLink constraints[45]. Note that the deletion applies to a theme vowel because the front vowel of the derivational suffix is protected by MaxAffix.

[45] Note that I am not considering a candidate where the [cor] features of the deleted front vowel survive on the second front vowel. This is because such a candidate would violate the Final[F] constraint that ensures that spreading is always leftward (see McCarthy 2009 for the formal definition of this constraint, and Chapter 3 for use and discussion).

4.97 Stem-level evaluation

/bu̯om-i̯$_1$ -i̯:$_2$t-/ C-pl C-pl [cor]$_A$ V-pl [cor]$_B$ V-pl [cor]$_C$ [cor]$_D$	OCP$_{RN}$	UNIFORMITY$_{RN}$	ID(C-PL)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]	MAX
a. bu̯om-i̯ -i̯:t- C-pl C-pl [cor]$_A$ V-pl [cor]$_B$ V-pl [cor]$_C$ [cor]$_D$	*!								
b. bu̯om-i̯$_1$ -i̯:$_2$t- C-pl [cor]$_{A,B}$ V-pl [cor]$_{C,D}$	*!								
c. bu̯om -i̯:$_{1,2}$ t- C-pl [cor]$_{A,B}$ V-pl [cor]$_{C,D}$		*!							
☞d. bu̯om- -i̯:$_2$t- C-pl [cor]$_B$ V-pl [cor]$_D$							*	*	*

When two high vowels come to be adjacent as a result of stem-to-word derivation, the situation is different. At the word-level cycle, OCP$_{RN}$ is ranked low, and has no effect on evaluation. Thus, the faithful parse gets to surface, while candidates with segmental fusion and deletion are ruled out by root-node uniformity and MaxLink respectively.

4.98 Word-level evaluation

/bu̯om-i_1 -i_2/ C-pl C-pl $[cor]_A$ V-pl $[cor]_B$ V-pl $[cor]_C$ $[cor]_D$	UNIFORMITY$_{RN}$	MAXAFFIX	*CMPLXONS	MAXLINKV-PL[COR]	ID(C-PL)	MAXLINKC-PL[COR]	ID(V-PLACE)	MAX	OCP$_{RN}$
☞a. /bu̯om.-j_1 -i_2/ C-pl C-pl $[cor]_A$ V-pl $[cor]_B$ V-pl $[cor]_C$ $[cor]_D$									*
b. bu̯o.m -$i:_{1,2}$ C-pl $[cor]_{A,B}$ V-pl $[cor]_{C,D}$	*!								
c. bu̯om- -$i:_2$ C-pl $[cor]_B$ V-pl $[cor]_D$				*!		*		*	

Stems containing sibilant-final roots behave essentially the same as labial-final ones when followed by non-diminutive derivational suffixes. That is, the front theme vowel is deleted when it comes to be followed by another front vowel as a result of stem-to-stem derivation, thus removing the context of yod-palatalization in the word-level cycle (4.99a). When two front vowels come to be adjacent at the word-level cycle, OCP$_{RN}$ is ranked too low to enforce deletion. Therefore, yod-palatalization would apply in the normal way 4.99b). The pattern is most clearly seen in stems that are both derived with -i:t- (a non-affective diminutive suffix) and inflected for Nominative plural 4.99c) Relevant evaluation is illustrated in 4.100 and 4.101.

4.99

a. Yod-palatalization bled by stem-level yod-deletion

/las-i-i:t-i-s/	→	[las-i:t-i-s]	*[laʃ-i:t-i-s]	'salmon, dim.'
/ez-i-i:t-i-s/	→	[ez-i:t-i-s]	*[eʒ-i:t-i-s]	'hedgehog, dim.'
/dad͡z-i-i:t-i-s/	→	[dad͡z-i:t-i-s]	*[dad͡ʒ-i:t-i-s]	'thistle, dim.'

b. Yod-palatalization in stem-to-word derivation

/las-i-i/	→	[laʃ-i]	*[las-i]	'salmon, Nom.pl.'
/ez-i-i/	→	[eʒ-i]	*[ez-i]	'hedgehog, Nom.pl.'
/dad͡z-i-i/	→	[dad͡ʒ-i]	*[dad͡z-i]	'thistle, Nom.pl.'

c.

/las-i-i:t-i-i/	→	[las-i:ʃ-i]	*[laʃ-i:ʃ-i]	'salmon, dim. Nom.pl.'
/ez-i-i:t-i-i/	→	[ez-i:ʃ-i]	*[eʒ-i:ʃ-i]	'hedgehog, dim. Nom.pl.'
/dad͡z-i-i:t-i-i/	→	[dad͡z-i:ʃ-i]	*[dad͡ʒ-i:ʃ-i]	'thistle, dim.Nom.pl.'

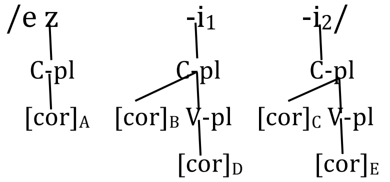
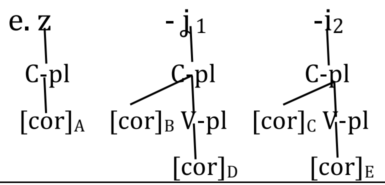
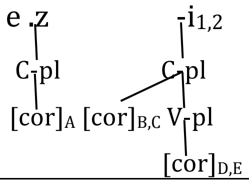
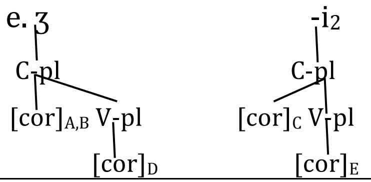
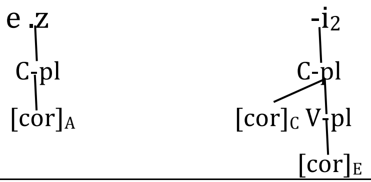
In 4.100, the faithful candidate is ruled out by the high-ranking OCP_{RN}, while the candidate with segmental fusion in (b) violates Uniformity. Candidate (c), where palatalization has applied, is penalized by ID(V-place) that ranks above MaxLinkV-place[cor] at this cycle. As a result, the deletion candidate in (d) is selected as optimal. This candidate becomes the basis for word-level evaluation, where the constraint ranking enforces yod-palatalization. However, prevocalic yod has already been wiped out of the representation, and yod-palatalization of the root-final sibilant apply.

4.100 Stem-level evaluation

/e z -i$_1$ -iː$_2$t-/ C-pl C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl [cor]$_C$ V-pl [cor]$_D$ [cor]$_E$	OCP$_{RN}$	UNIFORMITY$_{RN}$	ID(C-PL)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]	MAX
a. /e. z -j$_1$ -iː$_2$t-/ C-pl C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl [cor]$_C$ V-pl [cor]$_D$ [cor]$_E$	*!					*			
b. /e z -i$_{1,2}$ t-/ C-pl C-pl [cor]$_A$ [cor]$_{B,C}$ V-pl [cor]$_{D,E}$		*!							
c. /e ʒ -iː$_2$t-/ C-pl C-pl [cor]$_{A,B}$ V-pl [cor]$_C$ V-pl [cor]$_D$ [cor]$_E$					*!				*
☞d. /e z -iː$_2$t-/ C-pl C-pl [cor]$_A$ [cor]$_C$ V-pl [cor]$_E$							*	*	*

The situation is slightly different when the two front vowels become adjacent as a result of stem-to-word derivation. Here, OCP$_{RN}$ is ranked too low to exert pressure on the identical vowel sequences. However, high-ranking *ComplexOnset penalizes candidates where yod appears as a second element of a complex onset. At the same time, high-ranking MaxLink constraints protect the coronal features of the yod. The optimal output candidate is the one with yod-palatalization.

4.101 Word-level evaluation

	UNIFORMITY$_{RN}$	MAXAFFIX	*CMPLXONS	MAXLINKV-PL[COR]	ID(C-PL)	MAXLINKC-PL[COR]	ID(V-PLACE)	MAX	OCP$_{RN}$
a. 			*!						*
b. 	*!								
☞c. 								*	
d. 				*!		*			

Thus, we have seen that yod-deletion always applies at the stem-level cycle, unless its application creates an onsetless syllable. Therefore, the fact that alveolar sibilants surface as their postalveolar counterparts when followed by the diminutive suffix [-el-] cannot be due to the word-level yod-palatalization. Below I show that sibilant palatalization in this case is due to linking of the floating structure associated with the diminutive [-el-].

4.102

/ez-i-el-i-s/	→	[eʒ-el-i-s]	'hedgehog, dim.'
/dad͡z-i-el-i-s/	→	[dad͡ʒ-el-i-s]	'thistle, dim.'

In 4.103, candidates (a) and (b) containing a sequence of front vowels are eliminated by OCP_{RN}. The deletion candidate in (c) violates MaxAffix because it does not contain the correspondent of the floating structure associated with [-el-]. As a result, the palatalizing candidate in (d), where the floating structure is preserved on the root-final sibilant, is selected as optimal. Note that the sibilant palatalization that applies at the stem-level is crucially due to pressure from the Parse(F) and MaxAffix constraints – and therefore it can only be triggered by the diminutive suffixes associated with the floating structure.

4.103 Stem-level

/e z -i$_1$ -e$_2$l-/ C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl V-pl [cor]$_C$ [cor]$_D$	PARSE(F)	OCP_{RN}	$UNIFORMITY_{RN}$	ID(C-PL)	MAXAFFIX	ID(V-PLACE)	*CMPLXONST	MAXLINKC-PL-[COR]	MAXLINKV-PL-[COR]	MAX
a. e. z - j$_1$ -e$_2$l- C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl V-pl [cor]$_C$ [cor]$_D$	*!	*					*			
b. e. z - j$_1$ -e$_2$l- C-pl C-pl [cor]$_A$ [cor]$_B$ V-pl [cor]$_{C,D}$		*!					*			
c. e z -e$_2$l- C-pl [cor]$_A$					*!			*	**	*
☞d. e ʒ -e$_2$l- C-pl [cor]$_{A,B}$ V-pl [cor]$_{C,D}$						*				*

Summarizing the discussion in this sub-section, yod-deletion before front vowels is a stem-level process that accompanies stem-to-stem derivation, but fails in stem-to-word derivation. I treat yod-deletion as a way to resolve the violation of the OCP constraint that militates against sequences of segments with a large degree of structural overlap. Yod-deletion has the effect of destroying the context for word-level yod-palatalization (by wiping out its trigger). Therefore, el-palatalization of sibilants in stems of Declension 2, 5, and 6 cannot be due to yod-palatalization - as is also evidenced by the fact that sibilant palatalization fails before non-expressive derivational suffixes. Instead, it is analyzed here as expressive – i.e. triggered by the linking of the floating structure associated with [-el-].

4.3.3.4 Diminutive palatalization of alveolar sonorants

As we have seen in the preceding sections, diminutive palatalization, which is a stem-level phenomenon, consistently affects only two classes of root-final segments: sibilants and velar plosives. According to the analysis developed here, sibilants are susceptible to diminutive palatalization because they can host the floating structure associated with the diminutive suffixes [-uk-] and [-el-] without incurring violations of ID(C-place), which is high-ranked at the stem-level cycle. As for the velars, violation of ID(C-place) is tolerated because of the high-ranked *C-place-[dorsal] constraint.

However, in Section 4.2.2.2 I mentioned that diminutive uk-palatalization occasionally affects stem-final sonorants as well. In my sample, there is only one example of this type, while examples where sonorant palatalization before [-uk-] correctly does not apply are considerably more numerous[46]. More examples of

[46] It appears that a human referent is more likely to trigger exceptional uk-palatalization of sonorants. For instance, a google search for [stirn-uk-s]/[stirn-uk-i] 'doe/does' returns 33 hits as opposed to two hits for [stirɲ-uk-s]/[stirɲ-uk-i]. On the other hand, [be:rn-uk-s]/[be:rn-uk-i] 'child/children' returns 163 hits, against 4020 hits for [be:rɲ-uk-s]/[be:rɲ-uk-i].

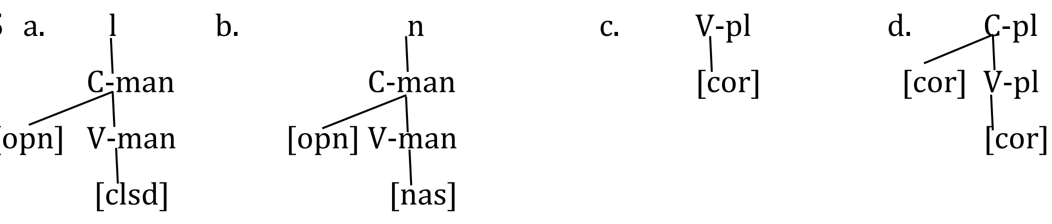
sonorant palatalization are to be found in the sample of Rūķe-Draviņa (1959:284).

4.104

/ragan-a-uk-Ø-s/	→	[ragaɲ-uk-s]		'witch'
/de:l-a-uk-Ø-s/	→	[de:l-uk-s]	*[de:ʎ-uk-s]	'son'
/saln-a-uk-Ø-s/	→	[saln-uk-s]	*[salɲ-uk-s]	'frost'
/stirna-uk-Ø-s/	→	[stirn-uk-s]	*[stirɲ-uk-s]	'doe'
/delna-uk-Ø-s/	→	[deln-uk-s]	*[delɲ-uk-s]	'palm'

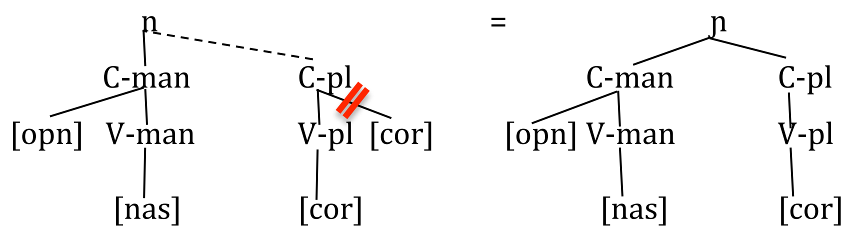
Notably, sonorant palatalization is never triggered by [-el-]. Even the large and dialectally diverse sample accumulated by Rūķe-Draviņa (1959) only contains a single example of sonorant palatalization triggered by [-el-], [a͜un-s]~[a͜uɲ-el-i-s] 'ram', of which she notes that it is less common than the corresponding form without sonorant palatalization, [a͜un-el-i-s] (Rūķe-Draviņa 1959:256). Furthermore, she has not recorded a single case where [-el-] triggers palatalization of the preceding liquid.

In fact, the absence of el-palatalization of sonorants is fully predicted by the representational analysis developed in the preceding section. Alveolar sonorants, which are lacking place specifications, do not have a node that can serve as an anchor to V-pl-[cor], which is the floating structure associated with [-el-] and the only mechanism by which [-el-] can cause palatalization. Consider:

4.105


On the other hand, uk-palatalization of sonorants can be easily modeled as the linking of the floating structure associated with [-uk-], that is, C-pl-[cor]V-pl-[cor], under the root node of the sonorant. The subsequent delinking of the C-pl-[cor] feature is due to the co-occurence constraint against segments that are simultaneously associated with C-pl-[cor] and C-man-[open] (phonetically, a segment violating this constraint would be a sibilant sonorant; recall from Chapter 3 that this constraint also plays a role in yod-palatalization of sonorants). The relevant representation is illustrated below:

4.106



Although uk-palatalization of sonorants is representationally possible, the constraint ranking at the stem-level cycle, as it stands, would ban configurations such as 4.106. This is because at the stem-level, ID(C-pl) outranks MaxAffix, and a palatalized nasal stop would violate ID(C-pl). However, it is possible that speakers might occassionally want to exploit the full palatalizing potential of [-uk-] to convey an additional overtone of affection and diminution. In OT-terms, this can be expressed as promoting MaxAffix over ID(C-pl) at the stem-level for certain items (see Smolensky, Davidson & Jusczyk 2004 on floating faithfulness constraints). This is illustrated below:

4.107

/raga ɲ- a -uk-/ C-man [opn] V-man [nas] C-pl [cor] V-pl [cor]	PARSE(F)	*C-PL[COR]C-MAN-[OPN]	MAXAFFIX	ID(C-PL)	ID(V-PL)
a. raga ɲ- -uk- C-man [opn] V-man [nas] C-pl [cor] V-pl [cor]	*!				
b. raga ɲ- -uk- C-man [opn] V-man [nas]			**!	*	*
c. raga ɲ - -uk- C-man [opn] V-man [nas] C-pl [cor] V-pl [cor]		*!		*	*
☞d. raga ɲ - -uk- C-man [opn] V-man [nas] C-pl V-pl [cor]			*	*	*

In 4.107, the fully faithful candidate violates the Parse(F) constraint. The candidate with deletion incurs two violations of MaxAffix and is eliminated (note that this candidate is a regular output of uk-derivation - if MaxAffix did not float

above ID(C-place), this candidate would win). The candidate in (c) violates the feature co-occurence constraint. As a result, the candidate in (d), which contains a palatalized nasal, is correctly selected as optimal.

Note that ranking floating MaxAffix above ID(C-place) also opens the way for exceptional palatalization of the alveolar plosives /t, d/ to postalveolar sibilants [ʃ, ʒ]. The latter, however, does not seem to occur[47]. Potentially, this could be explained as an accidental gap in the data (names of animates and humans ending in /t, d/ are not very numerous in the non-palatalizing declensions).

An alternative explanation for the pattern could be that violations incurred on the ID(C-pl) constraint are assessed gradiently, and not categorically – that is, the output candidate would receive one violation mark for every difference between the input specification of some segment and its output correspondent. In this case, the postalveolar sibilant in the mapping /t/→[ʃ] would receive one violation for the presence of a C-place node, and another one for the presence of the terminal C-place-[cor] feature (which cannot be delinked in the winning candidate because there is no mannerless segment that is only specified for V-place-[cor] in Latvian). The mapping /n/~[ɲ] would only receive one violation for the presence of the C-pl node, thus making it less costly for faithfulness. However, it still would not explain why /t/→[ʃ] fails, as it still wins over /t/→[t] on floating MaxAffix. Therefore, I am inclined to think that the non-applicability of exceptional uk-palatalization to obstruent plosives might be due to this data gap (hypocoristics based on names ending in alveolar plosives might contain some examples of the relevant kind, but this has to be left for future research).

47 Rūķe-Draviņa (1959) reports the pair [me̯it-a]~[me̯it͡ʃ-uk-s] 'daughter', but notes that the base in this case could be the noun [me̯it͡ʃ-a] 'girl'. My informant only indicates the form [me̯it-uk-s].

4.4 Summary

In this chapter, I have provided a representational and constraint-based analysis of expressive palatalization triggered by the diminutive suffixes [-uk-] and [-el-]. Expressive palatalization was formalized as linking of the floating structures associated with these suffixes to the root-final consonant if the latter represents a valid anchor for the given structure. Linking was enforced computationally, through high ranking of the constraints Parse(F) and MaxAffix.

The fact that expressive palatalization affects certain classes of segments but not others was explained through the combination of representational and computational factors. Representationally, the set of potential targets of expressive el-palatalization was limited to the class of segments specified for the C-place node and included sibilant alveolars, velar plosives and labials. Labials were excluded as targets by constraint ranking, where the undominated markedness constraint on feature co-occurrence banned output candidates containing palatalized labials.

The set of potential targets of expressive uk-palatalization included all segments of the Latvian language. The fact that uk-palatalization affects only a subset of those was accounted for by the constraint ranking. Thus, the high-ranking faithfulness constraint ID(C-place) at the stem-level cycle ensured that uk-palatalization could apply in (i) segments where it would not result in the violation of ID(C-place), i.e. sibilants; and (ii) segments where the violation of ID(C-place) was independently enforced by high-ranking markedness, i.e. velar plosives.

The fact that the set of potential targets of uk-palatalization is the superset of the potential targets of el-palatalization predicted that the former might – the constraint ranking permitting – affect segments other than sibilants and velars, while the latter cannot. The prediction was borne out in the data showing that expressive uk-palatalization may exceptionally affect alveolar sonorants, while el-palatalization of alveolar sonorants is unattested.

The fact that uk-palatalization and el-palatalization produce different changes in velars, but identical changes in sibilants, was explained by the fact that floating structures associated with the diminutive suffixes differ in their featural content. Thus, the floating structure associated with [-uk-] was proposed to have the shape C-place[cor]V-place[cor], while the floating structure associated with [-el-] was proposed to be a subset of it, namely, V-pl-[cor]. In phonetic terms, this means that uk-palatalization may trigger both assibilation and change of primary place, while el-palatalization may trigger change of place only. With respect to the velar targets, this accounted for the fact that uk-palatalization produces the mapping /k, g/~[t͡ʃ, d͡ʒ], while el-palatalization produces the mapping /k, g/~[c, ɟ]. With respect to the sibilant targets, this accounted for the fact that both uk- and el-palatalization may produce the mapping /s, z, t͡s, d͡z/~[ʃ, ʒ, t͡ʃ, d͡ʒ], with uk-induced assibilation applying vacuously in this case.

The observed differences between expressive palatalization and yod-palatalization were attributed to the fact that the processes are active at different phonological cycles. Thus, expressive palatalization triggered by [-uk-] and [-el-] applies in stem-to-stem derivation and is enforced by the constraint ranking at the stem-level cycle, while yod-palatalization applies in stem-to-word derivation and is enforced by the constraint ranking at the word-level cycle. Failure of yod-palatalization to apply before [-el-] was attributed to the stem-level process of yod-deletion that wiped out the trigger of yod-palatalization before the form could be evaluated against the word-level constraint hierarchy.

5 PALATALIZATION IN sC CLUSTERS

5.1 Introduction

It has long been observed that consonant clusters in Latvian do not behave in a uniform way when they occur in palatalizing contexts (Muižniece 2002, AGL 1959, Steinbergs 1977, among others). Four distinct patterns have been noted: (i) only the rightmost member of the cluster undergoes palatalization, as shown in 5.1a); (ii) the two rightmost members of the cluster undergo palatalization, as shown in 5.1b); (iii) palatalization is blocked, as shown in 5.1c); and (iv) palatalization is optional, as shown in 5.1d). To my knowledge, an explanation of these asymmetries has not previously been attempted. Instead, the behavior of clusters in palatalizing contexts has been treated as idiosyncratic and as such not meriting systematic discussion. The main goal of this chapter is to fill this gap and to propose a representational and a constraint-based analysis of the patterns illustrated in 5.1, thus extending and complementing the account of Latvian palatalization developed in the preceding chapters.

5.1 Palatalization in clusters

a.

/na:tr-e-u/	→	[na:trʲ-u]	'nettle, Gen.pl.'
/skai̯tl-i-u/	→	[skai̯tʎ-u]	'number, Gen. pl.'
/vals-i-u/	→	[valʃ-u]	'waltz, Gen. pl.'

b.

/kusn-i-u/	→	[kuʃɲ-u]	‘flux, Gen. pl.’
/zizl-i-u/	→	[ziʒʎ-u]	‘stick, Gen. pl.’

c.

/ast-e-u/	→	[ast-u]	'tail, Gen.pl.'
/kast-e-u/	→	[kast-u]	'box, Gen. pl.'

d.

/klukst-e-u/	→	[klukʃ-u]	OR	[klukst-u]	'brood hen'
/plekst-e-u/	→	[plekʃ-u]	OR	[plekst-u]	'flounder'

The pattern illustrated in 5.1a) represents a scenario that is fully consistent with the constraint-based analysis laid out in Chapter 3: here, palatalization affects the target immediately adjacent to the vocoid trigger, and the segment to the left of the target neither blocks the application of the process nor undergoes it. The analysis where yod-palatalization is represented as a re-association of the place features of the deleted front vocoid predicts exactly that. The main empirical focus of this chapter, therefore, will be on the cases illustrated in 5.1 b), 5.1c) and 5.1d). In what follows, I argue that rather than being idiosyncratic, these patterns follow directly from the syllabic status of a sC cluster occurring in a palatalizing context. I show that palatalization applies in tautosyllabic s + sonorant clusters, is consistently blocked in heterosyllabic s + obstruent clusters, and applies optionally in cases where /s/ is prosodified as a word-medial syllable appendix. Further, I show that all three patterns are motivated by the Obligatory Contour Principle.

This chapter is organized as follows: in Section 5.2, I present the data, offer a representational account of the assimilatory processes and identify the main challenges for a constraint-based analysis; in Section 5.3, I discuss representation and syllabification of sC clusters of different types in Latvian; and in Section 5.4, I propose a constraint-based analysis of the patterns in 5.1 couched within the Optimality Theory. Section 5.5 concludes the discussion.

5.2 Palatalization in sC clusters: data and generalizations

5.2.1 Palatal assimilation in s + sonorant clusters

In Latvian, the sibilant fricatives /s, z/ typically assimilate to the place of articulation of an adjacent palatal sonorant, regardless of whether the latter is underlying or is itself a result of palatalization. The assimilation is bi-directional and may apply progressively as well as regressively, as illustrated in 5.2. As shown in 5.2a), root-final palatal sonorants derived by yod-palatalization consistently trigger regressive assimilation of the preceding sibilants /s, z/ to [ʃ, ʒ]. The data in 5.2b) illustrate the progressive application of the assimilation: here, the nominative singular inflection /-s/ assimilates to a preceding root-final palatal sonorant.

5.2 Palatal assimilation of sibilant fricatives

a. *Palatal assimilation in s + sonorant clusters*

		Gen. pl.			Dat. sg.
/kusn-i-u/	→	[kuʃɲ-u]	'flux'	cf.	[kusn-i-m]
/aiz-ba:zn-i-u/	→	[aizba:ʒɲ-u]	'cork'	cf.	[aiz-ba:zn-i-m]
/pu:sl-i-u/	→	[pu:ʃʎ-u]	'bladder'	cf.	[pu:sl-i-m]
/zizl-i-u/	→	[ziʒʎ-u]	'stick'	cf.	[zizl-i-m]

b. Palatal assimilation in sonorant + s clusters

		Nom. sg.			Dat. sg.
/mi:ʎ-s/	→	[mi:ʎ-ʃ]	'cute, adj.'	cf.	[mi:ʎ-a-m]
/t͡seʎ-s/	→	[t͡seʎ-ʃ]	'road, n.'	cf.	[t͡seʎ-a-m]
/termiɲ-s/	→	[termiɲ-ʃ]	'term, n.'	cf.	[termiɲ-a-m]
/viɲ-s/	→	[viɲ-ʃ]	'he, pron.'	cf.	[viɲ-a-m]
/ve:j-s/	→	[ve:j-ʃ]	'wind, n.'	cf.	[ve:j-a-m]

Palatal assimilation in the context of palatal sonorants is restricted to sibilant fricatives. As shown in 5.3a), other obstruents surface faithfully in this position (note that Latvian lacks cases where a palatal sonorant is followed by an obstruent plosive within a prosodic word). At the same time, postalveolar sibilants do not trigger palatalization of adjacent sonorants, as shown in 5.3b).

5.3 Palatal assimilation does not apply

a.

		Gen. pl.				Dat. sg.
/na:tr-e-u/	→	[na:trʲ-u]	*[na:ʃrʲ-u]	'nettle'	cf.	[na:tr-e-j]
/ni̯edr-e-u/	→	[ni̯edrʲ-u]	*[ni̯eʒrʲ-u]	'reed'	cf.	[ni̯edr-e-j]
/ska̯itl-i-u/	→	[ska̯itʎ-u]	*[ska̯iʃʎ-u]	'number'	cf.	[ska̯itl-i-m]
/su:tn-i-u/	→	[su:tɲ-u]	*[su:ʃɲ-u]	'envoy'	cf.	[su:tn-i-m]

b.

		Gen. pl.				Dat. sg.
/vals-i-u/	→	[valʃ-u]	*[vaʎʃ-u]	'waltz'	cf.	[vals-i-m]
/milz-i-u/	→	[milʒ-u]	*[miʎʒ-u]	'giant'	cf.	[milz-i-m]
/sa:n-t͡sens-i-u/	→	[sa:n-t͡senʃ-u]	*[sa:n-t͡seɲʃ-u]	'rival'	cf.	[sa:n-t͡sens-i-m]
/ʃimpanz-e-u/	→	[ʃimpanʒ-u]	*[ʃimpaɲʒ-u]	'chimpanzee'	cf.	[ʃimpanz-e-j]

Assimilation of sibilant fricatives to adjacent palatal sonorants (henceforth referred to as "s-assimilation") has a number of systematic exceptions. Regressive s-assimilation consistently fails to apply across a prefix-stem boundary (illustrated in 5.4, and a prefix-final sibilant surfaces faithfully before a stem-initial palatal sonorant (Latvian lacks palatal-final prefixes, so non-application of progressive s-assimilation in this context cannot be shown):

5.4 No palatal assimilation across prefix-stem boundary

/iz-ɲem-t /	→	[iz-ɲem-t]	'to take out'	*[iʒ-ɲem-t]
/iz-ʎu̯od͡z-i:-t /	→	[iz-ʎu̯od͡z-i:-t]	'to loosen'	*[iʒ-ʎu̯od͡z-i:-t]
/iz-ja:-t/	→	[iz-ja:-t]	'to ride out'	*[iʒ-ja:-t]

Progressive s-assimilation underapplies after the nominalizing suffixes [-a:j-] and [-e:j-] 5.5a), although /j/ occuring root-finally after a long vowel may trigger the process (cf. [ve:j-ʃ]) (Steinbergs 1977:13). Notably, the pattern is not extended to all derivational suffixes: the diminutive suffix [-iɲ-] triggers progressive assimilation of /-s/ as expected, as shown in 5.5b).

5.5

a.

/sku͜ol-u͜o-t-a:j-s/	→	[sku͜ol-u͜o-t-a:j-s]	'teacher'	*[sku͜ol-u͜o-t-a:j-ʃ]
/raʒ-u͜o-t-a:j-s/	→	[raʒ-u͜o-t-a:j-s]	'manufacturer'	*[raʒ-u͜o-t-a:j-ʃ]
/gla:b-e:j-s/	→	[gla:b-e:j-s]	'rescuer'	*[gla:b-e:j-ʃ]
/d͡ze:r-e:j-s/	→	[d͡ze:r-e:j-s]	'drinker'	*[d͡ze:r-e:j-ʃ]

b.

/su͜ol-iɲ-s/	→	[su͜ol-iɲ-ʃ]	'bench, dim.'	*[su͜ol-iɲ-s]
/kru:m-iɲ-s/	→	[kru:m-iɲ-ʃ]	'bush, dim.'	*[kru:m-iɲ-s]
/ka͜us-iɲ-s/	→	[ka͜us-iɲ-ʃ]	'goblet, dim.'	*[ka͜us-iɲ-s]

Finally, progressive s-assimilation does not apply in forms where a palatal sonorant trigger is itself preceded by a sibilant (to my knowledge, Latvian lacks forms where other obstruents precede a palatal sonorant in this context). Note, however, that forms of this shape are extremely few, and the list might actually be exhausted by the three items given below.

5.6

/pe:kʃɲ-s/	→	[pe:kʃɲ-s]	*[pe:kʃɲ-ʃ]	'sudden'
/kra:ʃɲ-s/	→	[kra:ʃɲ-s]	*[kra:ʃɲ-ʃ]	'splendid'
/zaʎu͜okʃɲ-s/	→	[zaʎu͜okʃɲ-s]	*[zaʎu͜okʃɲ-ʃ]	'vigorous'

A representational account of s-assimilation presents no challenges given the feature specifications of the Latvian inventory presented in Chapter 3. The process can be straightforwardly represented as the spreading of the V-place node dominating the feature [coronal], as shown below:

5.7 a. b.

It follows from the representations in 5.7 that palatal assimilation may only apply if the potential target has a valid anchor for the spreading structure in its representation, i.e. a C-place node. Therefore, non-application of palatal assimilation in forms like [valʃ-u] and [skai̯tʎ-u] follows automatically from the representations and needs no further explanation. However, the presence of the V-place-[coronal] on a trigger and a valid anchor for it on a potential target is not a sufficient condition for s-assimilation to apply. Thus, palatal plosives and front non-low vowels that also bear a V-place-[coronal] specification never trigger s-assimilation, as illustrated in 5.8:

5.8

a.

/las-i-s/	→	[las-i-s]	*[laʃ-i-ʃ]	'salmon'
/se:n-e/	→	[se:n-e]	*[ʃe:n-e]	'mushroom'
/tas-i:t-e/	→	[tas-i:t-e]	*[taʃ-i:t-e]	'cup'

b.

/vi:r-iʃc-s /	→	[vi:r-iʃc-s]	*[vi:r-iʃc-ʃ]	'manly'
/li͜et-iʃc-s/	→	[li͜et-iʃc-s]	*[li͜et-iʃc-ʃ]	'businesslike'
/si͜eu-iʃc-s/	→	[si͜ev-iʃc-s]	*[si͜ev-iʃc-ʃ]	'womanly'
/te:u-iʃc-s/	→	[te:v-iʃc-s]	*[te:v-iʃc-ʃ]	'fatherly'

When developing a constraint-based analysis of s-assimilation, we have to address the following questions: (a) What motivates the spreading of V-place-[coronal]? (b) How can systematic exceptions to s-assimilation be explained? and (c) Why is the set of triggers restricted to palatal sonorants?

5.2.2 Palatalization blocking in s + plosive clusters

While a sibilant fricative preceding a sonorant in the palatalizing context itself undergoes palatalization, the situation is crucially different in clusters where a sibilant precedes a plosive target. In such cases, palatalization fails to apply, and a sibilant-plosive cluster surfaces faithfully.

In Chapter 3, we have seen that Latvian has a productive velar affrication process, by which the velar plosives /k, g/ surface as alveolar affricates [t͡s, d͡z] when followed by front-vowel-initial derivational suffixes. The relevant data is repeated below:

5.9 Velar affrication

/t͡su:k-a-iɲ-a/	→	[t͡su:t͡s-iɲ-a]	'pig, dim.'	cf.	[t͡su:k-a]	'pig, Nom. sg.'
/ku̯ok-a-iɲ-ʃ/	→	[ku̯ot͡s-iɲ-ʃ]	'tree, dim.'	cf.	[ku̯ok-s]	'tree, Nom. sg.'
/ru̯ok-a-iɲ-a/	→	[ru̯ot͡s-iɲ-a]	'hand, dim.'	cf.	[ru̯ok-a]	'hand, Nom. sg.'

However, velar affrication is blocked in forms where a target velar is preceded by the sibilant fricative /s/ (to my knowledge, other sibilants do not occur in this context). As a result of blocking, the heteromorphemic string [k-i], which is otherwise ill-formed, gets to surface faithfully, as illustrated in 5.10a). Interestingly, velar affrication applies normally in cases where the target velar is preceded by a non-sibilant consonant 5.10b).

5.10 Blocking of velar affrication

/mask-a-iɲ-a/	→	[mask-iɲ-a]	*[mast͡s-iɲ-a]	'mask, dim.'	cf.	[mask-a]	'mask, Nom.sg.'
/risk-a-iɲ-s/	→	[risk-iɲ-ʃ]	*[rist͡s-iɲ-ʃ]	'risk, dim.'	cf.	[risk-s]	'risk, Nom. sg.'
/t͡sisk-a-iɲ-a/	→	[t͡sisk-iɲ-a]	*[t͡sist͡s-iɲ-a]	'thigh, dim.'	cf.	[t͡sisk-a]	'thigh, Nom. sg.'
/t͡ʃu:sk-a-iɲ-a/	→	[t͡ʃu:sk-iɲ-a]	*[t͡ʃu:st͡s-iɲ-a]	'snake, dim.'	cf.	[t͡ʃu:sk-a]	'snake, Nom.sg.'

5.11 Velar affrication in clusters

/malk-a-iɲ-a/	→	[malt͡s-iɲ-a]	*[malk-iɲ-a]	'wood, dim.'
/bank-a-iɲ-a/	→	[bant͡s-iɲ-a]	*[bank-iɲ-a]	'bank, dim.'
/burk-a-iɲ-a /	→	[burt͡s-iɲ-a]	*[burk-iɲ-a]	'jar, dim.'

Notice that, had the velar affrication applied to the underlying /sk/ cluster, the result would have been the sibilant sequence [st͡s]. We may therefore hypothesize that the reason for velar affrication blocking is the marked status of sibilant sequences in Latvian[48]. However, the apparent markedness of [st͡s] does not prevent underlying strings of this type from surfacing faithfully. As illustrated below, tautomorphemic [st͡s] clusters may appear word-initially and intervocalically in nonnative items, while heteromorphemic [st͡s] freely occurs at the prefix-stem boundary, as well as at the compound boundary. In addition, [st͡s] clusters may appear word-finally, in cases where the inflectional suffix /-s/ and a

[48] Cf. Hall (2004) on assibilation blocking in German; also Section 5.4.2

root-final /t, d/ give rise to a positional affricate (see NAGL 2015:85-86 on positional affricates in Latvian):

5.12 Tautomorphemic [st͡s] clusters

a. Word-initial [st͡s] clusters

[st͡se:.n-a]	'scene'
[st͡se.na:.rij-s]	'scenario'
[st͡sep.te.r-i-s]	'sceptre'
[st͡si.en.to.lo.ɟi.j-a]	'scientology'

b. Intervocalic [st͡s] clusters

[dist͡si.pli:.n-a]	'discipline'
[diast͡si.j-a]	'diascia'
[ekst͡ses-s]	'excess'
[ost͡silogramm-a]	'oscilogramm'

5.13 Heteromorphemic [st͡s] clusters

a. At the prefix-stem boundary

[is-t͡sep-t]	'to bake'
[is-t͡sel-t]	'to lift out'
[is-t͡si̯es-t]	'to suffer through'

b. At the compound boundary

[vidus-t͡seʎ-ʃ]	'middle road'
[i:s-t͡sau̯r-ul-e]	'lug'
[ju:ras-t͡su:t͡s-iɲ-a]	'Guinea pig'

c. At the stem-suffix boundary

/kla:st-s/	→	[kla:st͡s]	'choice, Nom. sg.'
/strazd-s/	→	[strast͡s]	'thrush, Nom. sg.'
/sta:st-s/	→	[sta:st͡s]	'tale, Nom. sg.'
/mi̯elast-s/	→	[mi̯elast͡s]	'feast, Nom. sg.'

The blocking behavior of /s/ is not limited to velar affrication. As the data in 5.14a) illustrate, yod-palatalization is also consistently blocked in cases where a target plosive is preceded by /s/[49]. Other consonants that may precede the

[49] For the sake of completeness, it should be mentioned that the sources differ in their description of what happens to the /-st-/ cluster in palatalizing contexts. Thus, more recent sources (LDSP (2007) , Guļevska et al. 2002, Muižniece 2002) all report the pattern illustrated 5.14. However, older sources (AGL (1959), Steinbergs (1977)) maintain that /-st-/ may surface as [-ʃc-] in the same context, e.g. /strupast-

plosive target do not preclude the normal application of yod-palatalization, as shown in 5.14b).

5.14

a. Yod-palatalization blocked by /s/

/ast-e-u/	→	[as.t-u]	*[asʃ-u]	'tail, Gen.pl.'	cf.	[as.t-e]	'tail, Nom. sg.'
/kast-e-u/	→	[kas.t-u]	*[kasʃ-u]	'box, Gen.pl.'	cf.	[kas.t-e]	'box, Nom. sg.'
/valst-i-u/	→	[vals.t-u]	*[valsʃ-u]	'country, Gen.pl.'	cf.	[valst-s]	'country, Nom. sg.'
/zemst-e-u/	→	[zems.t-u]	*[zemsʃ-u]	‘district, Gen.pl.’	cf.	[zems.t-e]	'district, Nom. sg.'
/skanst-e-u/	→	[skans.t-u]	*[skansʃ-u]	‘bastion, Gen.pl.’	cf.	[skans.t-e]	'bastion, Nom. sg.'

b. Yod-palatalization in clusters

/smilt-i-u/	→	[smil.ʃ-u]	*[smil.t-u]	'sand, Gen. pl.'
/lent-e-u/	→	[len.ʃ-u]	*[len.t-u]	'ribbon, Gen. pl.'
/konfekt-e-u/	→	[kon.fek.ʃ-u]	*[kon.fek.t-u]	'candy, Gen. pl.'

Just like velar affrication, yod-palatalization is blocked exactly where it would produce adjacent sibilants. However, there is one difference that will prove important when we discuss the nature of the constraint that motivates palatalization blocking. Notice that had yod-palatalization applied to the underlying /st/ cluster, the result would have been the heterorganic sibilant cluster [sʃ]. In Latvian, sequences of sibilants that differ in V-place specifications never surface word-internally. If they arise as a result of affixation, place assimilation applies, by which both sibilants surface as postalveolar (5.15a). Notably, just like s-assimilation, sibilant assimilation may apply both regressively and progressively:

5.15

a. *Sibilant assimilation at the prefix-stem boundary*

/iz-ʒu:-t/	→	[iʒ-ʒu:-t]	*[iz-ʒu:-t]	'to dry'
/iz-ʃu:-t/	→	[iʃ-ʃu:-t]	*[is-ʃu:-t]	'to embroider'
/pus-t͡ʃukst-u-s/	→	[puʃ-t͡ʃukst-u-s]	*[pus-t͡ʃukst-u-s]	'half-whispering'
/uz-d͡ʒinskt-e:-t/	→	[uʒ-d͡ʒinskt-e:-t]	*[uz-d͡ʒinskt-e:-t]	'to start jingling'

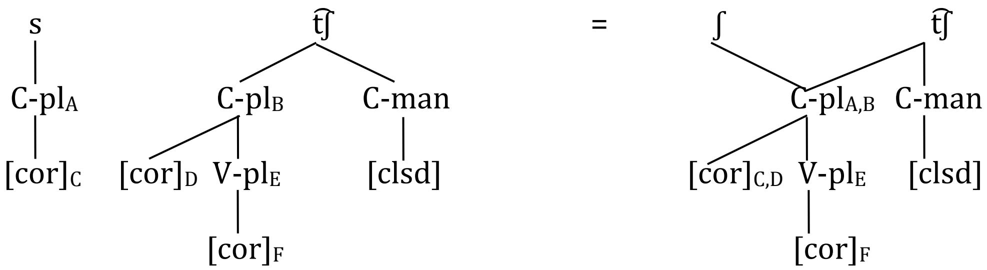
ju/→[strupaʃc-u], /ri:kst-u/→ [ri:kʃc-u]. Considering that LDSP does not list variants with [-ʃc-] as possible, I will assume that the [-st-]~[-ʃc-] alternation pattern is no longer a part of the grammar of Modern Latvian and therefore falls beyond the scope of this work.

b. *Sibilant assimilation at the stem-suffix boundary*

/meʒ-s/	→	[meʃ-ʃ]	*[meʒ-s]	'forest'
/mat͡ʃ-s/	→	[mat͡ʃ-ʃ]	*[mat͡-sʃ]	'match'
/sket͡ʃ-s/	→	[sket͡ʃ-ʃ]	*[sket͡ʃ-s]	'sketch'
/pli:ʃ-s/	→	[pli:ʃ-ʃ]	*[pli:ʃ-s]	'plush'

It might be tempting to analyze sibilant assimilation as the spreading of the V-place node dominating the [coronal] feature (i.e. as the same process that causes /s, z/ to palatalize when adjacent to palatal sonorants). However, if both patterns were due to the application of the same process, the failure of /s, z/ to palatalize when followed by a palatal sonorant across a prefix-stem boundary would remain unexplained. Besides, such an analysis would miss the link between blocking of palatalization in cases where it would produce sibilant clusters (either heterorganic or homorganic), and sibilant assimilation. Pending a detailed discussion in Section 5.4.2, I propose that the sibilant assimilation illustrated in 5.15 is the result of fusion at the level of C-place nodes. Since the fusion of C-place nodes entails that the adjacent segments come to share all the constituents dominated by C-place nodes, this analysis correctly predicts sibilant assimilation to be bi-directional.

5.16



The data presented in this section leave us with the following questions: (a) What motivates palatalization blocking in s + plosive clusters, and how is it related to palatal assimilation in s + sonorant clusters?; (b) What motivates sibilant assimilation in underlying heterorganic sibilant clusters?

5.2.3 Optional palatalization in s + plosive clusters

As we will see in this section, Latvian adds an additional twist to palatalization blocking in s + plosive clusters. Interestingly, sequences where an s + plosive cluster is itself preceded by a plosive, such as /kst/, typically exhibit variation with respect to the application of yod-palatalization (Muižniece 2002:70, Guļevska et al. 2002:60-61). For most items both of the following scenarios are attested: (i) yod-palatalization is blocked, and its trigger is deleted, mapping the underlying /-kst-i-u/ to [-kst-u] or (ii) yod-palatalization applies, mapping /kst-i-u/ to [-kʃ-u]. Note that when yod-palatalization does apply, its output is [-kʃ-] and not [-kʃʃ-] as might be expected in light of the data presented in the previous section.

5.17 Optional blocking of yod-palatalization

		Gen.pl.			
/klukst-e-u/	→	[klukʃ-u]	OR	[klukst-u]	‘brood hen’
/plekst-e-u/	→	[plekʃ-u]	OR	[plekst-u]	‘flounder’
/mai̯kst-e-u/	→	[mai̯kʃ-u]	OR	[mai̯kst-u]	'pole'
/t͡ʃipst-e-u/	→	[t͡ʃipʃ-u]	OR	[t͡ʃipst-u]	'pipit'

In addition to the variable items in 5.17, a number of lexical items are reported for which only one of the patterns above consistently applies. These are illustrated below, following Guļevska et al. (2002:60-61). It has to be said, however, that a Google search returns both the forms with blocking and those with palatalization for the items below as well. Therefore, the only thing that we might claim is that for the items below only one of the variants became recognized as a literary norm, and not that the alternative is impossible in Modern Latvian.

5.18

a. *Consistent blocking of yod-palatalization*

		Gen.pl.	
/makst-i-u/	→	[makst-u]	'womb'
/i:kst-i-u/	→	[i:kst-u]	'thumb'

b. *Consistent application of yod-palatalization*

		Gen.pl.	
/ri:kst-e-u/	→	[ri:kʃ-u]	'switch, rod'
/sat͡si:kst-e-u/	→	[sat͡si:kʃ-u]	'contest'

Importantly, sonorants preceding the root-final /st/ cluster do not cause variable palatalization blocking of the following sequence. As shown below, sonorant + s + obstruent sequences (e.g. /mst/) pattern with intervocalic s + plosive clusters: that is, palatalization in sequences of this type is consistently blocked.

5.19

/valst-i-u/	→	[vals.t-u]	*[valsʃ-u]	'country, Gen.pl.'	cf.	[valst-s]	'country, Nom. sg.'
/zemst-e-u/	→	[zems.t-u]	*[zemsʃ-u]	'district, Gen.pl.'	cf.	[zems.t-e]	'district, Nom. sg.'
/skanst-e-u/	→	[skans.t-u]	*[skansʃ-u]	'bastion, Gen.pl.'	cf.	[skans.t-e]	'bastion, Nom. sg.'

This final piece of the sC puzzle raises the following questions that will have to be addressed in the following sections: (a) Why do obstruents, and not sonorants or vowels, affect the palatalizing behavior of the following s + plosive cluster? (b) What is the source of variation in palatalization of CsC sequences? (c) How does optional palatalization in CsC clusters relate to palatalization blocking in s + plosive clusters and palatal assimilation in s + sonorant clusters?

5.2.4 Summary of the data

To sum up, in this section we have seen that three different types of medial sC clusters exhibit three different patterns when they occur in palatalizing contexts. In s + sonorant clusters, palatalization affects both members of the sequence. In intervocalic and post-sonorant s + plosive clusters, palatalization is consistently blocked. In post-obstruent s + plosive clusters, palatalization is optional: both the forms where palatalization applies and those where it is blocked are considered grammatical. In the next section, I argue that the three palatalization patterns exhibited by different types of medial sC clusters reflect the syllabic status of these clusters. More specifically, I show that: (i) medial s + sonorant clusters are always tautosyllabic; (ii) intervocalic and post-sonorant s + plosive clusters are always heterosyllabic; and (iii) medial post-obstruent s + plosive sequences always contain an appendixal /s/.

5.3 sC clusters in Latvian

Representation of sC clusters has been a matter of much debate in the phonological literature over the years. The reason for the continuing focus on sequences of this type is their strong cross-linguistic tendency to pattern differently from other clusters when it comes to phonotactics, phonological acquisition and phonological processes. As we will see shortly, the behavior of sC clusters in Latvian raises a familiar array of questions pertaining to their prosodic status. In this section I argue that, contrary to what has sometimes been suggested in the literature, different types of sC clusters may be represented differently in a given language.

This section is organized as follows. In 5.3.1, I give an overview of the distributional peculiarities of sC clusters that are traditionally considered to be challenging for theories of syllabification and briefly introduce representational solutions that have been proposed in the literature. In 5.3.2, I discuss the behavior of sC clusters in Latvian word-initial onsets and suggest different representations for s + sonorant and s + obstruent sequences. In 5.3.3, I give a brief overview of Latvian rhyme phonotactics and argue for the availability of a word-medial appendixal position. I further show that the distribution of word-medial s + plosive sequences indicates that in some of them, /s/ occupies an appendixal slot licensed by the syllable. Finally, in 5.3.4 I provide a constraint-based analysis that accounts for the syllabification of different types of medial clusters in Latvian.

5.3.1 Representation of sC clusters

It is generally assumed that the order of segments within a syllable is governed by their relative sonority, such that in a well-formed syllable the sonority rises towards the nucleus and decreases towards margins. This generalization is known as the Sonority Sequencing Principle (SSP, Clements 1990, Goldsmith 1990 among many others). The SSP entails that all segments fall on the scale with respect to their relative sonority, from obstruents, which are considered to be the least sonorous, to vowels, which are the most sonorous:

5.20 Sonority Hierarchy (Clements 1990):

obstruents	<	**nasals**	<	**liquids**	<	**glides**	<	**vowels**	
0		1		2		3		4	sonority rank

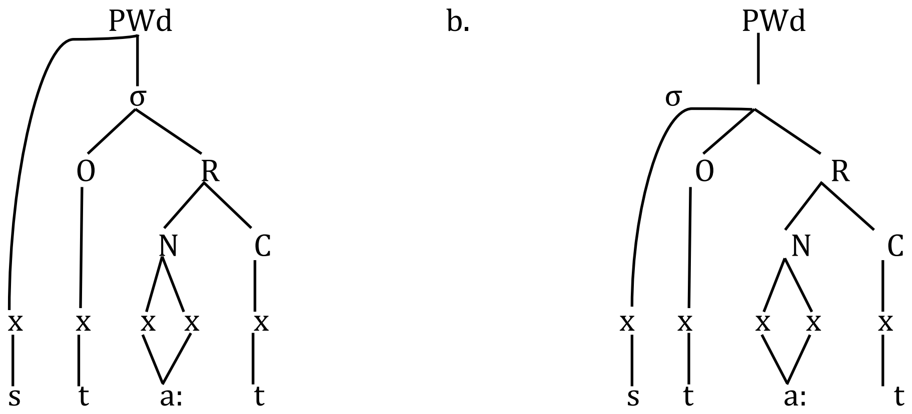
The relative wellformedness of onset clusters have been shown to depend on the sonority distance between their component elements, such that the clusters are more harmonic the greater the sonority rise is (Greenberg 1978). While many languages permit complex onsets that rise in sonority, only a small number of them tolerate onset clusters with sonority plateaux and sonority reversals (most famously, Polish, Lukaszewicz 2007). Interestingly, s + obstruent clusters frequently escape this restriction. That is, languages that otherwise require word-initial onsets to rise in sonority (e.g. English, Latvian, Norwegian), nevertheless permit s + obstruent clusters to surface freely in this position.

Word-initial sC clusters are also known to consistently defy combinatorial restrictions that hold in other branching onsets in a given language. For instance, they appear to escape the restriction against homorganic onset clusters: while onset clusters where both elements share the same place of articulation are generally avoided, such as [tl-, tn-], no such restriction holds of C_2 in sC clusters, with the same languages permitting [st-, sn-, sl-] (Goad 2011). And conversely, while onsets like [tr-, dr-] are typically well-formed, word-initial sequences like [sr-, zr-] are cross-linguistically restricted (Goad & Rose 2004).

Further evidence suggests that sC clusters might form a natural class to the exclusion of other complex onset types. There are languages that systematically avoid word-initial sC clusters while allowing other types of branching onsets (most famously, Spanish and other Ibero-Romance languages, Bonet & Harbour 2012, Cuetos et al. 2011). The opposite pattern is also attested: Goad (2011) reports with a reference to Miller (1965) that in the Keresan language Acoma only initial clusters of the type sC (where C is an obstruent) are allowed. Evidence for the special status of sC clusters also comes from studies of phonological acquisition. For instance, developmental data seem to suggest that sC clusters behave as a class with respect to their order of acquisition relative to branching onsets of other types, both in normal and in disordered phonology (Yavas et al. 2008, Barlow 2001 and references therein).

In sum, there is a large body of cross-linguistic evidence indicating that the phonological behavior of sC clusters, as a class, deviates from that of other word-initial clusters. In view of the special status of sC clusters, it has been suggested that they should be represented differently from regular branching onsets. Several representational options have been put forward, all having in common the idea that the sibilant fricative in initial sC clusters lies outside of the core syllable domain (see Goad 2011 for an overview and criticism of different approaches). It was proposed that rather than being a part of the onset, /s/ in this position is directly licensed by a higher prosodic category – either a syllable, or a prosodic word (illustrated below for Latvian [sta:t] 'to cease').

5.21 a. b.



It has further been suggested that both 5.21a) and 5.21b) are necessary to account for the distribution of sC clusters in different languages (Goad & Rose 2004, Goad 2011). Under the Peripherality Condition (Hayes 1995), which states that extrametrical elements may only occur at the edges of their domains, the representations in 5.21a) and 5.21b) make different predictions about the distribution of non-heterosyllabic sC clusters.

5.22 Peripherality Condition: extrametrical elements must be peripheral.

In other words, in languages where /s/ in non-heterosyllabic sC clusters is licensed directly by the prosodic word, as shown in 5.21a), we expect sC clusters to occur word-initially only. On the other hand, in languages where /s/ is licensed by the syllable constituent, as shown in 5.21b), we expect to find instances of non-heterosyllabic sC clusters word-internally as well (see also van der Hulst 1984:116-117 for an argument for Dutch along these lines). A clear example of a language employing the option illustrated in 5.21a) is Attic Greek, as reported in Steriade (1982). As shown in 5.23a, b), Attic Greek permits word-initial sC clusters, as well as intervocalic sC sequences (which Steriade 1982 analyzes as heterosyllabic). However, sC clusters occurring word-medially after a consonant are repaired by stray erasure affecting /s/ (phonotactic restrictions on codas in Attic Greek prevent /s/ to be re-syllabified as a coda of the preceding syllable in this position; Steriade 1982).

5.23 Distribution of sC clusters in Attic Greek (after Steriade 1982:211-216)

a. *Word-initial sC clusters*

[smēkō]	'to wipe clean'
[skaptō]	'to dig'
[sklēros]	'hard'
[spaō]	'to draw'

b. Intervocalic sC clusters

[di.das.kō]	'to teach'
[les.k^{h}ē]	'lounge'
[as.tron]	'star'
[as.t^{h}ma]	'panting'

c. Stray erasure in CsC clusters

/CV-grap^h-st^{h}ai/	→	[gegrap^{h}t^{h}ai]	'to have been written'
/^{h}eps-to-s/	→	[^{h}ep^{h}t^{h}os]	'boiled'
/plok-smos/	→	[plok^{h}mos]	'locks'
/e-stal-st^{h}ai/	→	[estalt^{h}ai]	'to have sent'

Option 5.21b) is employed in languages like English (Goad 2011) and Dutch (van der Hulst 1984), where non-heterosyllabic sC clusters may occur both word-initially and word-medially in non-intervocalic contexts. Some illustrative examples from English are given in 5.24, following Goad (2011):

5.24 Distribution of sC clusters in English (after Goad 2011)

a. Word-initial sC clusters

['spʌɪdər]	'spider'
[steɪn]	'stain'

b. Intervocalic sC clusters

['iːstər]	'Easter'
['ɔjstər]	'oyster'

c. Appendixal /s/ word-medially

['ɛkstrə]	'extra'
['ɑbstəkəl]	'obstacle'
[ˌɛkspə'zɪʃən]	'exposition'
['kɑnskrɪpt]	'conscript'
[bowlstər]	'bolster'
[howlstər]	'holster'

Another issue in the theoretical debate surrounding sC clusters is whether all clusters of this type should be represented in a uniform way, regardless of whether they violate the sonority sequencing principle (as in case of s + obstruent clusters) or satisfy it (as in case of s + sonorant clusters). Although this appears to be the case in languages like Spanish and Attic Greek, where s + obstruent and s + sonorant clusters behave exactly the same, data from other languages do not always converge on this solution. Compelling evidence in favor of distinct representations for s + obstruent and s + sonorant clusters comes from van de Weijer (1996), who shows that s + sonorant clusters pattern together with branching onsets and distinctly from s + stop clusters with respect to a number of cluster simplification processes in different languages.

Let us briefly consider two examples illustrating this asymmetry. In Gothic, certain verbs form the preterite by partial reduplication of the first syllable of the base form, as shown in 5.25 (van de Weijer 1996:181). In cases where the first syllable of the base contains an onset cluster, it undergoes simplification. Interestingly, the pattern holds for regular branching onsets like [gr-] and [fr-] and for s + sonorant onsets like [sl-] 5.25b), while consistently underapplying in s + plosive clusters 5.25c). A similar pattern also holds of perfective reduplication in Sanskrit (van de Weijer 1996:182), where all rising sonority clusters simplify to the first element, while in s + stop clusters it is the second member that is preserved.

5.25 Reduplication in Gothic (from van de Weijer 1996:181)

a.	haita	'I am called'	haihait	'I was called'
	h^wopa	'I boast'	h^waih^wop	'I boasted'
b.	fraisa	'I try'	faifrais	'I tried'
	grētan	'to weep'	gaigrōt	'I wept'
	slēpan	'to sleep'	saislēp	'I slept'
c.	(ga-)stalda	'I acquire'	staistald	'I acquired'
	skaida	'I sever'	skaiskaiþ	'I severed'

Another pattern quoted by van de Weijer (1996:185) comes from Modern Standard Hindi, where different repair strategies apply to initial sC clusters of loanwords, depending on the nature of the second element. As shown in 5.26, raising sonority clusters, including those starting with /s/, are repaired by epenthesis, while in case of s + stop clusters prothesis applies instead:

5.26 Loanword adaptation in Modern Standard Hindi

a.	[pɩlɩz]	'please'
	[fɩrɔk]	'frock'
b.	[sɩlɩper]	'slipper'
	[sɩlɩpɩŋ bæg]	'sleeping-bag'
c.	[ɩspeliŋ]	'spelling'
	[ɩspun]	'spoon'

To recapitulate, it appears that sC clusters are not represented in a uniform way across languages. While there is a general consensus that non-heterosyllabic s + obstruent clusters involve an extrametrical element licensed directly by a higher prosodic constituent, the identity of this constituent seems to be determined on a language-specific basis, with some languages showing evidence for it being a prosodic word, and others for it being a syllable. Further, there is evidence suggesting that s + obstruent and s + sonorant clusters are not necessarily represented in the same way in a given language. Thus, in some languages all sC clusters regardless of their sonority profile pattern together as a class, while in others s + sonorant clusters pattern with branching onsets. As we will see shortly, Latvian represents a clear example of the latter.

5.3.2 sC clusters and Latvian onset phonotactics

Latvian permits word-initial consonant sequences ranging in length from zero to three elements (Auziņa 2005, Kariņš 1996, Bond 1994). Any consonant present in the inventory (with the exception of [ŋ] which only surfaces before velar stops) may appear as a singleton onset, and any vocoid – long or short – may appear in an onsetless syllable.

5.27

a. Onsetless initial syllables

[a:.d-a]	'skin'		[i.kr-i]	'roe'
[a.da.t-a]	'needle'		[i:.r-e]	'rent'
[u.p-e]	'river'		[okea:n-s]	'ocean'
[u:.de.l-e]	'mink'		[o:.pe.r-a]	'opera'
[æ.zær-s]	'lake'		[a̯i.n-a]	'sight'
[æ:.n-a]	'shadow'		[i̯e.l-a]	'street'
[e.gl-e]	'spruce'		[u̯o.l-a]	'egg'
[e:r.t͡s-e]	'tick'		[a̯u.g-i]	'plants'

b. *Initial singleton onsets*

[pas.s-e]	'passport'		[ma:.t-e]	'mother'
[bit.t-e]	'bee'		[lap.s-a]	'fox'
[za:.l-e]	'grass'		[ra.d-i]	'relatives'
[t͡sa:.l-i-s]	'chicken'		[na:.tr-e]	'nettle'
[t͡ʃus.k-a]	'snake'		[ɲem-t]	'to take'
[ʃu:.n-a]	'cell'		[ʎaud-i-s]	'people'
[ce:.d-e]	'chain'		[ʝak.ka]	'cardigan'
[ɟi:.m-i-s]	'face'		[ve:j-ʃ]	'wind'

The majority of two-member onsets have rising sonority, s + plosive sequences being the only exception. In addition, sonority plateaux are attested in a small number of borrowed items, typically foreign toponyms and international scientific terms (e.g. [pto:ze] 'ptosis'), while sonority reversals are disallowed. An overview of possible and impossible onset combinations in native items is given in 5.28, s + plosive clusters aside (see also Auziņa 2005, Kariņš 1997, Bond 1994)[50].

---

[50] Within each onset type, further combinatorial restrictions apply: for instance, rising sonority sequences like *[bn-] and *[tl-] are not well-formed onsets in Latvian. Restrictions of this type are not treated here, as they are not crucial for the analysis of the palatalization patterns at hand. For a full overview of possible segment combinations in word-initial onsets, see Kariņš (1997) and Bond (1994).

5.28

C2 / C1	Obstruents	Nasals	Laterals	Rhotics	[v]	[j̯]
Obstruents	*	✓	✓	✓	✓	*
Nasals	*	*	*	*	*	*
Laterals	*	*	*	*	*	*
Rhotics	*	*	*	*	*	*
[v]	*	*	*	*	*	*
[j̯]	*	*	*	*	*	*

5.29

[kna:b-i-s]	'beak'	[kɲu:d-e:-t]	'to itch'
[klei̯t-a]	'dress'	[kʎav-a]	'maple'
[krac-i-s]	'jade'	[kvi̯eʃ-i]	'wheat'

The crucial property of the inventory in 5.28 is that segments belonging to the same major class never co-occur within a syllable onset. Thus, obstruent-obstruent and sonorant-sonorant onset sequences never appear in native items, even where it would mean a sonority rise of several steps (as in *[nr-]). This strongly suggests that the contrast relevant for Latvian onset phonotactics is one between obstruents and sonorants, and the more fine-grained sonority distinctions within each category do not play a role.

Like many other languages, Latvian allows a number of sibilant + plosive sequences to surface word-initially in apparent violation of the Sonority Sequencing Principle. Clusters of this type are attested both in nonnative items and items belonging to the core vocabulary. As illustrated in 5.30a), both /s/ and /ʃ/ may precede plosives word-initially, while their voiced counterparts /z, ʒ/ are banned from this position (note that there is no restriction against voiced plosives occuring in simple or complex onsets). Importantly, s + sonorant clusters pattern differently in this respect: both voiced and voiceless sibilants are allowed to surface before sonorants, as shown in 5.30b) (the non-occurrence of [zm-] is likely an accidental gap).

5.30

a.

[spai̯n-i-s]	'bucket'	cf.	*[zb-]	cf.	[blakt͡s]	'bug'
[stilp-s]	'shin'	cf.	*[zd-]	cf.	[drau̯k-s]	'friend'
[sku̯ol-a]	'school'	cf.	*[zg-]	cf.	[gni:d-a]	'nit'
[ʃpag-a]	'sabre'	cf.	*[ʒg-]	cf.	[bagar-s]	'dredge'
[ʃtat͡s]	'state'	cf.	*[ʒd-]	cf.	[dat-i]	'data'
[ʃce:r-e-s]	'scissors'	cf.	*[ʒɟ-]	cf.	[ɟæ:rp-s]	'garment'

b.

[sni̯ek-s]	'snow'	[znu̯ot͡s]	'son-in-law'
[sla:n-i-s]	'layer'	[zlot͡s]	'zloty'
[smai̯t͡s]	'smile'		
[ʃɲukur-s]	'muzzle'	[ʒɲau̯k-s]	'constrictor'
[ʃlips-e]	'tie'	[ʒʎakst-e:-t]	'to squelch'
[ʃmerl-iɲ-ʃ]	'mudfish'	[ʒmi̯ek-t]	'to press'

Unlike other complex onsets, word-initial sequences starting with a sibilant fricative may be up to three consonants in length, as shown in 5.31 (following Auziņa 2005, Kariņš 1996, Bond 1994, Matthews 1958). Note that in word-initial sequences of this type, /s/ always precedes a plosive-sonorant cluster that constitutes a well-formed binary onset. The restriction against voiced sibilants preceding plosives also holds in three-member clusters.

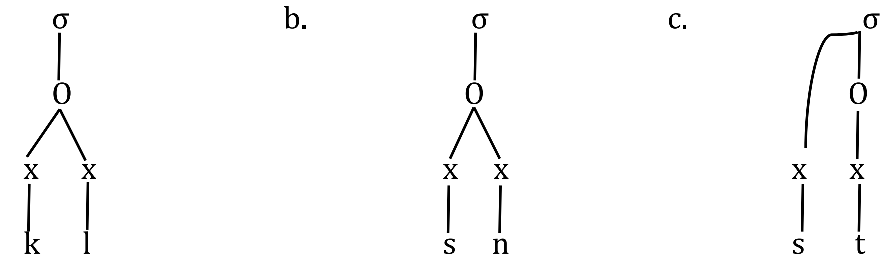
5.31

[skleroz-e]	'sclerosis'
[skrai̯d-i:-t]	'to run'
[spra:d͡z-e]	'buckle'
[stra:d-a:-t]	'to work'
[spli:n-s]	'spleen'
[spʎau̯-t]	'to spit'
[ʃpru̯ot-e]	'sprat'
[ʃtrop-e]	'lanyard'

In sum, word-initial clusters in Latvian appear to fall into two groups: (i) maximally bipositional clusters of rising sonority, which may start with either voiced or voiceless obstruents; and (ii) maximally tripositional clusters violating the SSP, which may only start with voiceless sibilant fricatives. Following much of the literature on the representation of sC clusters (see Goad 2011 for an overview), I assume that initial sequences of the former type constitute true binary branching onsets, while sequences of the latter type contain a sibilant appendix preceding the onset constituent, as shown in 5.32.

5.32

a. b. c.



In the following section, I consider the behavior of intervocalic sC clusters and present some evidence suggesting that the appendix position in Latvian is licensed by the syllable constituent, rather than the prosodic word.

5.3.3 sC clusters and Latvian rhyme phonotactics

In this section I consider phonotactic restrictions that hold in Latvian word-medial rhymes. I show that Latvian rhymes are subject to two major restrictions: first, the length of a rhyme is limited to three skeletal positions; and second, a rhyme may contain maximally two weight-bearing elements. The main goal of this section is to show that in certain cases a word-medial sibilant fricative occurring interconsonantally may occupy a coda position, while in other cases it must be treated as a word-medial appendix licensed by the syllable.

The composition of Latvian rhymes is usually discussed in the context of tone assignment (Kariņš 1996, Laua 1997, but see Bond 1994 for some discussion of onset and rhyme phonotactics). Every heavy syllable is obligatorily associated with a tone: in Standard Latvian, a three-way opposition is made between level, falling and broken tones (Kariņš 1996:16). For the purpose of tone assignment, three types of heavy syllables are recognized: those containing a long vowel, as in

5.33a), those containing a diphthong, as in 5.33b), and those containing a short vowel followed by a sonorant, as in 5.33c). Non-sonorant consonants do not contribute to syllable weight: syllables where a short vowel is followed by an obstruent are treated as light and are not associated with tones. This is illustrated below (syllable tones are indicated following transcriptions given in LDSP 2007):

5.33

Heavy									Light		
a.	[mā:.s-a]	'sister'	b.	[sa̯ī.t-e]	'string'	c.	[leñ.t-e]	'ribbon'	d.	[lap.sa]	'fox'
	[sê:.ʒ-a]	'seat'		[tàu̯.t-a]	'people'		[d͡zìm.t-e]	'gender'		[ma.s-a]	'mass'

While vowels and diphthongs are uncontroversially contained within a syllable nucleus, two representational options are available for sonorants following tautosyllabic short vowels: these can either occupy a second slot of a branching nucleus or be syllabified as weight-bearing codas. Under the latter approach, syllables containing long vowels/diphthongs closed by sonorant codas and syllables where a short vowel is followed by two tautosyllabic sonorants would be regarded as super-heavy. Tautomorphemic sequences of both types freely occur in Latvian, as the data below illustrate. However, as we will see shortly, these are limited to word-final position.

5.34

a.

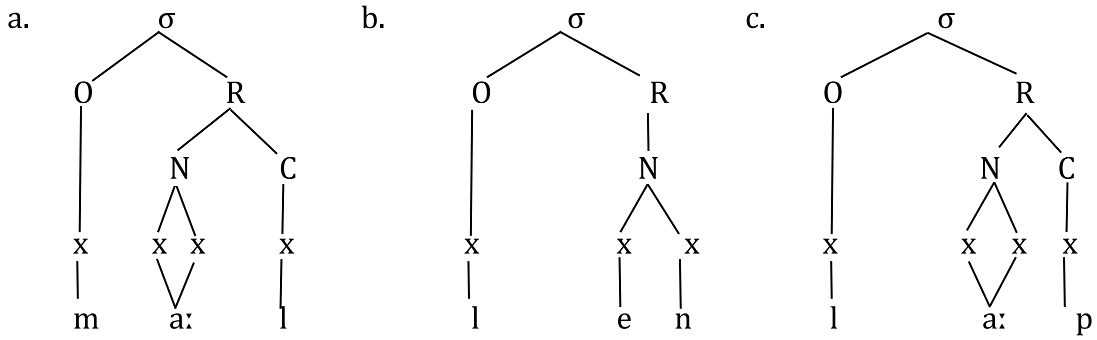
[gàl-s]	'end'	cf.	[mā:l-s]	'clay'
[svìn-s]	'lead, Pb'	cf.	[vī:n-s]	'wine'
[gèl-s]	'gel'	cf.	[dǣ:l-s]	'son'
[rùm-s]	'rum'	cf.	[krū:m-s]	'bush'
[kùl-s]	'clay floor'	cf.	[â:.bu̯ōl-s]	'apple'

b.

[t͡sæl̂m-s]	'stem'
[gal̂m-s]	'court'
[pil̄n-s]	'full'
[kal̂n-s]	'mountain'
[kùrl-s]	'deaf'

However, there is no evidence that the syllables illustrated in 5.34 are in fact super-heavy, as they pattern no differently from regular heavy syllables with respect to tone and stress assignment (Daugavet 2010). Daugavet takes this as an indication that codas – whether sonorant or not – do not contribute to syllable weight in Latvian. She proposes that tautosyllabic sonorants following a short vowel form part of a branching nucleus, while tautosyllabic sonorants following long vowels, diphthongs and sonorants constitute non-weight-bearing codas. In fact, this is the view that dominates in traditional descriptions, where tautosyllabic V-SON strings are referred to as "diphthongal sequences" (Lat. *diftongiskie savienojumi*), while sonorants following tautosyllabic long vowels and diphthongs are regarded as "non-syllabic", i.e. located outside of the nucleus (Laua 1997:99-103). In other words, Daugavet (2010) classifies Latvian as a nucleus-weight language (Ewen & van der Hulst 2001:134), where syllables with a branching nucleus are always heavy, while syllables with a unary nucleus are always light, regardless of whether or not they have a coda. This gives us the inventory of heavy syllables shown below:

5.35



While this approach explains why syllables of the type illustrated in 5.35a) do not constitute a separate class with respect to tone and stress assignment, it also predicts that their distribution should be exactly like that of the syllables in 5.35b) and 5.35c): that is, all three types of heavy syllables should be able to occur word-medially as well as word-finally. However, this prediction is not borne out by the data. As shown in 5.36a)[51][52], sonorants freely occur in word-medial rhymes after short vowels, but are banned after long vowels and dipthongs in this position. Similarly, tautosyllabic sonorant sequences never occur word-medially 5.36b).

5.36

a.

[bil.d-e]	'picture'	*[bi:l.d-e]
[al.g-a]	'salary'	*[a:l.g-a]
[gul.t-a]	'bed'	*[gu:l.t-a]
[pum.p-a]	'knob'	*[pu:m.p-a]
[rin.d-a]	'line'	*[ri:n.d-a]
[len.t-e]	'ribbon'	*[le:n.t-e]

b.

[al.n-i-s]	'elk'	*[aln.t-i-s]
[vil.n-i-s]	'wave'	*[viln.t͡s-i-s]
[pal.ma]	'palm tree'	*[palm.k-a]
[del.n-a]	'palm'	*[deln.t-a]
[stir.n-a]	'doe'	*[stirn.t-a]
[kur.m-i-s]	'mole'	*[kurm.t͡s-i-s]

In principle, the absence of word-medial rhymes where a sonorant is preceded by a branching nucleus may be attributed to the size restriction on word-medial rhymes. That is, one might propose that medial rhymes in Latvian are restricted to two skeletal positions and may therefore contain either a branching nucleus (e.g. [len.t-e] 'ribbon', [ma:.s-a] 'sister') or a unary nucleus followed by a coda (e.g. [lap.sa] 'fox'). Under this approach, the forms in the rightmost column of 5.36 would be ungrammatical because they exceed the maximal size of the medial rhyme, and not the maximal weight. There is, however, a problem with this explanation. Were it the case that medial rhymes in Latvian were restricted to

[51] The restriction does not hold of derived stems, where tautosyllabic sonorants after long vowels and diphthongs are attested, e.g. [sai̯m.-ni̯ek-s] 'master'.

[52] The only exception to this pattern are tautosyllabic rhotics, which freely occur before long as well as short vowels, e.g. [va:r.n-a] 'crow', [sva:r.k-i] 'skirt', [be:r.n-i] 'children', etc. Forms of this type are due to a diachronic process lengthening short vowels before a tautosyllabic [r], which was operative in Latvian at some stage (Daugavet 2010:96-97). Daugavet (ibid) suggests that vowel lengthening in this context was compensatory and caused by [r] losing its moraicity at some point. Notably, in Modern Standard Latvian [r] does contribute to syllable weight, as evidenced by the fact that syllables with a short vowel closed by [r] receive a tone.

maximally two skeletal positions, we would not expect to find word-medial tautosyllabic sequences where a branching nucleus is followed by an obstruent coda either. That is, structures like that in 5.35c) would be disallowed word-medially. This is not the case: as the data in 5.37 illustrate, examples where tautosyllabic obstruents occur after long vowels, dipthongs and sonorants word-medially are not hard to find.

5.37

a.

[ma:k.sl-a]	'art'
[zvai̯g.zn-e]	'star'
[a:p.s-i-s]	'badger'
[va.ra.vīk.sn-e]	'rainbow'
[ka:k.sl-i-s]	'goitre'

b.

[zalk.t-i-s]	'grass snake'
[alk.sn-i-s]	'alder'
[d͡zelk.sn-i-s]	'thistle'
[kant͡s.ler-s]	'chancellor'
[sfiŋk.s-a]	'sphinx'

To summarize, the data considered so far lead me to two conclusions: (i) tautosyllabic sonorants following short vowels are affiliated with a weight-bearing coda, rather than being a part of a branching nucleus; and (ii) in word-medial rhymes, up to three skeletal positions are permitted. With this in mind, let us finally move on to consider the distribution of sibilant fricatives word-medially.

What we have to determine now is whether there are forms in Latvian that would allow us to motivate the appendixal status of /s/ word-medially. As shown in 5.38, /s/ freely occurs after heavy tri-positional rhymes and before plosive onsets (as far as I have been able to establish, all strings in question are non-derived). Note that both types of heavy rhymes are represented in 5.38: i.e. those where a short vowel is followed by a tautosyllabic sonorant 5.38a), and those where a long vowel or a diphthong is followed a tautosyllabic obstruent 5.38b):

5.38 Word-medial [s] occurs after tri-positional rhymes

a.

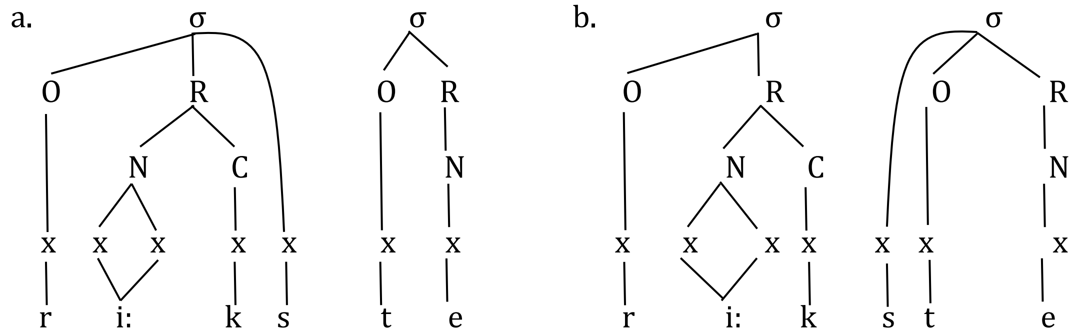
[pulk.s.ten-i-s]	'clock'
[t͡ʃink.s.t-e:-t]	'whine'
[kuŋk.s.t-e:-t]	'groan'
[smilk.s.t-e:-t]	'whimper'

b.

[va͜ip.s.t-i]	'traits'
[ri:k.s.t-e]	‘switch, rod’
[la:p.s.t-a]	'spade'
[pla͜uk.s.t-a]	'palm'
[ma͜ik.s.t-e]	'pole'
[skru͜op.s.t-a]	'eye-lash'

When /s/ occurs in one of the positions illustrated in 5.38, it may not be incorporated into any sub-syllabic constituent: Its syllabification in the onset of the second syllable would result in violation of the Sonority Sequencing Principle, while its syllabification in the coda of the first syllable would mean both violating the SSP and exceeding the maximal rhyme size. I therefore conclude that the fact that /s/ is nevertheless attested in this position indicates that Latvian allows extrametrical segments word-medially. It follows that in 5.38 /s/ is an appendix dominated by a syllable constituent. Note that in cases where the sibilant fricative occurs in this position, it may in principle occupy either the appendixal slot licensed by the preceding syllable or that licensed by the following one. We are not going to resolve this ambiguity here, as it will not be crucial for the subsequent analysis. In what follows, I use the notation "<s>" to indicate that /s/ is a word-medial syllable appendix whose affiliation is ambiguous.

5.39



The same analysis can be extended to forms in 5.40. Although coda syllabification of /s/ in these cases would not result in violation of the restriction on maximal rhyme size, it is still precluded by the Sonority Sequencing Principle.

5.40

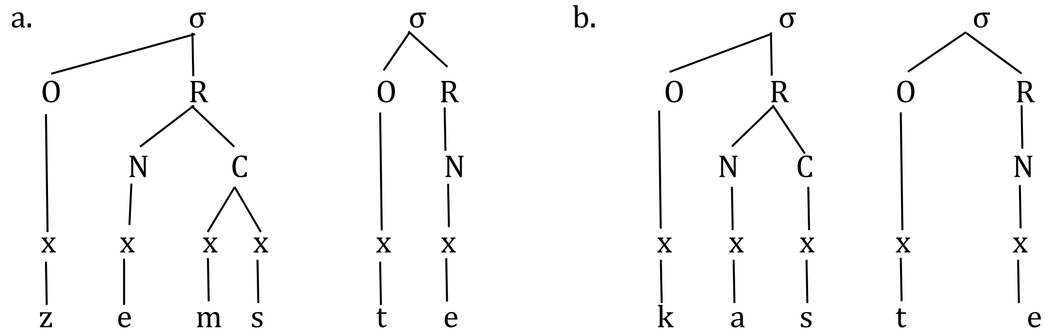
[kluk.<s>.t-e]	'brood hen'
[plek.<s>.t-e]	'flounder'
[t͡ʃip.<s>.t-e]	'pipit'
[mak.<s>.t-i-s]	'wombs'

The situation with the forms in 5.41a) is different. Here, syllabification of /s/ in the coda of the first syllable would violate neither the maximal rhyme size restriction nor the SSP, while its syllabification in the onset would result in an SSP violation. I suggest, therefore, that /s/ in forms of this type is syllabified in the coda, as shown in 5.42. For the same reason, coda syllabification of /s/ is motivated in the forms illustrated in 5.41b), where it follows a short vowel and precedes an obstruent plosive.

5.41 Heterosyllabic s + plosive clusters

a.	[zems.t-e]	'district'
	[skans.t-e]	'bastion'
	[li̯es.t-e]	'boot-tree'
	[vals.t-i-s]	'states'
b.	[kas.t-e]	'box'
	[ves.t-e]	'vest'
	[bis.t-e]	'bust'
	[kas.t-e]	'box'

5.42



5.3.4 Syllabification of intervocalic clusters

Let us now turn to the constraint-based analysis. Recall that the inventory of onset clusters in 5.28 only gives evidence for a binary split between obstruents on the one hand and sonorants on the other. In a system like this, the Sonority Sequencing Principle may be reduced to one rule:

5.43 In binary onsets, C_1 is an obstruent and C_2 is a sonorant.

Latvian onset phonotactics receive a rather satisfactory treatment in the alignment-based syllable theory (Itô & Mester 1994), where restrictions on the relative order of segments within a syllable take the form of directional alignment constraints favoring sequences where a specific structure is aligned with a given edge of a specified domain. The generalization in 5.43 can be captured by two alignment constraints demanding that obstruents are aligned with the syllable edge, and sonorants are aligned with the nucleus (cf. Krämer 2009:131 on the implementation of alignment-based syllable theory for Italian). Recall from Chapter 3 that the class of obstruents is defined by C-laryngeal node, while the class of sonorants (including /i, e, æ, u/) is defined by C-manner-[open] feature. This allows us to formulate the alignment constraints as shown below:

5.44 Align(C-lar-Edge)$_\sigma$ - segments specified for C-laryngeal node are aligned with the syllable edge.

Align(C-manner-[open]-Nucleus) – segments specified for C-manner-[open] are aligned with the nucleus.

The tableau in 5.45 illustrates the evaluation. An important property of the grammar in 5.45 is that it can capture the relative wellformedness of onsets with sonority reversals and those with sonority plateaux – recall that the latter, but not the former, are attested in certain loanwords (cf. Morelli 2003:360). Clusters with sonority plateaux incur one violation each on the relevant alignment constraints. Thus, an onset cluster containing two obstruents receives a violation mark on Align(C-lar-Edge)$_\sigma$, while the onset sequence of two sonorants is penalized by Align(C-manner-[open]-Nucleus). Onset clusters with sonority reversals, such as the one in (d), violate both alignment constraints.

5.45

	ALIGN(C-LAR-EDGE)$_\sigma$	ALIGN(C-MANNER-[OPEN]-NUCLEUS)
a.[pl-A]		
b.[pt-A]	*	
c.[nr-A]		*
d.[lp-A]	*	*

The pattern that remains unaccounted for under this analysis is the absence of onset clusters of the type Cj̥, where C is an obstruent, in native items. I propose that this is due to an alignment constraint demanding that the segments specified for the C-place-[coronal] feature be aligned with the syllable edge, which would affect sibilants and the front vocoids /i, e, æ/. In front vocoids, the constraint would conflict with Align(C-manner-[open]-N), which demands that all sonorants are aligned with the syllable nucleus. As a result, all onset clusters containing front vocoids would be marked, regardless of whether the vocoid occurs as a C_1 or a C_2.

5.46 Align(C-place-[coronal]-Edge)$_\sigma$ - segments specified for C-place-[coronal] are aligned with the syllable edge.

5.47

	ALIGN(C-LAR-EDGE)$_\sigma$	ALIGN(C-MAN-[OPN]-NUCLEUS)	ALIGN(C-PL-[COR]-EDGE) $_\sigma$
a. [j̥-A]			
b.[pj̥-A]			*
c.[j̥p-A]	*	*	

Let us now turn to the syllabification of intervocalic consonant clusters. Following Kariņš (1996), I assume that Latvian obeys the Maximal Onset Principle (Goldsmith 1990), and intervocalic consonants are maximally assigned to the onset position as long as it does not mean violating onset phonotactics.

5.48

Maximal Onset Principle (Goldsmith 1990): intervocalic consonants are assigned to the onset where allowed by SSP and language-specific phonotactics.

This can be achieved by ranking alignment constraints above NoCoda and *ComplexCoda. Syllabification of intervocalic sequences is illustrated in 5.49, 5.50 and 5.51 for the words [sak.t-a] 'brooch', [u.sn-e] 'thistle' and [il.kn-i-s] 'tusk'. In 5.49, candidate (a) violates the Align(C-lar-Edge) $_\sigma$ constraint because the second obstruent in the tautosyllabic cluster is misaligned with the syllable edge. In 5.50, both candidates fare equally well on alignment constraints, but candidate (b), where the cluster is heterosyllabic, fatally violates NoCoda. In 5.51, where candidates (b) and (c) incur one violation each on NoCoda, the winner is determined by the *ComplexCoda constraint.

5.49

/sakt-a/	ALIGN(C-LAR-EDGE) $_\sigma$	ALIGN (C-MAN-[OPEN]-NUC)	NOCODA	*COMPLEXCODA
a. [sa.kta]	*!			
☞b. [sak.ta]			*	

5.50

/usn-e/	ALIGN(C-LAR-EDGE) $_\sigma$	ALIGN (C-MAN-[OPEN]-NUC)	NOCODA	*COMPLEXCODA
☞a. [u.sn-e]				
b. [us.n-e]			*!	

5.51

/ilkn-i-s/	Align(C-lar-Edge)σ	Align (C-man-[open]-Nuc)	NoCoda	*ComplexCoda
a. [i.lkn-i-s]	*!	*		
☞b. [il.knis]			*	
c. [ilk.n-i-s]			*	*!

Let us now consider an analysis that accounts for the correct syllabification of intervocalic s + plosive sequences. Once the word-medial appendixal slot is made available in the representations, it may in principle be occupied by any word-medial consonant, also in cases where onset and coda positions are available (cf. also Goad 2011 on ambiguities of this kind). That is, both [as.t-e] and [a.<s>t-e] are allowed by the representations. The main goal of the OT analysis is to ensure that /s/ is incorporated as a syllable appendix only in cases where no other position for it is available. Following Krämer (2009), I assume that the universal markedness of appendixal elements is captured by the σ-Contiguity constraint as defined below (from Krämer 2009:149):

5.52 σ-Contiguity: Every syllable edge is adjacent to another syllable edge or a pause.

In order to ensure that /s/ is prosodified as a syllable appendix only as a last-resort device, σ-Contiguity must be outranked by alignment constraints, while dominating NoCoda. The interaction of these constraints is illustrated in 5.53, 5.54 and 5.55.

5.53

	Align(C--[opn]-N)	Align(C-lar-E)σ	σ-Contiguity	NoCoda	*ComplexCoda
/ast-e/					
a. [a.st-e]		*!			
☞b. [as.t-e]				*	
c. [a.<s>.t-e]			*!		

In 5.53, candidate (a) with a complex onset violates the alignment constraint because [t] is misaligned with the edge of the syllable where it occurs. Candidate (c) violates σ-Contiguity because it contains an appendix. As a result, candidate (b), where the sibilant is syllabified in the coda, is selected as the optimal output.

5.54

	Align(C--[opn]-N)	Align(C-lar-E) σ	σ-Contiguity	NoCoda	*ComplexCoda
/plaksn-e/					
☞a. [plak.sn-e]				*	
b. [plak.<s>.n-e]			*!		
c. [plaks.n-e]		*!			*

In 5.54, the situation is similar. Here, candidate (b) is penalized by the σ-Contiguity constraint, while the candidate with a complex coda crucially violates alignment, as [k] is not aligned with the edge of the first syllable. As a result, candidate (a) with a complex onset is predicted to surface, because the onset string in this candidate satisfies onset phonotactics.

5.55

	Align(C--[opn]-N)	Align(C-lar-E) σ	σ-Contiguity	NoCoda	*ComplexCoda
/makst-i-s /					
a. [mak.st-i-s]		*!		*	
b. [maks.t-i-s]		*!		*	*
☞c. [mak.<s>.t-i-s]			*	*	

In 5.55, the situation is quite different. Here, both candidates where the sibilant is incorporated in the syllable structure, (a) and (b), violate alignment constraints.

The only remaining choice, therefore, is a candidate where /s/ is prosodified as an appendix.

To summarize, we have seen that sC clusters in Latvian can be syllabified in three ways depending on their sonority profile and the context where they occur: (a) s + sonorant clusters are tautosyllabic; (b) s + plosive clusters are heterosyllabic coda-onset sequences when occurring after vowels and sonorants; and (c) s + plosive clusters are appendix-initial when occurring word-initially or after obstruents.

5.4 Palatalization in sC clusters: a constraint-based analysis

In this section I develop a constraint-based analysis of the palatalization patterns introduced in Section 5.2. I argue that both palatal assimilation of /s/ in the context of palatal sonorants and palatalization blocking in s + plosive clusters are motivated by the Obligatory Contour Principle (OCP) that prohibits adjacent identical elements. I also show that a way in which OCP violations are avoided in each particular case is crucially determined by the syllabic status of a sC cluster.

5.4.1 Palatal assimilation in tautosyllabic sC clusters

Let us start the discussion by considering the pattern where the sibilant fricatives /s, z/ assimilate to adjacent tautosyllabic palatal sonorants, a process which is treated here as spreading of the V-place node dominating the [coronal] feature. The relevant data are repeated in 5.56:

5.56

			Gen. pl.	
a.	/kusn-i-u/	→	[ku.ʃɲ-u]	‘flux’
	/pu:sl-i-u/	→	[pu:.ʃʎ-u]	‘bladder’
b.	/t͡seʎ-s/	→	[t͡seʎ-ʃ]	‘road, n.’
	/termiɲ-s/	→	[termiɲ-ʃ]	‘term, n.’

Given the fact that the set of targets is restricted to sibilants (i.e. segments specified for C-place-[coronal]) and the set of triggers is restricted to palatals (i.e. segments specified for V-place-[coronal]), the spreading can be attributed to the prohibition against adjacent tokens of the [coronal] feature, i.e. to OCP violation avoidance. In this case, the OCP constraint would have to be formulated in such a way as to be sensitive to the adjacent tokens of the feature [coronal], regardless of whether they reside on the same or different tiers, as shown below (see Hume 1992 on cross-planar OCP effects, Youssef 2013 for implementation in the PSM model):

5.57 OCP [coronal] - adjacent tokens of the feature [coronal] are prohibited.

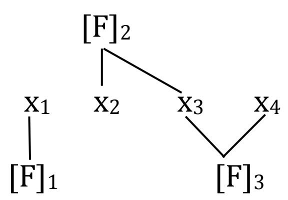
While the definition of adjacency and non-adjacency is straightforward in cases where the elements in question are located on the same autosegmental tier 5.58, the formulation of the constraint in 5.57 raises an immediate question as to how adjacency should be determined in cases where the two tokens of [coronal] are dominated by C-level and V-level class nodes.

5.58 Adjacency: the elements x and y are adjacent on tier n if no element z on tier n intervenes (Hume 1992:138).

According to the definition in 5.58, no two tokens of [F] could be adjacent if they reside on different tiers. Cross-planar OCP effects, like the one illustrated in 5.56 for Latvian, are nevertheless cross-linguistically attested. In order to account for the existence of cross-planar OCP effects, Hume (1992:137) argues that "all instances of a given place feature are arrayed on the same tier regardless of whether the feature is defined on the vocoidal or consonantal plane". While this account solves the adjacency problem, it is not itself unproblematic: for instance, under this approach, the C-class and V-class features are predicted to be equally likely to spread long-distance, which is contrary to fact.

In order to formalize the notion of cross-planar adjacency for the purpose of analysing Latvian palatalization patterns, I take as my point of departure the concept known as f-precedence, proposed in Jurgec (2011). F-precedence was intended to capture the precedence relations that may obtain between autosegments residing on different tiers. Just like adjacency, precedence implies strict sequential ordering and therefore cannot be directly established for elements arrayed on different autosegmental tiers, which may fully or partially overlap. This is schematically illustrated in 5.59. While autosegment $[F]_1$ clearly precedes $[F]_3$ (and is also adjacent to it, since no element intervenes between the two on the same tier), the relation between $[F]_2$ and $[F]_3$ is that of partial overlap. In turn, whether $[F]_1$ is adjacent to $[F]_2$ and whether $[F]_2$ is adjacent to $[F]_3$ cannot be determined based on the definition in 5.58, because the elements are arrayed on different tiers.

5.59



Jurgec (2011) proposes that the precedence relation between autosegments arrayed on different tiers may be established indirectly, with a reference to the root nodes that the autosegments in question are associated with:

5.60 **F-precedence** (after Jurgec 2011:33):

Feature [G] f-precedes feature [H], iff

(i) the root node x_i is associated with [G] but not with [H], and

(ii) the root node x_j is associated with [H] but not with [G], and

(iii) x_i precedes x_j

The definition of f-precedence can be straightforwardly adapted to capture the relationship that I dub "cross-tier adjacency", which defines the criteria for violations of the OCP[coronal] constraint defined in 5.57.

5.61 **Cross-tier adjacency**: Let $[F]_1$ be the token of the feature [F] aligned on tier A, and $[F]_2$ be the token of the feature [F] aligned on tier B. $[F]_1$ is adjacent to $[F]_2$, iff:

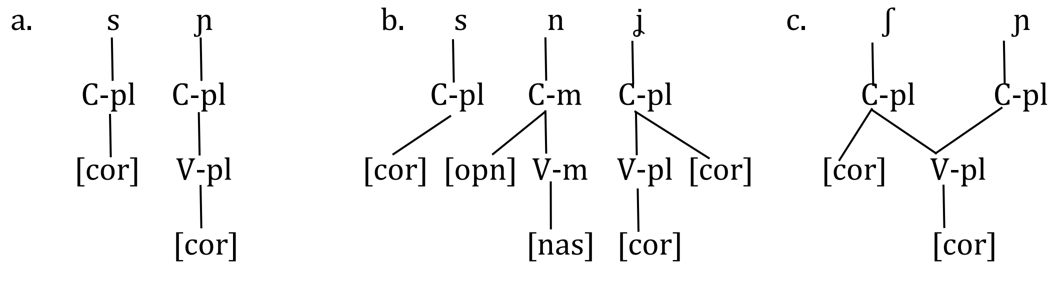
(i) the root node x_1 is associated with $[F]_1$ but not $[F]_2$, and

(ii) the root node x_2 is associated with $[F]_2$ but not $[F]_1$, and

(iii) x_1 is adjacent to x_2

If we adopt the definition of cross-tier adjacency in 5.61, the OCP[cor] constraint is violated by the string in 5.62a), because [s] dominates C-place-[cor] but not V-place-[cor], [ɲ] dominates V-place-[cor] but not C-place-[cor], and [s] is string-adjacent to [ɲ]. The configuration in 5.62b) does not violate OCP[cor] because [s] is not string-adjacent to [j̥], while 5.62c) does not violate OCP[cor] because V-place-[cor] is associated with both [ʃ] and [ɲ].

5.62



The tableau illustrating regressive application of s-assimilation is given in 5.63 (irrelevant features are omitted). To ensure that the violations of OCP[cor] are not repaired by delinking, the constraint should be ranked below MaxLink[V-pl-cor] and MaxLink[C-place-cor]. Note that all candidates where the cluster /sn/ is parsed as heterosyllabic (not indicated here) will be ruled out by NoCoda. In 5.63, the faithful candidate (a) violates two alignment constraints because it has a sonorant not aligned with the nucleus and a sibilant not aligned with the syllable edge. Candidate (b), with yod-palatalization but no s-assimilation, is penalized by OCP[cor]. Candidate (d), where yod-palatalization did not apply, violates MaxLink[V-place-cor]. As a result, the candidate in (c), with both yod-palatalization and s-assimilation, is correctly selected as optimal.

5.63

/ku s n -i -u / C-pl C-pl [cor] V-pl [cor] [cor]	Align(C-m-[opn]-N)	Align(C-lar-E)σ	Align(C-pl-[cor]-E)σ	MaxLink [V-pl-cor]	NoCoda	Ident (C-place)	MaxLink [C-pl-cor]	OCP[cor]	Ident (V-place)
a. [ku . s n -i̯ -u] C-pl C-pl [cor] V-pl [cor] [cor]	*!		*						
b. [ku . s ɲ -u] C-pl C-pl [cor] V-pl [cor]							*	*!	*
☞c. [ku . ʃ ɲ -u] C-pl C-pl [cor] V-pl [cor]							*		*
d. [ku . s n -u] C-pl [cor]				*!			*		

Progressive application of s-assimilation works in essentially the same way, the only difference being that in this case the palatal sonorant trigger is present underlyingly. In 5.64, the faithful candidate in (a) fatally violates OCP[cor] and is ruled out. Candidate (b), where violation of OCP[cor] is avoided by delinking the underlying V-place-[cor] specification, is penalized by the MaxLink constraint. As a result, candidate (c), with progressive spreading of V-place-[cor] is correctly selected as optimal. Note that the directionaly of spreading does not need to be stipulated and follows from the underlying specifications of the adjacent segments.

5.64

/vi ɲ - s / C-pl C-pl V-pl [cor] [cor]	Align(C-m-[opn]-N)	Align(C-lar-E)$_\sigma$	Align(C-pl-[cor]-E)$_\sigma$	MAXLINK [V-PL-COR]	NOCODA	IDENT (C-PLACE)	MAXLINK [C-PL-COR]	OCP[COR]	IDENT (V-PLACE)
a. [vi ɲ - s] C-pl C-pl V-pl [cor] [cor]								*!	
b. [vi ɲ - s] C-pl [cor]				*!					
☞c. [vi ɲ - ʃ] C-pl C-pl V-pl [cor] [cor]									*

Let us now turn to a discussion of systematic exceptions to s-assimilation. Recall that underlying alveolar sibilants fail to assimilate to the place of articulation of the following palatal sonorant across a prefix-stem boundary. The relevant data are repeated below:

5.65

/iz-ɲem-t /	→	[iz-ɲem-t]	'to take out'	*[iʒ-ɲem-t]
/iz-ʎu̯od͡z-iː-t /	→	[iz-ʎu̯od͡z-iː-t]	'to loosen'	*[iʒ-ʎu̯od͡z-iː-t]

Clearly, the way it stands, the constraint ranking in 5.63 and 5.64 cannot account for the failure of s-assimilation in this case. I propose that the reason for the failure of s-assimilation in s + sonorant clusters broken up by a prefix-stem boundary lies in their heterosyllabicity: in order to avoid an OCP[cor] violation in such clusters, spreading of V-place-[cor] has to apply across a syllable boundary. The markedness of such a configuration is captured by a family of constraints, CrispEdge, which forbid feature sharing between segments belonging to different prosodic constituents (Îto & Mester 1999). CrispEdge(σ), as defined below (see also Chapter 4), would penalize candidates where the syllable boundary intervenes between two root nodes dominating the same autosegment (refer to Îto & Mester 1999:30 for the formal definition). As we will see in the following sections, this constraint will also play a crucial role in blocking palatalization in s + obstruent clusters.

5.66 CrispEdge(σ) – linking across syllable edges is forbidden.

However, heterosyllabicity of sibilant-sonorant clusters in the forms given in 5.65 does not follow from the alignment constraints, since clusters of this type make for well-formed onsets. Following Kariņš (1996:63), I assume that Latvian has a constraint requiring that the left edge of the root should be aligned with the left edge of some syllable, thus prohibiting syllabification from applying across a prefix-stem boundary (McCarthy & Prince (1993) for general discussion, Kariņš (1996) for implementation for Latvian, Ito & Mester (2015:296) for implementation in Sino-Japanese).

5.67 Align-Left (Root, σ) – the left edge of the root must be aligned with the left edge of the syllable.

The effect of these constraints on the evaluation is illustrated in 5.68. Candidate (c), where spreading has applied across the syllable boundary, crucially violates CrispEdge(σ), while candidate (d), where a heteromorphemic cluster is parsed as tautosyllabic, is penalized by high-ranking Align-L (Root, σ). Candidate (b), where the violation of OCP[cor] is avoided by delinking V-place-[cor] is ruled out by

MaxLink, and as a result the faithful candidate in (a) is selected as optimal despite the violation incurred on OCP[cor].

5.68

/i z- ɲ em -t/ C-pl C-pl [cor] V-pl [cor]	Align-L (Root, σ)	Align(C-m-[opn]-N)	Align(C-lar-E)$_σ$	Align(C-pl-[cor]-E)$_σ$	CrispEdge(σ)	MaxLink [V-pl-cor]	NoCoda	Ident (C-place)	MaxLink [C-pl-cor]	OCP[cor]	Ident (V-place)
☞a. [i z- . ɲ em -t] C-pl C-pl [cor] V-pl [cor]							*			*	
b. [i z- . n em -t] C-pl [cor]						*!					
c. [i ʒ- . ɲ em -t] C-pl C-pl [cor] V-pl [cor]					*!		*				*
d. [i . ʒ- ɲ em -t] C-pl C-pl [cor] V-pl [cor]	*!										*

Recall that progressive palatal assimilation of the sibilant /s/ also consistently fails in cases where it follows a palatal obstruent in word-final position. The relevant data is repeated below, where the adjectivizing suffix /-iʃc-/ is followed by a nominative singular inflection /-s/:

5.69

/viːr-iʃc-s /	→	[viːr-iʃc-s]	*[viːr-iʃc-ʃ]	'manly'
/li̯et-iʃc-s/	→	[li̯et-iʃc-s]	*[li̯et-iʃc-ʃ]	'businesslike'

In fact, the failure of progressive palatal assimilation to apply in this case follows straightforwardly from our analysis – a word-final sibilant following an obstruent may only be incorporated in the coda constituent in violation of the Alignment constraints, which means that in example 5.69, /s/ should be parsed as a syllable appendix. In this case, spreading of V-place-[cor] from the palatal stop to the following sibilant would result in violation of CrispEdge(σ), because a syllable appendix, by definition, lies outside of the syllable boundary.

Another set of exceptions that remains to be accounted for is the failure of s-assimilation to be triggered by adjacent front non-low vowels, which are also specified for V-place-[cor] in our system. The data are repeated below:

5.70

/las-i-s/	→	[las-i-s]	*[laʃi-ʃ]	'salmon'
/pas-e/	→	[pas-e]	*[paʃ-e]	'passport'

I propose that this problem can be solved by extending the family of CrispEdge constraints to include a constraint making reference to the edges of sub-syllabic constituents; that is, onsets, nuclei and codas. Such a constraint would penalize feature sharing if it results in features being multiply linked to root nodes dominated by sub-syllabic constituents of different types:

5.71 CrispEdge(sub-syll) – linking across the edges of sub-syllabic constituents is forbidden.

The additional confirmation for the fact that the constraint in 5.71 is operative in Latvian comes from the behavior of forms where a palatal sonorant is affiliated with a syllable nucleus. Most scholars working on Latvian agree that in cases where the word-final consonant sequence contains a sonorant ([m, n, l, r]) that is both preceded and followed by some obstruent, the sonorant occupies a nuclear position (Auziņa 2005, Muižniece 2002, Laua 1997, Kariņš 1996, Bond 1994 among others; cf. Matthews 1958 for an alternative view). Thus, words like those in 5.72 are typically considered to be disyllabic (note that in all of the forms below [s] is a nominative singular inflection).

5.72

[pu.tn̩-s]	'bird'	[ka.kl̩-s]	'neck'
[ni.kn̩-s]	'angry'	[ka.tl̩-s]	'pot'
[mi.tr̩-s]	'moist'	[kra:.sn̩-s]	'oven'
[ri.tm̩-s]	'rythm'	[stin.gr̩-s]	'strong'

If CrispEdge(sub-syll) is indeed active in Latvian, we would expect that a palatal sonorant occurring in this position should not be able to trigger palatalization of the adjacent sibilant, as it would entail feature sharing across the nucleus-coda boundary. As we have already seen in Section 5.2.1, this prediction is borne out for Latvian:

5.73

/pe:kʃɲ-s/	→	[pe:k.ʃɲ-s]	*[pe:k.ʃɲ-ʃ]	'sudden'
/kra:ʃɲ-s/	→	[kra:.ʃɲ-s]	*[kra:.ʃɲ-ʃ]	'splendid'
/zaʎu̯okʃɲ-s/	→	[zaʎu̯ok.ʃɲ-s]	*[zaʎu̯ok.ʃɲ-ʃ]	'vigorous'

The evaluation incorporating CrispEdge(sub-syll) is illustrated in 5.74. Here the monosyllabic candidates (a) and (b) are ruled out due to multiple violatations incurred on the alignment constraints. Candidate (d), where assimilation has applied across the nucleu-coda boundary, is penalized by CrispEdge(sub-syll). As a result, the faithful candidate in (c) is correctly predicted to surface.

5.74

/pe:k ʃ ɲ -s / C-pl C-pl V-pl [cor] [cor]	Align(C-m-[opn]-N)	Align(C-lar-E)$_{\sigma}$	Align(C-pl-[cor]-E)$_{\sigma}$	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	NOCODA	IDENT (C-PLACE)	MAXLINK [C-PL-COR]	CRISPEDGE(SUB-SYLL)	OCP[COR]	IDENT (V-PLACE)
a. [pe:k ʃ ɲ -s] C-pl C-pl V-pl [cor] [cor]	*!	*	*							*	
b. [pe:k ʃ ɲ -ʃ] C-pl C-pl V-pl [cor] [cor]	*!	*	*								*
☞c. [pe:k . ʃ ɲ -s] C-pl C-pl V-pl [cor] [cor]						*				*	
d. [pe:k . ʃ ɲ -ʃ] C-pl C-pl V-pl [cor] [cor]						*			*!		*

To summarize, in this section we have seen that bi-directional assimilation of sibilants to the place of articulation of the adjacent palatal sonorants is triggered by the OCP[coronal] constraint which penalizes adjacent tokens of the feature [coronal]. Failure of assimilation to apply across the prefix-stem boundary was attributed to the Crisp-Edge(σ) constraint militating against feature linking across syllable boundaries. Further, we have seen that s-assimilation may only apply in cases where the trigger and the target are adjacent within the same sub-syllabic constituent, which was captured by the Crisp-Edge(sub-syll) constraint.

5.4.2 Palatalization blocking in heterosyllabic sC clusters

Let us now consider palatalization blocking in s + plosive clusters and sibilant assimilation. The relevant data are repeated below:

5.75

a. Blocking of velar affrication

/mask-a-iɲ-a/	→	[mas.k-iɲ-a]	*[mas.t͡s-iɲ-a]	'mask, dim.'	cf.	[mas.k-a]	'mask, Nom.sg.'
/risk-a-iɲ-s/	→	[ris.k-iɲ-ʃ]	*[ris.t͡s-iɲ-ʃ]	'risk, dim.'	cf.	[risk-s]	'risk, Nom. sg.'

b. Blocking of yod-palatalization

/ast-e-u/	→	[as.t-u]	*[as.ʃ-u]	'tail, Gen.pl.'	cf.	[as.t-e]	'tail, Nom. sg.'
/kast-e-u/	→	[kas.t-u]	*[kas.ʃ-u]	'box, Gen.pl.'	cf.	[kas.t-e]	'box, Nom. sg.'

c. Sibilant assimilation across the prefix-stem boundary

/iz-ʒu:-t/	→	[iʒ-.ʒu:-t]	*[iz-ʒu:-t]	'to dry'
/iz-ʃu:-t/	→	[iʃ-.ʃu:-t]	*[is-ʃu:-t]	'to embroider'

As shown in 5.75a, b), palatalization is blocked in cases where it would give rise to a sequence of sibilant consonants, while in 5.75c) assimilation applies across the prefix-stem boundary to repair the heterorganic sibilant sequence (recall that /s/ fails to assimilate to the following palatal sonorant in this context). In other words, in 5.75 we have three patterns that are specific to sibilants, and therefore it is tempting to analyze them as being triggered by the same constraint. On first glance, it appears that OCP[cor] is an obvious candidate: it militates against adjacent tokens of the [coronal] feature and is therefore violated by sequences of sibilants. However, recall that – by virtue of being ranked below CrispEdge(σ) – violations of OCP[coronal] are tolerated if the adjacent segments dominating different tokens of [coronal] are separated by a syllable boundary. This makes OCP[cor] an unlikely trigger of sibilant assimilation, which consistently applies across a prefix-stem boundary.

Velar affrication blocking in Latvian is exactly parallel to the pattern that is reported for German in Hall (2004). In German nonnative items, root-final alveolar plosive /t/ alternates with the affricate [t͡s] when followed by the tautosyllabic palatal glide [j]. The process is consistently blocked if the target plosive is preceded by /s/, in which case the string surfaces faithfully as [stj]. The relevant data are illustrated below (following Hall 2004):

5.76 Assibilation in German (after Hall 2004)

a. *Normal application of assibilation*

[naˈtsjo:n]	'nation'	cf.	[naˈti:f]	'native'
[negaˈtjo:n]	'negation'	cf.	[ˈne:gati:f]	'negative'

b. *Assibilation blocked by the preceding /s/*

[basˈtjo:n]	'bastion'	*[basˈtsjo:n]
[ˈhɔstjə]	'host'	*[ˈhɔstsjə]

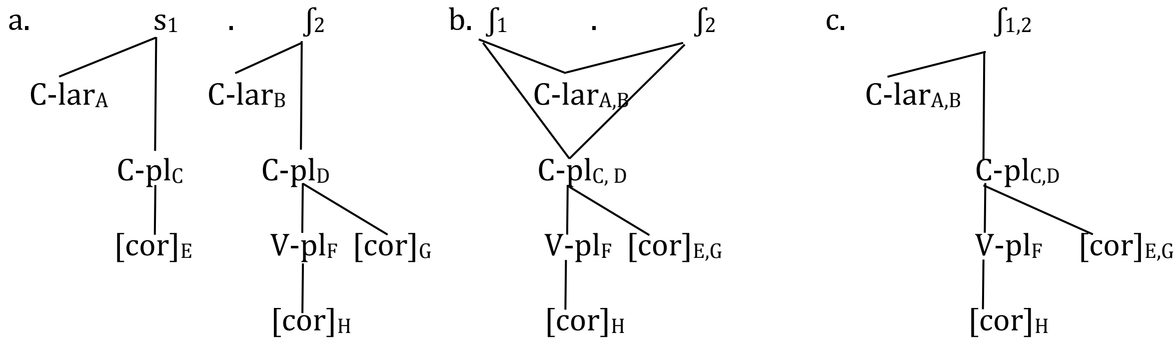
Hall (2004) captures assibilation blocking by means of the OCP constraint *SibSib, militating against sequences of adjacent sibilants. In order to translate this constraint into the PSM feature system of Latvian, where sibilants are defined as a class by C-place-[cor] and C-laryngeal, we have to appeal to the local conjunction of the OCP constraints defined in 5.77 (see Fukazawa 1999 on local conjunction of OCP constraints, Smolensky 1993 on local conjunction generally).

5.77 OCP(C-place-[coronal])$_{RN}$ – assign one violation mark if adjacent root nodes dominate C-place-[coronal].

OCP(C-lar)$_{RN}$ – assign one violation mark if adjacent root nodes dominate C-lar.

Importantly, a locally conjoined constraint, OCP(C-place-[coronal])$_{RN}$ & OCP(C-lar)$_{RN}$, penalizes adjacent sibilants regardless of whether they dominate the same or different tokens of C-place-[coronal] and C-lar. Thus, OCP(C-place-[coronal])$_{RN}$ & OCP(C-lar)$_{RN}$ (or *SibSib in Hall 2004) is violated by both the configuration in 5.78a), where each root node is associated with a separate token of C-place-[coronal] and C-lar, and the configuration in 5.78b), with the multiple linking of features. This means that this constraint cannot trigger sibilant assimilation across the prefix-stem boundary, which gives rise to the configuration in 5.78b).

5.78



In order for the OCP constraint to enforce subsegmental fusion, it must be relativized to the constituents below the root node. I suggest that the OCP constraint responsible for the patterns in 5.75 is one which militates against sequences where both C-place-[coronal] and C-lar are adjacent on their respective tiers.

5.79 OCP(C-place-[coronal]) – assign a violation mark if two tokens of C-place-[coronal] are adjacent.

OCP(C-lar) – assign a violation mark if two tokens of C-lar are adjacent.

The locally conjoined constraint OCP(C-place-[coronal]) & OCP(C-lar) is violated by 5.78a), and satisfied by both 5.78b), where fusion occurs at the level of class nodes, and 5.78c), where the fusion of root nodes applies. The fact that it is 5.78b), and not 5.78c), that surfaces as a result of sibilant assimilation suggests that the OCP must be crucially dominated by a constraint militating against segmental coalescence, Uniformity$_{RN}$.

5.80 Uniformity$_{RN}$ – no root node of the output has multiple correspondents in the input (Elzinga 1999:83).

Note that the fusion of C-place nodes that applies to satisfy OCP(C-place-[coronal]) & OCP(C-lar) also entails that the adjacent segments come to share all the constituents dominated by C-place nodes, which means that the leftmost sibilant of the /s.ʃ/ sequence becomes associated with the V-place node dominating the [coronal] feature. Thus, sibilant palatalization can now be seen as a by-product of fusion at the level of C-class nodes.

To account for the fact that underlying sibilant sequences are never repaired by desibilation, I postulate the Identity constraint in 5.81 (which is equivalent to Ident(+strident) proposed in Hall 2004).

5.81 ID(C-place-[coronal], C-lar) – if some root node x_i is specified as C-place-[cor], C-lar its output correspondent x_o is specified as C-place-[cor], C-lar.

The tableau capturing sibilant assimilation across the prefix-stem boundary is illustrated in 5.82 (irrelevant constraints omitted). The faithful candidate in (a) is penalized by the OCP constraint against adjacent C-place[cor] features. Candidate (c), where adjacency is repaired by segmental fusion, violates Uniformity_{RN}, while candidate (d), where adjacency is repaired by delinking C-place-[cor] from the underlying sibilant, violates the high-ranking Identity constraint. As a result, the candidate in (b), where the adjacency is repaired by subsegmental fusion, is correctly selected as optimal.

5.82

/i z$_1$ -ʃ$_2$ u:-t / C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	ID(C-PLACE-[COR], C-LAR)	UNIFORMITY$_{RN}$	OCP(C-PL-[COR]) & OCP(C-LAR)	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	OCP[COR]	IDENT (V-PLACE)
a. [i s$_1$. -ʃ$_2$ u:-t] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$			*!			*	
☞b. [i ʃ$_1$. -ʃ$_2$ u:-t] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$				*			*
c. [i . -ʃ$_{1,2}$ u:-t] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$		*!					*
e. [i s$_1$. -T$_2$ u:-t] C-pl$_A$ [cor]$_C$	*!				*		*

Since none of the constraints employed so far were directional, the ranking in 5.82 correctly predicts that sibilant assimilation should apply progressively as well. This is illustrated in 5.83.

5.83

/me ʒ$_1$ - s$_2$ / C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	ID(C-PLACE-[COR], C-LAR)	UNIFORMITY$_{RN}$	OCP(C-PL-[COR]) & OCP(C-LAR)	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	OCP[COR]	IDENT (V-PLACE)
a. [me ʃ$_1$. - s$_2$] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$			*!			*	
☞b. [me ʃ$_1$. - ʃ$_2$] C-pl$_{A,B}$ [cor]$_{C,E}$ V-pl$_D$ [cor]$_F$				*			*
c. [me ʃ$_{1,2}$] C-pl$_{A,B}$ [cor]$_{C,E}$ V-pl$_D$ [cor]$_F$		*!					*
d. [me ʃ$_1$. - T$_2$] C-pl$_A$ [cor]$_C$ V-pl$_D$ [cor]$_F$	*!						*

To sum up the discussion so far, I have argued that sibilant assimilation is triggered by the locally conjoined constraint OCP(C-place-[coronal]) & OCP(C-lar), which militates against sequences that contain adjacent tokens of C-place-[coronal] and C-laryngeal. I analyze sibilant assimilation as fusion at the level of C-class nodes, which captures the fact that the process may apply both progressively and regressively. Since OCP(C-place-[coronal]) & OCP(C-lar) outranks CrispEdge(σ), sibilant assimilation applies across syllable boundaries. Note that fusion applies to both heterorganic and homorganic sibilant clusters. In the latter case, however, it does not result in palatalization.

Notably, the constraint ranking in 5.82 also correctly predicts that palatalization is blocked in cases where its application would have produced a sibilant sequence. This is illustrated in 5.84 for yod-palatalization blocking. Here, candidates (a) and (b), both of which have onset clusters, are ruled out by alignment constraints. Candidate (g), which contains an appendix, is ruled out by σ-Contiguity. Therefore, the competition is between the candidates that contain a heterosyllabic obstruent cluster. Candidate (d), where yod-palatalization has applied, turning the underlying /t/ into a sibilant fricative, crucially violates OCP(C-pl-[cor])&OCP(C-lar). Candidate (e), where the violation is repaired by subsegmental fusion, is penalized by CrispEdge(σ). In turn, candidate (f), which avoids violation of the OCP by segmental fusion, is punished by $\text{Uniformity}_{\text{RN.}}$ As a result, candidate (c), where the OCP violation is avoided by blocking yod-palatalization, is correctly selected as optimal.

5.84

/a s1 t2 -i- u/ C-pl$_A$ (s1), C-pl$_B$ (i) [cor]$_C$; V-pl$_D$ [cor]$_E$ [cor]$_F$	Align(C-lar-E)$_\sigma$	Align(C-pl-[cor]-E)$_\sigma$	σ-Contiguity	Uniformity$_{RN}$	OCP(C-pl-[cor]) &OCP(C-lar)	CrispEdge(σ)	MaxLink [V-pl-cor]	NoCoda	Ident (V-place)
a. [a s1 . t2 -i̯- u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$		*!						*	
b. [a . s1 t2 - u] C-pl$_A$ [cor]$_C$	*!						*		
☞c. [a s1 . t2 - u] C-pl$_A$ [cor]$_C$							*	*	
d. [a s1 . ʃ2 - u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$					*!			*	*
e. [a ʃ1 . ʃ2 - u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$						*!		*	**
f. [a . ʃ1,2 - u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$				*!					**
g. [a. <ʃ1> . ʃ2 - u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$			*!			*			**

Candidate (f) deserves some further discussion. Note that the failure of this candidate crucially hinges on the existence of competitors that satisfy syllable well-formedness constraints, i.e. Alignment and σ-Contiguity. In case of intervocalic and post-sonorant /-st-/ clusters, the presence of such competitors is guaranteed because the sibilant can be prosodified as a coda of the preceding syllable without violating the SSP. This, however, is not the case in word-medial plosive-sibilant-plosive clusters, where alignment constraints force the sibilant to occupy the appendixal slot. It follows, therefore, that any fully faithful parse of underlying sequences of this type, i.e. the equivalent of candidate (c) in 5.84, would violate either Alignment and σ-Contiguity, thus losing to a coalescense candidate such as (f). Therefore, if the ranking in 5.84 correctly reflects the Latvian grammar, we predict that plosive-sibilant-plosive sequences should behave differently with respect to palatalization: it is expected that coalescense, and not blocking, should be the optimal repair strategy in this case. As we will see in the next section, this prediction is indeed borne out by the Latvian data.

To summarize, in this section I have argued that palatalization blocking and sibilant assimilation are both motivated by the locally conjoined OCP constraint OCP(C-pl-[cor])&OCP(C-lar), which militates against adjacent tokens of C-place-[coronal] in segments associated with C-lar. In case of underlying sibilant sequences, the constraint is satisfied by sub-segmental fusion at the level of C-place nodes, which in turn results in palatalization if one of the adjacent sibilants is specified for V-place-[coronal]. Otherwise, the violation of OCP(C-pl-[cor])&OCP(C-lar) is avoided by blocking the process that would have produced a sibilant sequence, had it applied.

5.4.3 Optional palatalization in sC clusters with appendixal /s/

Finally, let us examine the behavior of plosive-sibilant-plosive sequences in the context where yod-palatalization would normally be expected, i.e. root-finally before a prevocalic front theme vowel. As we have already seen, yod-palatalization is optional in sequences of this type (Muižniece 2002:70, Guļevska et al. 2002:60-61). If the plosive-sibilant-plsoive sequence appears in a yod-palatalizing context, two outcomes are possible: (i) yod-palatalization is blocked, and its trigger is deleted, mapping the underlying /-kst-i-u/ to [-kst-u], or (ii) yod-palatalization applies, mapping /kst-i-u/ to [-kʃ-u]. The relevant data are repeated below:

5.85 *Optional blocking of yod-palatalization*

		Gen.pl.			
/klukst-e-u/	→	[kluk.ʃ-u]	OR	[kluk.<s>.t-u]	'brood hen'
/t͡ʃipst-e-u/	→	[t͡ʃip.ʃ-u]	OR	[t͡ʃip.<s>.t-u]	'pipit'

The main goal of this section is to develop an OT-based analysis that would account for the attested variation in the application of yod-palatalization in sequences of this type. Optimality Theory was originally conceived as a deterministic model, in the sense that for every input there is a unique output, chosen by the given set of ordered constraints. This does not entail that a given input-output mapping in a given language (or indeed the set of all grammatical input-output mappings in that language) is consistent with only one totally ordered constraint set. This is illustrated in 5.86, where the hierarchy where Align(C-manner-[open]-N) dominates Align(C-lar-E)$_{\sigma}$ and the hierarchy where the order of these constraints is reversed converge on the same result. In cases where the relative order of constraints never affects the outcome of the evaluation, the relation between these constraints is said to be that of noncrucial nonranking (Prince & Smolensky 1993:55). It has also been hypothesized that in a model where partial ordering is not allowed, all nonranking should be noncrucial: that is, in cases where a dominance relation between some constraints cannot be established, all possible orders should produce the same result.

5.86

a. b.

	ALIGN(C-M-[OPN]-N)	ALIGN(C-LAR-E) σ	NOCODA				ALIGN(C-LAR-E) σ	ALIGN(C-M-[OPN]-N)	NOCODA
/putr-a/						/putr-a/			
☞a. [pu.tra]						☞a. [pu.tra]			
b. [put.ra]			*!			b. [put.ra]			*!

However, it has later been argued that there are cases where the nonranking between some constraints is crucial, in a sense that none of the *total* orders of these constraints is consistent with a given language. Unlike noncrucial nonranking, crucial nonranking always obtains between the constraints that are in competition. Crucial nonranking may be necessitated by either of the two scenarios: (i) the competing constraints cannot be mutually ranked because every total ranking fails to select the correct input-output map in all cases (Rice 2006); or (ii) every possible total ranking selects a distinct output for a given input, but all such input-output maps are well-formed in a language (Anttila 1997). As we will see in this section, variation in the application of palatalization blocking in plosive-sibilant-plosive clusters can be modeled as a case of crucial nonranking of the latter type.

The two possible outputs of yod-palatalization in 5.87 fare equally well on the high-ranking alignment constraints, as neither of them incurs an SSP violation. The constraints that distinguish between them are Uniformity_{RN} and σ-Contiguity, with each output candidate incurring a violation on one of them, as shown below.

5.87

/mai̯k s₁ t₂ -e -u / C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	Align(C-m-[opn]-N)	Align(C-pl-[cor]-E)$_\sigma$	σ-Contiguity	UNIFORMITY$_{RN}$	OCP(C-PL-[COR]) &OCP(C-LAR)	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	NOCODA	IDENT (V-PLACE)
a. [mai̯k . ʃ$_{1,2}$ -u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$				*				*	*
b. [mai̯k .< s₁ > . t₂ -u] C-pl$_A$ [cor]$_C$			*				*	*	

I propose that the fact that both outputs are predicted by the Latvian grammar is the result of crucial nonranking between Uniformity$_{RN}$ and σ-Contiguity (see Anttila 1997 on variation as crucial nonranking). In other words, I propose that in present-day Latvian two totally ordered grammars co-exist: the one where σ-Contiguity outranks Uniformity$_{RN}$, and the one where the order of these constraints is reversed. For the inputs like /mai̯kst-e-u/, the former grammar would select the candidate with fusion, [mai̯k.ʃ-u], as an optimal output, while the latter grammar would prefer the faithful candidate [mai̯k.<s>.t-u]. The respective scenarios are illustrated below in 5.88 and 5.89 (candidates violating sonority sequencing are not included).

In 5.88, the faithful candidate (a) is ruled out by the high-ranking Align(C-pl-[cor]-E)$_\sigma$ constraint because C-place-[cor] feature of the underlying front vowel is not aligned with the syllable edge. The remaining candidates, (b), (d) and (e), all of which contain a syllable appendix, are penalized by σ-Contiguity, and as a result the candidate with segmental fusion in (c) is selected as optimal.

5.88

/kluk s1 t2 -e -u/ C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	Align(C-m-[opn]-N)	Align(C-pl-[cor]-E)$_σ$	σ-Contiguity	Uniformity$_{RN}$	OCP(C-pl-[cor]) &OCP(C-lar)	CrispEdge(σ)	MaxLink [V-pl-cor]	NoCoda	Ident (V-place)
a. [kluk.< s1 >. t2 -j -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$		*!	*					*	
b. [kluk.< s1 >. t2 -u] C-pl$_A$ [cor]$_C$			*!				*	*	
☞c. [kluk . ʃ1,2 -u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$				*				*	*
d. [kluk.< s1 >. ʃ2 -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$			*!		*			*	*
e. [kluk.< ʃ1 >. ʃ2 -u] C-pl $_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$			*!			*		*	**

In 5.89, the situation is different. While candidate (a) is still ruled out by Align(C-pl-[cor]-E)$_σ$, candidate with segmental fusion in (c), the winner in the previous tableau, is banned by now high-ranked Uniformity$_{RN.}$ The remaining candidates with syllable appendices, (b), (d) and (e), tie on σ-Contiguity. Candidate (d), where yod-palatalization applied, but fusion did not, incurs a fatal violation of the conjoined OCP constraint. Candidate (e), where fusion C-place nodes occurs

across a syllable boundary, violates CrispEdge(σ), leaving candidate (b) to win the evaluation.

5.89

/kluk s_1 t_2 -e -u/ C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	Align(C-m-[opn]-N)	Align(C-pl-[cor]-E)$_σ$	UNIFORMITY$_{RN}$	σ-Contiguity	OCP(C-PL-[COR]) &OCP(C-LAR)	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	NOCODA	IDENT (V-PLACE)
a. [kluk.< s_1 >. t_2 -j -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$		*!		*				*	
☞b. [kluk.< s_1 >. t_2 -u] C-pl$_A$ [cor]$_C$				*			*	*	
c. [kluk . $ʃ_{1,2}$ -u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$			*!					*	*
d. [kluk.< s_1 >. $ʃ_2$ -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$				*	*!			*	*
e. [kluk.< $ʃ_1$ >. $ʃ_2$ -u] C-pl $_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$				*		*!		*	**

Note that either ranking predicts the correct output for cases where the underlying sibilant-plosive cluster is preceded by a sonorant consonant, as in /valst-i-u/ → [vals.tu], *[val.ʃu]. This is because in such a case the output candidate satisfying Alignment, Uniformity$_{RN}$ and σ-Contiguity is guaranteed to be present in the evaluation. This is illustrated in 5.90. Here, the faithful candidate in (a) violates Alignment constraint because it contains a segment specified for C-place-[coronal] that is not aligned with the syllable edge. Candidate (b). which has a syllable appendix, is penalized by σ-Contiguity. Candidate (d), with segmental fusion, is ruled out by Uniformity_{RN}. Candidate (e) fatally violates OCP. Candidate (f), which avoids the OCP violation by fusion across the syllable boundary is banned by CrispEdge(σ). As a result, the canditate in (c) is correctly predicted to surface. Note that the winning candidate violates neither Uniformity_{RN} nor σ-Contiguity, which means that their mutual ranking has no effect on the evaluation in this case.

5.90

/val s1 t2 - i -u/ C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$	Align(C-m-[opn]-N)	Align(C-pl-[cor]-E)$_\sigma$	UNIFORMITY$_{RN}$	σ-Contiguity	OCP(C-PL-[COR]) &OCP(C-LAR)	CRISPEDGE(σ)	MAXLINK [V-PL-COR]	NOCODA	IDENT (V-PLACE)
a. [val s1 . t2 - j -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$		*!						*	
b. [val . < s1 >. t2 -u] C-pl$_A$ [cor]$_C$				*!			*	*	
☞c. [val s1 . t2 -u] C-pl$_A$ [cor]$_C$							*	*	
d. [val . ʃ1,2 . -u] C-pl $_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$			*!					*	*
e. [val s1 . ʃ2 -u] C-pl$_A$ C-pl$_B$ [cor]$_C$ V-pl$_D$ [cor]$_E$ [cor]$_F$					*!			*	*
f. [val ʃ1 . ʃ2 -u] C-pl$_{A,B}$ V-pl$_D$ [cor]$_{C,E}$ [cor]$_F$						*!		*	*

To sum up, in this section I have shown that both yod-palatalization blocking, and segmental fusion in plosive-sibilant-plosive clusters applies to avoid the violation on OCP constraint OCP(C-pl-[cor])&OCP(C-lar). I argued that the variation between the two scenarios can be modeled as the crucial non-ranking between Uniformity_{RN} and σ-Contiguity constraints. The fact that /s/ occuring between two obstruents may not be affiliated with an onset or a coda plays a crucial role in the evaluation, as it guarantees the absence of the output candidate satisfying σ-Contiguity. In strings where such candidate is available, i.e. in case of post-vocalic and post-sonorant s + plosive clusters, palatalization blocking is correctly predicted to be the only scenario.

5.5 Summary

In this chapter I have proposed a representational and a constraint-based analysis of the patterns exhibited by sC clusters in palatalizing contexts. Three main patterns were considered: (i) palatal assimilation of /s/ in s + sonorant clusters; (ii) palatalization blocking in s + plosive clusters; and (iii) optional palatalization in s + plosive clusters. I have shown that the behavior of different sC clusters in palatalizing contexts is not idiosyncratic, but follows directly from feature specifications and syllabic profile of the cluster. I have argued that all three patterns are motivated by the avoidance of violations of the Obligatory Contour Principle, and shown that the repair strategy employed in each case crucially depends on whether or not the adjacent segments belong to the same sub-syllabic constituent. I have demonstrated that OCP violations in tautosyllabic s + sonorant clusters are repaired by feature spreading, while in heterosyllabic s + obstruent clusters, where multiple feature linking is precluded by the syllable boundary, OCP violations are avoided by blocking the process that would have created them. Optional palatalization in s + plosive clusters containing a syllable appendix was treated as a result of crucial non-ranking between two markedness constraints.

6 CONCLUSIONS

The goal of this work was to examine a group of phenomena in Modern Standard Latvian that fall under the broad definition of palatalization, and to provide a representational and a constraint-based analysis thereof.

The main theoretical contribution of this dissertation is twofold. First, it illustrates that the application of a substance-free model to a process that has been traditionally regarded as a classic example of a phonetically motivated rule results in a descriptively adequate, explanatory and formally simple analysis of assimilation patterns that posed considerable challenges for traditional phonetically-driven approaches, while at the same time revealing a complex inter-relation of different phenomena within a given phonological grammar. Second, this work contributes to the debate on the role of geometric subsegmental representations in constraint-based computational models (Uffmann 2005, 2007), by demonstrating that a principled account of locality, transparency and blocking effects in Latvian palatalization requires the reference to hierarchical autosegmental structures.

The main empirical contribution of this work is in its detailed and systematic examination of a number of complex data patterns in Modern Standard Latvian, a language that has been previously under-reported in generative phonological literature. A relatively narrow focus of this work - a group of processes subsumed under the cover term "palatalization" in a single language - made it possible to examine the phenomena under investigation in considerable detail and to uncover some regularities and dependencies that have been previously overlooked.

In Chapter 3, I examined four palatalization processes that apply in the context of front vocoids: yod-palatalization, velar affrication, velar palatalization and vowel raising. The main advantage of the account developed here is that it treats all of the mentioned Latvian processes as strictly assimilatory, and at the same time avoids purely stipulative mechanisms characteristic of many previous feature-geometric approaches to cross-category interactions. The constraint-based analysis proposed here treats assimilatory palatalization as motivated by the need to repair marked structures (e.g. complex onsets) and geometric configurations (e.g. bare class nodes). In contrast to the account of Latvian palatalization developed in Steinbergs (1977), the formal analysis presented in this work does not require unmotivated exceptions, representing the processes mentioned above as fairly regular and productive word-level and stem-level phenomena.

In Chapter 4, I provided an analysis of palatalization patterns triggered by the diminutive suffixes [-uk-] and [-el-], which were previously regarded as phonologically unmotivated (Endzelīns 1951, Rūķe-Draviņa 1959, Steinbergs 1977). Supplementing the existing descriptions with my own fieldwork data, I have demonstrated that in most cases palatal alternations triggered by these suffixes are attributable to phonological yod-palatalization, which becomes apparent if the morphological nature of the base of derivation is taken into account (which has not been done for Latvian previously). In the remaining cases, I argued that diminutive palatalization is due to the linking of the floating geometric structures associated with these suffixes to the root-final consonant if the latter represents a valid anchor for the given structure. In contrast to previous approaches treating diminutive palatalization as extragrammatical (Kochetov & Alderete 2010), I showed that linking is phonologically motivated by a structural well-formedness constraint Parse(F).

In Chapter 5, I focused on patterns exhibited by different types of sC clusters in palatalizing contexts, a topic that has received virtually no attention in Latvian phonological literature. Examination of data patterns has uncovered that rather than being idiosyncratic, as previously thought, the behavior of sC clusters in palatalizing environments is determined by the syllabic profile of the cluster. I have shown that in sC clusters that are represented as branching onsets, both elements undergo palatalization, in sC clusters that constitute heterosyllabic coda-onset sequences palatalization is blocked, while in sC clusters containing appendixal /s/ application of palatalization is optional. Further, I have argued that all three patterns are motivated by the avoidance of violations of the Obligatory Contour Principle, and shown that the repair strategy employed in each case crucially depends on whether or not the adjacent segments belong to the same sub-syllabic constituent.

In an attempt to place palatalization into a wider context and demonstrate its interaction with other aspects of Latvian phonology and morphology, this dissertation also touched upon certain issues pertaining to prosodic and morphological organization of Modern Standard Latvian, many of which have received very little attention in the theoretical literature to date. While this work has provided a starting point for the discussion of these problems, a more detailed investigation thereof has to be left for future research. One such issue still pending a thorough empirical and theoretical investigation is onset and rhyme phonotactics of Modern Standard Latvian. Although some of the general restrictions on the linear sequencing of elements in Latvian onsets and rhymes have been proposed in Chapter 5, it still remains to be seen whether the representational model developed here is sufficient to account for e.g. non-sonority-based combinatorial restrictions that obtain in onset and coda clusters, and how and whether a theory like PSM, which crucially relies on underspecification, can serve as a basis for a fully articulated syllabification model in a given language. Another issue that could only cursorily be addressed here is the morphological structure of the Latvian verb and the various palatalization processes that take place in verbal inflection and derivation. Although some aspects of it are discussed in some detail in Steinbergs (1977), the comprehensive formal account of Latvian verbal morphophonology is still lacking. Last but not least, in this work I did not address the complex issue of dialectal variation with respect to assimilatory and diminutive palatalization, which, no doubt, will prove a fruitful field for future investigation that will shed further light on phonological, morphological and phonetic aspects of the process.

Appendix 1

Translation	Base noun	-uk-	Rating	-el-	Rating
father	tētis	tētuks	5	tētelis	3
bull	vērsis	vēršuks	5	vērselis/vēršelis	3
light bulb	spuldze	spuldžuks	5	spuldzele	2
aunt	tante	tantuks	5	tantele	4
buck	āzis	āžuks	5	āželis	5
mother	māte	mātuks	5	mātele	2
picture	bilde	bilžuks	5	bildele/bilžele	3
frog	varde	varžuks	5	vardele/varžeļi	4
sister	māsa	māšuks	5	māšele	5
chick	cālis	cāļuks	5	cālelis	2
duck	pīle	pīļuks	5	pīlele	1
son	dēls	dēluks	5	dēlelis	1
brother	brālis	brāļuks	5	brālelis	2
fattie	resnis	rešņuks	5	resnelis/rešnelis	5/2
bear	lācis	lāčuks	5	lāčelis	4
tomcat	runcis	runčuks	5	runčelis	5
cat	minka	minčuks	5	miņķelis	3
owl	pūce	pūčuks	5	pūčele	3
daughter	meita	meituks	5	meitele	3
bread	maize	maižuks	5	maižele	2
pig	cūka	čūčuks	5	cūķele/cūcele/cūčele	4/2/2
dog	suns	suņuks	5	šunelis	5
mongrel	krancis	kravčuks	5	kravčelis	5
hedgehog	ezis	ežuks	5	eželis	4
old man	vecis	večuks	5	vecelis	5
gnat	knislis	knišļuks	5	knislelis	2
titmouse	zīle	zīļuks	5	zīlele	2
manual laborer	rokpelnis	rokpeļņuks	4	rokpelnelis	2
barrel	muca	mučuks	4	mučele	5
closet	skapis	skapjuks	4	skapelis	2
witch	ragana	ragaņuks	4	raganele	4
helper	palīdze	palīdžuks	4	palīdzele	3
prince	princis	prinčuks	4	prinčelis	3
cup	tase	tašuks	4	tašele	2
wolf	vilks	vilčuks	4	vilķelis	2
pike	līdaka	līdačuks	4	līdaķele/līdacele	2
frost	salna	salnuks	4	salnele	2
elephant	zilonis	ziloņuks	4	zilonelis	3
egg	ola	oluks	4	olele	2
bitch	kuce	kučuks	4	kučele	2
cat	kaķis	kaķuks	4	kaķelis	3
panda	panda	panduks	4	pandele	3
palm (of hand)	delna	delnuks	4	delnele	2

thistle	dadzis	dadžuks	4	dadželis	2
grove	birzs	biržuks	4	birzele/biržele	3/2
rooster	gailis	gaiļuks	4	gailelis	2
flower	zieds	zieduks	4	ziedelis	3
reptile	rupucis	rupučuks	4	rupučelis	3
beast	lops	lopuks	4	lopelis	2
cod	menca	menčuks	4	menčele	2
castle	pils	piļuks	4	pilele	2
horse	zirgs	zirdžuks	4	zirģelis	5
shrew	cirslis	ciršļuks	4	cirslelis	2
hare	zaķis	zaķuks	4	zaķelis	4
bee	bite	bišuks	4	bitele	2
plum	plūme	plūmjuks	3	plūmele	3
ostrich	strauss	straušuks	3	strauselis/štrauselis	2/2
son-in-law	znots	znotuks	3	znotelis	4
garden	dārzs	dāržuks	3	dārželis/dārzelis	4/4
rain	lietus	lietuks	3	lietelis	2
bug	vabole	vaboļuks	3	vabolele	2
elk	alnis	aļņuks	2	alnelis	2
ear	auss	aušuks	2	aušele/ausele	2/2
asp	apse	apšuks	2	apšele	3
ancestor	sencis	seņčuks	2	senčelis/sencelis	2/2
seal	ronis	roņuks	2	ronelis	4
sheep	aita	aituks	2	aitele	4
lion	lauva	lauvuks	2	lauvele	3
eagle-owl	ūpis	ūpjuks	2	ūpelis	2
bully	kauslis	kaušļuks	2	kauslelis	2
thrush	strazds	strazduks	2	strazdelis	3
foot	pēda	pēduks	2	pēdele	2
deer	briedis	briežuks	2	briedelis/briežēlis	2/2
thistle	usne	ušņuks	2	ušnele/usnele	2/2
rabbit	trusis	trušuks	2	trušelis	3
eel	zutis	zušuks	2	zutelis	3
chatterbox	pļāpa	pļāpuks	2	pļāpele	3
tick	ērce	ērčuks	2	ērčele	2
doe	stirna	stirnuks	2	stirnele	3
bridge	tilts	tiltuks	2	tiltelis	3
goose	zoss	zosuks	2	zosele	2
eye	acs	ačuks	2	ačele	5
salmon	lasis	lašuks	2	lašelis	2
client (f.)	kliente	klientuks	2	klientele	4
plaice	plekste	plekštuks	2	plekstele	4
lady	kundze	kundžuks	2	kundzele	3
snail	gliemezis	gliemežuks	2	gliemezelis	2
fish	zivs	zivjuks	2	zivele/zivtele	3/5

Appendix 2

I. UK-diminutives

1. Zviedru ***tētuki*** bērnu kopšanas atvaļinājumā.
   Swedish father-Nom.dim child-Gen. Minding-Gen. leave-Loc.
   'Swedish fathers on parental leave'

2. ***Vēršuks*** savā vērtībā [....] izrādījās [...]viens liess pavasara jērs.
   bull-Nom.dim its value-Loc. turned-out one lean spring lamb-Nom.
   'A bull turned out to be worth no more than one lean spring lamb.'

3. Tualetē atstāju parasto ***spuldžuku***
   Toilet-Loc. left regular light-bulb-Acc.dim.
   'I left a regular light bulb in the toilet.'

4. Meklēšanā izsludinātu [...] ***tantuku*** atrod… tetovēšanas salonā!
   Searching-Loc. announced aunt-Acc.dim. found… tatoo parlour-Loc.
   'The woman considered missing was discovered in a tatoo parlour.'

5. Brienot atpakaļ uz pļavas [...] tika manīts ***āžuks***
   Walking back on field-Gen. was noticed buck.Nom.dim.
   'Walking back, we noticed a buck on the field'

6. Lai ***mātuks*** auklē mazbērnus…
   Let mother-Nom.dim. babysit grandchildren-Acc.
   'Let the mother babysit the grandchildren'

7. ***Bilžuks*** ir tikai tā brīža emociju [...] stopkadrs.
   Picture-Nom.dim. is just that moment-Gen. emotions-Acc. stop-frame-Nom.
   'A picture is just a stop-frame of the moment´s emotions.'

8. Karstie ***varžuki*** tikai franču ēstuvēs manīti
   Hot frog-Nom.dim. just French eateries-Loc. noticed.
   'Hot frogs are only to be found in French eateries.'

9. ***Māšuks*** atbrauca uz Latviju!
   Sister-Nom.dim. arrived to Latvia-Acc.
   'The sister arrived to Latvia.'

10. Ja kaut viens ***cāļuks*** izšķilsies būs laime pilnīga.
    If only one chick-Nom.dim. hatch-out will-be happiness-Nom. full.
    'If only one chick will hatch, we will be completely happy.'

11. Reiz tie mazie ***pīļuki*** par skaistām izaugs pīlēm.
    Once these small ducks-Nom.dim. into beautiful will-grow ducks-Dat.
    'One day these small ducklings will grow into beautiful ducks.'

12. Mans ***dēluks*** arī gulēt pa dienu pārsvarā iet ar raudāšanu
My son-Nom.dim. also sleep on day-Acc. mostly go with crying-Acc.
'Also my son mostly goes for a nap crying during the day.'

13. ***Brāļuks*** jau nav nekāds ***brāļuks***.
Brother-Nom.dim. already not any brother-Nom.dim.
'My little brother is not a little brother anymore.'

14. Ja domā, ka mazais resns, tad nemaz nav nekāds ***rešņuks.***
If think that small-one-Nom fat then not-at-all not any fattie-Nom.dim.
'If you think that the small one is fat, then he is not at all a fattie'.

15. Bērnībā daudzi jūsmojuši par amizantajiem ***lāčukiem*** cirkā.
Childhood-Loc many admired about amusing bears-Dat.dim. circus-Loc.
'As children, many admired the amusing bears in the circus.'

16. ***Runčuks*** [….] izpelnījies šādu raksturojumu – kaķis ar stabilu psihi.
Tomcat-Nom.dim. earned such characterization-Acc cat-Nom withstable psyche-Acc.
'The tomcat was characterized as a cat with a stable psyche.'

17. Mazais ***minčuks*** […] meklē labas un mīļas mājas.
Small cat-Nom.dim. searches good and cozy home-Acc.
'A small cat is looking for a good and cozy home.'

18. [Viņš] piekrita uzņemt ***pūčuku*** savā rehabilitācijas stacijā.
He-Nom agreed accept owl-Acc.dim. own rehabilitation station-Loc.
'[He] agreed to take the owl into his rehabilitation station.'

19. Mans ***meituks*** jau beidz vidusskolu.
My daughter-Nom.dim. already finishes secondary-school-Acc.
'My daughter is already finishing secondary school.'

20. Neēdīs viņš gurķi, ja viņš grib ***maižuku***
Will-not-eat he-Nom cucumber-Acc. if he-Nom wants bread-Nom.dim.
'He will not eat a cucumber, if what he wants is bread.'

21. Ir gadījies, ka tas ***čūčuks*** pēcāk atmostas no šoka
Is happened that such pig-Nom.dim. later wakes-up from shock-Gen.
'It happened that such a pig would later wake up from shock.'

22. Tiklīdz ***suņuks*** atkopās, sāka uzticēties
As-soon-as dog-Nom.dim. recovered began to-trust
'As soon as the dog recovered, it began to trust us.'

23. Pa Slokas ielu […] aizskrēja paliela auguma ***krančuks.***
Along Slokas street-Acc. ran large height mongrel-Nom.dim.
'A large mongrel ran along Slokas street.'

24. Tik daudz ***ežuku*** un visi adataini.
So many hedgehogs-Gen.dim. and all spiny
'There are so many hedgehogs, and all are spiny'

25. Bārā sēž jau krietni iedzēris ***večuks.***
Pub-Loc. sits already very drunk old-man-Nom.dim.
'A very drunk old man is sitting in a pub.'

26. Ļoti labprāt ***zīļuki*** ēd auzu pārslas
Very willingly tomtits-Nom.dim. eat oat flakes-Acc.
'Tomtits very willingly eat oat flakes.'

27. Nekāda skaistule, es pat teiktu riktīgs ***ragaņuks.***
Not beauty-Nom I even say-cond. real witch-Nom.dim.
'Not a beauty, I would even say a real witch'

28. Kā tanī filmā par visudaiļā UK ***prinčuka*** un daiļaviņas
As in-that movie-Loc about handsome UK prince-Gen.dim and beauty-Gen

no parastās tautas attiecībām…
from simple folk-Gen. relationship-Dat.

'As in that movie about the relationship between a handsome UK prince and a beauty from the common folk'

29. Jau 12 gadu vecumā esmu reāls ***kučuks***
Already 12 years age-Loc. am real bitch-Nom.dim.
'Already at the age of twelve I am a real bitch.'

30. Baltais ***kaķuks*** slēpjas zālē.
White cat-Nom.dim. hides grass-Loc.
'A white cat is hiding in the grass.'

31. Šādi ***dadžuki*** vēl ir lipīgi
These thistles-Nom.dim. also are sticky.
'These thistles are also sticky.'

32. Pārdodu […] vistiņas, […] piedāvāju arī ***gaiļukus***.
Sell chickens-Acc offer also roosters-Acc.dim.
'I sell chickens and roosters.'

33. Tie divi ***zieduki*** tika norauti.
Those two flowers-Nom.dim. got picked.
'Those two flowers got picked.'

34. Viens varen piemīlīgs rāpulis – ***Bruņurupučuks.***
One mighty cute reptile-Nom. Turtle-Nom.dim.
'One mighty cute reptile named Turtle'

35. Esi ***lopuks,*** zvēra mājas ir mežs.
Are beast-Nom.dim. animal-Gen. home-Nom is woods-Nom.
'You are a beast, and an animal´s home is in the woods.'

36. Normāla izmēra butes, plus ***menčuks*** bonusā
Normal size plaices-Nom. plus cod-Nom.dim. bonus-Loc.
'Normal-sized plaices, plus a cod as a bonus'

37. Es jau kravāju somas lai pārvāktos uz to ***piļuku.***
I already pack bags-Acc. to move to that castle-Acc.dim.
'I´m already packing my bags to move to that castle.'

38. Viņš man ir minka, ***zaķuks***, minčuks.
He for-me is tomcat-Nom., hare-Nom.dim. tomcat-Nom. dim.
'He is my tomcat, my bunny.'

39. Krokusus [...] bildējot [...] kadrā iekļuvušas 4 ***bišuki***
Crocuses-Acc. photographing frame-Loc. got-into 4 bees-Nom.dim.
'While taking pictures of crocuses, four bees got into the frame.'

40. Pirmoreiz šogad izbaudīju ***lietuku***.
First-time this-year enjoyed rain-Acc.dim.
'I enjoyed rain for the first time this year.'

41. Mazs, dzeltens ***vaboļuks.***
Small yellow beetle-Nom.dim.
'A small yellow beetle'

42. Manam mazajam huligānam ***aušuki*** ir jātīra diezgan bieži
My small hooligan-Dat. ears-Nom.dim. is clean-deb. quite often
'My small hooligan´s ears need to be cleaned quite often.'

43. Roņuks rādīja dažādus trikus.
Seal-Nom.dim. showed different tricks-Acc.
'A seal performed various tricks.'

44. Kazlēni un ***aituki*** vienā aplokā.
Goats-Nom. and sheep-Nom.dim. one pasture-Loc.
'Goats and sheep on one pasture'

45. Mazi ***lauvuki*** un ***lauvuku*** mamma.
Small lions-Nom.dim. and lions-Gen.dim. mommy-Nom.
'Small lions and their mommy'

46. Eglīte, [...] vecītis, ***briežuki*** un citas jaukas lietas
Christmas-tree-Nom. Santa-Nom. deer-Nom.dim. and other nice things-Nom.
'A Christmas tree, Santa, reindeer, and other nice things'

47. Mans ***trušuks*** baigi daudz šķauda.

My rabbit-Nom.dim. very much sneezes.
'My rabbit sneezes very much.'

48. ***Zušuki*** sāk kosties
Eels-Nom.dim. start bite
'Eels start to bite.'

49. Diez vai [viņam] var uzticēties? Nenopietns ***pļāpuks.***
Hardly [he-Dat.] can trust Light-minded chatterbox-Nom.dim.
'He can hardly be trusted. A light-minded chatterbox.

50. Tagad gaida ***ērčuki*** lai siltākā vietā iekostos.
Now await ticks-Nom.dim to warmest place-Loc. bite-cond.
'Ticks are now waiting to bite in the warmest place.'

51. ***Stirnuks*** [...] bija pienācis par tuvu.
Doe-Nom.dim. was come too close.
'The doe has come too close.'

52. Eksperti jau stastīja par vitāli svarīgu ***tiltuku.***
Experts-Nom. already told about vitally important bridge-Acc.dim.
'Experts have already told about a vitally important bridge.'

53. Diviem atvērās ***ačuki*** 10. dienā
Two-Dat. opened eyes-Nom.dim. 10th day-Loc.
'Two opened their eyes on the tenth day.'

54. ***Lašuki*** kolosāli šodien lēkāja
Salmons-Nom.dim. awesomely today jumped
'It was awesome how the salmons jumped today.'

55. ***Klientukam*** patīk, lai pabeigtu savus darījumus
Client-Dat.dim. like to finish their business-Acc.
'Clients like to finish their business.'

56. Kad atteicos, tad [...] ***kundžuks*** apvainojās
When refused then lady-Nom.dim. got-offended.
'When I refused, the lady got offended.'

57. Diez vai tai ezerā tie [...] ***zivjuki*** izdzīvos.
Hardly this lake-Loc these fish-Nom.dim. will-survive.
'This fish will hardly survive in this lake.'

II. EL-Diminutives

1. Atkal ***tētelis*** aicina uz vardarbīgu rīcību.
Again father-Nom.dim. invites for violent action-Acc.
'The father is again calling for violent action.'

2. Tēvs […] uzsēdinājis dēlu ***vēršelim*** mugurā.
Father sat son-Acc bull-Dat.dim. back-Loc.
'The father has sat his son on the bull´s back.'

3. [Tur] var likt led ***spuldzeles.***
[There] can put LED light-bulbs-Acc.dim.
'LED light bulbs can be put there.'

4. Kāpj ***tantele*** pārpildītā autobusā.
Climbs aunt-Nom.dim. over-full bus-Loc.
'A woman is climbing into a full bus.

5. Mazs ***āželis*** izskrējis bļaudams aiz vārtiem.
Small buck-Nom.dim. ran-out screaming behind gate-Dat.
'A small buck ran screaming out of the gate.'

6. Man ***mātele*** vēl bija.
Me mother-Nom.dim. also was.
'I also had a mother.'

7. ***Brālelis*** ar bija, jaunāks par mani.
Brother-Nom.dim. also was younger than me-Acc.
'I also had a brother, younger than me.'

8. Kaut kāda romantiska ***bilžele***
Some romantic picture-Nom.dim.
'Some romantic picture'

Man patīk tava ***bildele***
I-Dat. like your picture-Nom.-dim.
'I like your picture.'

9. Maza ***vardele*** zālē bija paslēpusies
Small frog-Nom.-dim. grass-Loc. was hidden.
'A small frog has hidden in the grass.'

10. ***Māšele*** Melānija ir varens palīgs studijās
Sister-dim. Melany is mighty help-Nom. studies-Loc.
'Sister Melany is a big help in my studies.'

11. ***Dēlelis*** arī ar ātrlaivām naski braukātu.
Son-Nom-dim. also with speedboats fast would-go.
'The son would also go fast in speedboats.'

12. ***Resneļi*** ēd vairāk, kā organisms spēj patērēt.
Fatties-Nom.dim. eat more than body can use.
'Fatties eat more than a body can use.'

13. Ko tas plīša ***lāčelis*** te bubina zem deguna?

What that plush bear-Nom.dim. here mumbles under nose-Gen.
'What is this teddy bear mumbling under his nose?'

14. Pazudis ruds, 5 mēnešus vecs ***runčelis.***
Lost red 5 months old tomcat-Nom-dim.
'A five months-old red cat is missing'

15. Jums būtu jāiznāk aptuveni šādai ***pūčelei***
You be-cond.get-deb. approximately such owl-Dat-dim.
'You should get approximately such an owl.'

16. Skaista ***meitele***- lieliskas kājiņas.
Pretty girl-Nom.dim. great legs-Nom.dim.
'A pretty girl, great legs'

17. Sagatavotās ***maiželes,*** šauju krāsnī.
Prepared breads-Acc.dim. put oven-Loc.
'I put the prepared breads into the oven.'

18. Vecis tikai norādīja ***cūķelei*** cik viņa ir mēslīga.
Old-man-Nom. only indicated pig-Dat.dim. how she is messy.
'The old man has just indicated to that pig how messy she was.'

19. Atraktīvs ***šunelis*** meklē sportiskus saimniekus.
Attractive dog-Nom.dim. searches sporty owners-Acc.
'An attractive dog is searching for sporty owners.'

20. Mums [...] mazais ***krančelis*** šķiet visjaukākais suņu-bērns.
We-Dat. small mongrel-Nom.dim. seems nicest dog-baby-Nom.
'The little mongrel seems like the nicest dog-baby to us'

21. Kur var nopirkt pašgatavotas koka ***mučeles***?
Where can buy hand-made wooden barrels-Acc.dim.
'Where can I buy hand-made wooden barrels?'

22. Janopērk ***skapelis*** ar atvilknēm
Buy-deb. closet-Nom.dim. with drawers-Dat.
'I have to buy a closet with drawers.'

23. Mazā ***raganele*** uz slotas devās iekarot Poliju!
Small witch-Nom.dim. on broom-Gen. went conquer Poland
'A small witch on a broom went to conquer Poland.'

24. Viņš varētu būt Anglijas mazais ***prinčelis***.
He can-cond. be England´s little prince-Nom.dim.
'He could be England´s little prince.'

25. Viena ***līdaķele*** un daži asari bija stipri par maz.
One pike-Nom.dim. and several perches-Nom. was strongly too little.

'One pike and several perches was really too little.'

Vai tad tā ***līdacele*** nebij jālaiž vaļā?
If then that pike-Nom.dim. not-was let-deb. out
'Didn´t you have to release that pike?'

26. ***Kučele*** dabū svaram atbilstošu daudzumu sausās [barības]
Bitch-Nom.dim. gets weight-Dat. corresponding amount-Acc. dry [food-Gen.]
'The bitch is getting the amount of dry food corresponding to her weight.'

27. ***Kaķelis*** labi ēd
Cat-Nom.dim. well eats
'The cat eats well.'

28. Ko tad tāds mazs ***gailelis*** var pārnest
What then such small rooster-Nom.dim. can carry
'What can such a small rooster carry?'

29. Nākošajā gadā uzziedēja viens [...] ***ziedelis***.
Next year-Loc. blossomed one flower-Nom.dim.
'The next year, one flower blossomed.'

30. Ēzelēns bija mazs, ļauns un smirdīgs ***lopelis.***
Donkey-Nom. was small evil and stinky beast-Nom.dim.
'The donkey was a small, evil and stinky beast.'

31. Šitāda slima ***menčele*** šodien man piekodās!
Such sick cod-Nom.dim. today I.Dat. bit
'This sick cod bit today.'

32. Tēvam piederēja neliels sirms ***zirģelis.***
Father-Dat. belonged small gray horse-Nom.dim.
'The father owned a small gray horse.'

33. Varbūt šogad apciemo arī tevi kāds ***zaķelis*** ar oliņām!
Maybe this-year visits also you.Acc. some hare-Nom.dim. with eggs-Dat.
'Maybe this year some hare with eggs visits you as well.'

34. Tāpat kā ***bitele*** - pa dārzu
Just as bee-Nom.dim. around garden-Acc.
'Like a bee in the garden'

35. Tās ***plūmeles*** ir ļoti skaistā krāsā
These plums-Nom.dim. are very pretty color-Loc.
'These plums have a very pretty color.'

36. ***Štrauselis,*** kurš iebāzis galvu smiltīs
Ostrich-Nom.dim. that stuck head-Acc. sand-Loc.
'An ostrich that stuck its head in the sand'

37. Bijušais ***znotelis*** paskraida pa futbola laukumu.
Former son-in-law-Nom.dim. ran around football field-Acc.
'The former son-in-law ran around a football field'

38. Man ***dārželī*** vakar pirmais ananāss nogatavojās
I-Dat. garden-Loc.dim. yesterday first pineapple-Nom. ripened.
'The first pineapple ripened in my garden yesterday.'

39. Svētdien bija ***lietelis***
Sunday was rain-Nom.dim.
'It was raining on Sunday.'

40. Lai sasildītu nosalušās ***aušeles***
To warm-cond. freezing ears-Acc.dim.
'In order to warm up freezing ears'

41. ***Aiteles*** mierīgas
Sheep-Nom.dim. calm
'The sheep are calm.'

42. ***Strazdelis*** laikam martam gatavojas
Thrush-Nom.dim. probably March-Dat. prepares
'The thrush is probably getting ready for March.'

43. Viena ***pēdele*** […] bez defekta
One foot-Nom.dim. without defect
'One foot is without defect.'

44. Vienlaicīgi iznāca gan šis ***briedelis***, gan aļņu bullis
Simultaneously came-out both this deer-Nom.dim. and elk-Gen. bull-Nom.
'Both this deer and an elk came out simultaneously.'

45. Kādam ***trušelim*** ādu vilks nost.
Some rabbit-Dat.dim. skin-Acc. will-take off
'They will take the skin off some rabbit.'

46. Pievelkot tuvāk krastam parādījās ***zutelis***
Pulling closer shore-Dat. appeared eel-Nom.dim.
'When we pulled closer to the shore, an eel appeared.'

47. Vecā ***pļāpele.***
Old chatterbox-Nom.dim.
'An old chatterbox'

48. Viens neliels ***tiltelis*** par pusmiljardu latu
One small bridge-Nom.dim. for half-billion lats.
'One small bridge for half a billion lats'

49. Dzīvās ***ačeles*** un bedrītes vaigos
Lively eyes-Nom.dim. and dimples-Nom. cheeks-Loc.
'Lively eyes and dimples on the cheeks'

50. Viens vīrs [...] ***lašeli*** izcēla
One man-Nom. salmon-Acc.dim. took-out
'One man took out a salmon.'

51. Ko tā ***kundzele*** vispār saprot
What that lady-Nom.dim. generally understands
'What does that lady understand anyway?'

52. ***Zivele*** saakusi taa savaadi uzvesties.
Fish-Nom.dim. began such strangely behave
'The fish began to behave strangely.'

Anšovs ir maza [...] ***zivtele***
Anchovy-Nom. is small fish-Nom.dim.
'Anchovy is a small fish.'

References

Akinlabi, A. 2011. Featural affixes. In Colin Ewen, Elizabeth Hume, Marc van Oostendorp, and Keren Rice (eds.) *Blackwell Companion to Phonology*, Oxford: Wiley Blackwell. pp. 1945–1971.

Anttila, Arto. 1997. Deriving variation from grammar. In Hinskens, Frans Roeland van Hout, and Leo Wetzels (eds.), *Variation, Change and Phonological Theory*, John Benjamins, Amsterdam/Philadelphia, pp. 35-68.

Archangeli, Diana and Douglas Pulleyblank. 1994. *Grounded phonology*. MIT Press, Cambridge.

Archangeli, Diana. 2011. Feature specification and underspecification. In Marc van Oostendorp, Colin Ewen, Elizabeth Hume & Keren Rice (eds). *The Blackwell companion to phonology*, vol. 4, 2019-2048. Malden, MA: Wiley-Blackwell.

Auziņa, Ilze, Ieva Breņķe, Juris Grigorjevs, Inese Indričāne, Baiba Ivulāne, Andra Kalnača, Linda Lauze, Ilze Lokmane, Dace Markus, Daina Nītiņa, Gunta Smiltniece, Baiba Valkovska and Anna Vulāne. 2015. *Latviešu valodas gramatika [The grammar of the Latvian language]*. Riga: Latviešu valodas institūts.

Auziņa, Ilze. 2005. *Latviešu valodas izrunas datormodelēšana*. [Computer modeling of Latvian pronunciation]. Doctoral dissertation. Riga.

Barlow, Jessica. 2001. A preliminary typology of initial clusters in acquisition. *Clinical linguistics and phonetics 15*, pp. 9-13.

Bateman, Nicoleta. (to appear). Palatalization as overlap of articulatory gestures: crosslinguistic evidence. In *Proceedings of the 34th Berkeley Linguistics Society*.

Bateman, Nicoleta. 2007. *A crosslinguistic investigation of palatalization*. Doctoral dissertation, University of California, San Diego.

Bermúdez-Otero, Ricardo. 2007. Morphological structure and phonological domains in Spanish denominal derivation. In Fernando Martínez-Gil & Sonia Colina (eds), *Optimality-theoretic studies in Spanish phonology*, 278-311. Amsterdam: John Benjamins.

Bermúdez-Otero, Ricardo. 2011. Cyclicity. In Marc van Oostendorp, Colin Ewen, Elizabeth Hume & Keren Rice (eds). *The Blackwell companion to phonology*, vol. 4, 2019-2048. Malden, MA: Wiley-Blackwell.

Bermúdez-Otero, Ricardo. 2012. The architecture of grammar and the division of labour in exponence. In Jochen Trommer (ed.), *The morphology and phonology of exponence* (Oxford Studies in Theoretical Linguistics 41), 8-83. Oxford: Oxford University Press.

Bermúdez-Otero, Ricardo. 2013. The Spanish lexicon stores stems with theme vowels, not roots with inflectional class features. *Probus* 25:3–103.

Bermúdez-Otero, Ricardo. 2014. Amphichronic explanation and the life cycle of phonological processes. In Patrick Honeybone and Joseph C. Salmons (eds). *The Oxford handbook of historical phonology*. Oxford: Oxford University Press.

Bhat, D.N.S. 1978. A general study of palatalization. In Joseph H. Greenberg (ed.) *Universals of Human Language*, vol. 2, 47–91. Stanford, CA: Stanford University Press.

Blaho, Sylvia. 2004. Privative [voice] in Optimality Theory. Presented at the 12th Manchester Phonology Meeting. Manchester, Great Britain

Blaho, Sylvia. 2008. *The syntax of phonology: A Radically Substance-Free Approach*. Tromsø: University of Tromsø PhD thesis.

Bond, Dzintra. 1994. Latvian syllable onsets and rhymes. *Linguistica Baltica 3*, pp. 87-100.

Bonet, Eulàlia and Daniel Harbour. 2012. Contextual allomorphy. In Jochen Trommer (ed.), *The Morphology and Phonology of Exponence*. Oxford: Oxford University Press, pp. 195-235.

Bradley, Travis G. 2015. Labialization and palatalization in Judeo-Spanish phonology. In Jason Smith and Tabea Ihsane (eds.) *Selected papers from the 42nd Linguistic Symposium on Romance Languages (LSRL)*, Cedar City, Utah, 20-22 April 2012, pp. 77-98.

Calabrese, Andrea. 1993. On palatalization processes: An inquiry about the nature of a sound change. Ms., Harvard University, Cambridge, Mass., and University of Connecticut, Storrs.

Calabrese, Andrea. 2005. *Markedness and economy in a derivational model of phonology*. Studies in Generative Grammar 80. Berlin: Mouton de Gruyter.

Casali, R. F. 1997. Vowel elision in hiatus contexts: Which vowel goes? *Language* 73, pp. 493–533

Ćavar, M. & S. Hamann. 2003. Polish velar and coronal palatalization – its perceptual background. In P. Kosta, J. Błaszczak, J. Frasek, L. Geist & M. Żygis (eds.) *Investigations into Formal Slavic Linguistics*. Berlin: Peter Lang Verlag; 31-48.

Ćavar, Małgorzata E. 2004. *Palatalization in Polish: An Interaction of Articulatory and Perceptual Factors*. Doctoral dissertation. University of Potsdam.

Ceplītis L., A. Miķeļsone, T. Porīte, S. Rage. 2007. *Latviešu valodas pareizrakstības un pareizrunas vārdnīca*. Riga: Avots. [Dictionary of orthography and pronunciation of the Latvian language].

Chang, S., Plauché, M. C., & Ohala, J. J. 2001. Markedness and consonant confusion asymmetries. In E. Hume & K. Johnson (eds.), *The role of speech perception in phonology*. San Diego CA: Academic Press. 79-10.

Chen, Matthew. 1973. Predictive Power in Phonological Description. *Lingua* 32, 173-191.

Chen, Su-I. 1996. *A theory of palatalization and segment implementation*. Doctoral dissertation, State University of New York, Stony Brook.

Chomsky, N. and M. Halle. 1968. *The sound pattern of English*. New York: Harper and Row.

Clements, G. Nick. 1976. Vowel Harmony in Nonlinear Generative Phonology: An Autosegmental Model, Indiana University Linguistics Club, Bloomington, Indiana.

Clements, G. Nick. 1985. The geometry of phonological features. *Phonology* 2: 225–252.

Clements, G. Nick. 1990. The role of the Sonority Cycle in Core Syllabification", In Kingston and Beckman (eds). *Laboratory Phonology 1,* Cambridge: Cambridge University Press.

Clements, G. Nick. 1991a. Place of articulation in consonants and vowels: a unified theory. In *Working papers of the Cornell Phonetics Laboratory*. Vol. 5. Ithaca, NY.

Clements, G. Nick. 1991b. Vowel height assimilation in Bantu languages. In *Working Papers of the Cornell Phonetics Laboratory*, vol. 5. Ithaca: Cornell University.

Clements, G. Nick. 2001. Representational economy in constraint-based phonology. In T. Alan Hall (ed.), *Distinctive Feature Theory*, 71–146. Berlin & New York: Mouton De Gruyter.

Clements, G. Nick, and Elizabeth V. Hume. 1995. The internal organization of speech sounds. In John Goldsmith (ed.), *The handbook of phonological theory*, 245–306. Cambridge, MA. & Oxford: Basil Blackwell.

Cressey, William W. 1974. Homorganic in generative phonology. *Papers in linguistics* 7. 69-81.

Cuetos, F., Hallé, P., Dominguez, A., & Segui, J. 2011. Perception of prothetic /e/ in #sC utterances: Gating data. In W.-S. Lee & E. Zee (eds.), *Proceedings of the 17th International Congress of Phonetic Sciences*. Hong Kong University Press, pp. 540-543.

Czaplicki, Bartlomiej. 2014. Frequency of use and expressive palatalization: Polish diminutives. In Eugeniusz Cyran and Jolanta Szpyra-Kozlowska (eds.) *Crossing Phonetics-Phonology Lines*, Cambridge Scolars Publishing, pp. 141-160.

Daugavet, Anna. 2010. Syllable Length in Latvian and Lithuanian: Searching for the criteria. *Baltic Linguistics 1*: 83-114.

Elsabbagh, M. & Karmiloff-Smith, A. 2004. Modularity of mind and language. In *The Encyclopedia of Language and Linguistics – 2nd Edition.*

Elzinga, Dirk. 1999. *The Consonants of Gosiute*. PhD dissertation, University of Arizona.

Endzelīns, Jānis. 1922. *Lettische Grammatik*, Riga: Kommissionsverlag A. Gulbis.

Endzelīns, Jānis. 1938. *Latviešu valodas skaņas un formas. [Sounds and forms of the Latvian language].* Latvijas ūniversitātes mācības grāmatu serija, nr. 7, Latvijas Universitāte.

Endzelīns, Jānis. 1951. *Latviešu valodas gramatika [Grammar of the Latvian language]*. Rīga: Latvijas Valsts izdevniecība.

Endzelīns, Jānis. 1971. *Comparative phonology and morphology of the Baltic languages*. Mouton: the Hague, Paris.

Ewen Colin J. and Harry van der Hulst. 2001. *The Phonological Structure of Words*. Cambridge: Cambridge University Press.

Fodor, J.A. 1983. *The modularity of mind.* MIT Press: Cambridge, MA.

Fukazawa, Haruka. 1999. *Theoretical Implications of OCP Effects on Features in Optimality Theory*. Doctoral dissertation, University of Maryland, College Park.

Goad, Heather & Yvan Rose. 2004. Input elaboration, head faithfulness and evidence for representation in the acquisition of left-edge clusters in West Germanic. In René Kager, Joe Pater & Wim Zonneveld (eds.), *Fixing Priorities: Constraints in Phonological Acquisition*. Cambridge: Cambridge University Press, pp. 109-157.

Goad, Heather. 2011. The representation of sC clusters. In Marc van Oostendorp, Colin J. Ewen, Elizabeth Hume & Keren Rice (eds.), *The Blackwell Companion to Phonology*. Oxford: Wiley-Blackwell, pp. 898-923.

Goldsmith, John. 1976a. An overview of Autosegmental Phonology. *Linguistic Analysis*, 2, 1.

Goldsmith, John. 1976b. *Autosegmental Phonology*. Doctoral dissertation, MIT: Indiana University Linguistics Club.

Goldsmith, John. 1981. Accent in Tonga: An Autosegmental Account. In G. N. Clements, (ed.) *Harvard Studies in Phonology II*, Indiana University Linguistics Club, Bloomington, Indiana.

Goldsmith, John. 1990. *Autosegmental and Metrical Phonology*. Basil Blackwell, Oxford.

Gonzalez, Carolina. 2014. Prevocalic velar advancement in Chilean Spanish and Proto-Romance. In Marie-Hélène Côté and Eric Mathieu (eds.), *Variation Within and Across Romance Languages; Selected Papers from the 41st Linguistic Symposium on Romance*

Languages (LSRL). Current Issues in Linguistic Theory, vol. 333. Amsterdam/Philadelphia: John Benjamins, pp. 277-296

Greenberg, Joseph H. 1978. Some generalizations concerning initial and final consonant clusters. In Greenberg, Joseph H. (ed.) *Universals of human language*. *Vol. 2. Phonology.* Stanford: Stanford University Press, pp. 243-280.
Guion, S. G. 1998. The role of perception in the sound change of velar palatalization. *Phonetica*, 55, pp. 18–52.

Guļevska, D., A. Miķelsone and T. Porīte. 2002. *Pareizrakstības un pareizrunas rokasgrāmata. [Handbook of Spelling and Pronunciation]* Riga: Avots

Gussmann E. 2001. Hidden identity, or the double life of segments. In K. Dziubalska-Kołaczyk (ed.) *Constraints and Preferences,* pp. 229-249. Berlin: Mouton de Gruyter.

Gussmann, E. 2004. The irrelevance of phonetics: the Polish palatalization of velars. In T. Scheer (ed.) *Corpus Usage des Corpus en Phonolgie*, pp. 125–152. Nice: Université de Nice-Sophia Antipolis, CNRS.

Hale, M. & C. Reiss. 2008. *The Phonological Enterprise*. Oxford: OUP.

Hale, M., M. Kissock, and C. Reiss. 2006. Microvariation, variation, and the features of universal grammar. *Lingua 117 (4)*, pp. 645-65.

Hall, Allen Tracy. 2004. Assibilation in modern German. *Lingua 114*, pp. 1035-1062.

Hall, T. A., S. Hamann and M. Zygis. 2006. The phonetic motivation for phonological stop assibilation. *Journal of the International Phonetic Association* 36:1, pp. 59–81.

Hall, T.A. and S. Hamann. 2006. Towards a typology of stop assibilation. *Linguistics 44:6*, pp. 1195-1236

Halle, Morris. 1987. The Morphophonemics of Latvian Declension. In R. Channon and L. Shockey (eds.), *In Honor of Ilse Lehiste*. Dordrecht:Foris Publications, pp. 375-379.

Halle, Morris. 1992a. Phonological features. In William Bright (ed.) *International encyclopedia of linguistics,* vol. 3, pp. 207–212. Oxford: Oxford University Press.

Halle, Morris. 1992b. The Latvian declension. In Geert Booij and Jaap van Marle, *Yearbook of Morphology 1992*, pp. 33-47.

Halle, Morris. 1995. Feature geometry and feature spreading. *Linguistic Inquiry 26* (1): 1–46.

Halle, Morris. 2003. Phonological features. In William J. Frawley (ed.) *International encyclopedia of linguistics*, pp. 314-320. New York: Oxford University Press.

Halle, Morris and V. J. Zeps. 1966. Survey of Latvian Morphophonemics. *MIT RLE Quarterly Progress Report,* 83, pp. 105-113.

Halle, Morris, Bert Vaux, and Andrew Wolfe. 2000. On feature spreading and the representation of place of articulation. *Linguistic Inquiry* 31 (3): 387–444.

Hayes, Bruce. 1995. *Metrical Stress Theory: Principles and Case Studies.* Chicago: The University of Chicago Press.
Hulst, H. G. van der. 1984. *Syllable structure and stress in Dutch.* Dordrecht: Foris.

Hume, Elizabeth. 1992. *Front Vowels, Coronal Consonants and Their Interaction in Nonlinear Phonology*. PhD dissertation, Cornell University.

Hyman, Larry M. 1975. *Phonology: theory and analysis*. New York: Holt, Rinehart and Winston.

Inkelas, Sharon and Cheryl Zoll. 2007. Is Grammar Dependence Real? *Linguistics* 45, pp. 133-171.

Iosad, Pavel. 2012. *Representation and Variation in Substance-Free Phonology: A Case Study in Celtic*. PhD dissertation, University of Tromsø.

Ito, Junko & Armin Mester (2015) Word formation and phonological processes. In Haruo Kubozono (ed.), *The Handbook of Japanese Language and Linguistics: Phonetics and Phonology*, Mouton, pp. 363–395.

Itô, Junko and Armin Mester 1994. Reflections on CodaCond and Alignment. UC Santa Cruz ms.

Îto, Junko and Armin Mester. 1999. Realignment. In René Kager, Harry van der Hulst & Wim Zonneveld (eds.), *The prosody-morphology interface*. Cambridge: Cambridge University Press, pp. 188–217.

Ito, Junko, Yoshihisa Kitagawa, and Armin Mester. 1996. Prosodic faithfulness and correspondence: Evidence from a Japanese argot. *Journal of East Asian Linguistics 5*, pp.217–294.

John J. McCarthy. 2009. Harmony in harmonic serialism. Ms, University of Massachusetts, Amherst.

Jurgec, Peter. 2011. *Feature spreading 2.0: a unified theory of assimilation*. PhD dissertation, University of Tromsø.

Kalme, Vilma and Gunta Smiltniece. 2001. *Latviešu Literārās Valodas Vārddarināšana un Morfoloģija [Derivation and morphology in Literary Latvian].* Liepāja.

Kang, Yoonjung & Sohyun Hong. 2009. The adaptation of the English voiceless affricate in 1930s Korean. *Toronto Working Papers in Linguistics (TWPL):34*.

Kariņš, A. Krišjānis. 1996. *The Prosodic Structure of Latvian*. Doctoral dissertation, University of Pennsylvania.

Kim, H. 2001. A phonetically based account of phonological stop assibilation. *Phonology 18*, pp. 81-108.

Kiparsky, Paul. 1981. Vowel Harmony. Ms., MIT.
Kochetov, Alexei and John Alderete. 2010. Patterns and scales of expressive palatalization: typological and experimental evidence. Ms. University of Toronto & Simon Fraser University.

Kochetov, Alexei. 2011. Palatalization. In Colin Ewen, Elizabeth Hume, Marc van Oostendorp, and Keren Rice (eds.) *Blackwell Companion to Phonology*, pp. 1666–1690. Oxford: Wiley Blackwell.

Krämer, Martin 2006. The Emergence of the Comparatively Unmarked. In Donald Baumer, David Montero, and Michael Scanlon (eds.) *Proceedings of the 25th West Coast Conference on Formal Linguistics*, pp. 236-244. Somerville, MA: Cascadilla Proceedings Project.

Krämer, Martin. 2009. *The Phonology of Italian*. Oxford: Oxford University Press.

Kurisu, Kazutaka. 2008. Phonological Typology in Optimality Theory. A handout of the talk presented at Kobe Conference on Language Typology. Kobe University, October 25, 2008.

Kurisu, Kazutaka. 2009. Palatalizability via feature compatibility. *Phonology* 26, pp. 437-475.

Lahiri, Aditi, and Evers, Vincent. 1991. Palatalization and coronality. In Carol Paradis and Jean-Francois Prunet (eds.), *Phonetics and phonology: The special status of coronals*. New York: Academic Press, pp. 79-100.

Laua, Alise. 1997. *Latviešu literārās valodas fonētika*. 4., pārstrādātais un papildinātais izdevums. [Phonetics of Literary Latvian. 4th edition, updated and revised] Rīga: Zvaigzne ABC.

Levāne-Petrova K. 2012. Līdzsvarots mūsdienu latviešu valodas tekstu korpuss un tā tekstu atlases kritēriji [Balanced text corpus of Modern Latvian and its text selection criteria]. *Baltistica VIII*, pp. 89-98

Lipski, J.M. 1990. Elision of Spanish intervocalic /y/: toward a theoretical account, *Hispania, 73*, pp. 797-803

Lombardi, Linda. 2001. Why Place and Voice are different. In Linda Lombardi (ed.), *Segmental Phonology in Optimality Theory: Constraints and Representations*. CUP.

Łukaszewicz, B. 2007. Reduction in syllable onsets in the acquisition of Polish: Deletion, coalescence, metathesis, and gemination. *Journal of Child Language 34(1)*, pp. 52–82

Markus, Dace and Juris Grigorjevs. 2003. *Fonētikas pētīšanas un vizualizēšanas metodes*. [Methods for phonetics research and visualization]. Rīga: Rasa ABC.

Mathiassen, Terje. 1996. *A Short Grammar of Latvian*. Slavica Publishers, Inc.
Matthews, William. 1959. Phonematic System of Literary Latvian. In *Veltījums akadēmiķim prefesoram Dr. Jānim Endzelīnam viņa 85 dzīves un 65 darba gadu atcerei*. E.Sokols, K. Graudiņš, E. Šmite (eds.) Riga: Valodas un literatūras institūts, 181-200.

McCarthy, John and Prince, Alan 1995, Faithfulness & reduplicative identity, in Beckman et al. (eds.) *University of Massachusetts Occasional Papers in Linguistics 18: Papers in Optimality Theory*, Amherst: Graduate Linguistics Student Association, pp. 249-384. ROA-110.

McCarthy, John. 1988. Feature Geometry and Dependency: A Review. *Phonetica* 43:84-108.

Mester, Armin, and Junko Ito. 1989. Feature predictability and underspecification: Palatal prosody in Japanese mimetics. *Language 65*, pp. 258-93.

Mielke, Jeff. 2008. *The emergence of distinctive features*. Oxford: Oxford University Press.

Miller, Wick. 1965. *Acoma grammar and texts*. University of California Publications in Linguistics 40. Berkeley: University of California Press.

Morelli, Frida. 2003. The relative harmony of /s+stop/ onsets: Obstruent clusters and the Sonority Sequencing Principle. Féry, Caroline & Ruben van de Vijver (eds.), *The syllable in Optimality Theory*. Cambridge: Cambridge University Press, pp. 356–371.

Morén, Bruce. 1999. *Distinctiveness, Coercion and Sonority: A Unified Theory of Weight*. Doctoral dissertation. University of Maryland at College Park.

Morén, Bruce. 2003. The Parallel Structures model of feature geometry. In *Working Papers of the Cornell Phonetics Laboratory*, 194–270. Vol. 15. Ithaca, NY.

Morén, Bruce. 2006. Consonant–vowel interactions in Serbian: features, representations and constraint interactions. *Lingua* 116 (8): 1198–1244.

Morén, Bruce. 2007. The division of labour between segment-internal structure and violable constraints. In Sylvia Blaho, Patrik Bye, and Martin Krämer (eds.), *Freedom of analysis?* (Studies in Generative Grammar 95), 313–344. Berlin: Mouton de Gruyter.

Muižniece, Lalita. 2002. *Latviešu valodas praktiskā fonoloģija*. [Practical Phonology of Latvian] Rīga: Rasa ABC.

Nau, Nicole. 2011. Declension classes in Latvian and Latgalian: Morphomics vs. morphophonology. *Baltic Linguistics 2*, pp. 141-177.

Odden, David. 2006. Phonology ex nihilo. Paper presented at the Tromsø Phonology Project Group Meeting.

Odden, David. 2011. Features impinging on tone. In John Goldsmith, Elizabeth Hume and Leo Wetzels (eds.) *Tones and Features. Berlin*: Mouton De Gruyter, pp. 81-107.
Odden, David. 2013. Formal Phonology. In Sylvia Blaho, Martin Krämer, and Bruce Morén-Duolljá (eds.) *X years of CASTL phonology and L years of Curtness*, *Nordlyd* 40 (1), pp. 24–43.

Ohala, J. J. 1978. Southern Bantu vs. the world: the case of palatalization of labials. Berkeley Linguistic Society, Proceedings, Annual Meeting 4. 370-386.

Ohala, John J., 1994. The frequency code underlies the sound-symbolic use of voice pitch. In Hinton, Leanne, Johanna Nichols and John J. Ohala (eds.), *Sound Symbolism*. Cambridge: Cambridge University Press, pp. 325–347.

Padgett, Jaye. 1995. Feature classes. In Beckman, J., S. Urbanczyk & L. Walsh (eds.) *University of Massachusetts Occasional Papers in Linguistics UMOP 18*. Amherst: GLSA, 385-420.

Padgett, Jaye. 2001. Contrast dispersion and Russian palatalization. In Elizabeth V. Hume and Keith Johnson (eds.), *The role of speech perception in phonology*. San Diego: Academic Press, pp. 187–218.

Plauché, Madelaine. 2001. *Acoustic Cues in the Directionality of Stop Consonant Confusions.* PhD Dissertation. University of California, Berkeley.

Prince, Alan and Paul Smolensky. 1993/2004. *Optimality Theory: constraint interaction in generative grammar*. Malden, Mass and Oxford: Blackwell.

Rice, Curt. 2006. Optimizing Gender. *Lingua 116*, pp. 1394-1417.

Rose, Sharon. 1997. *Theoretical Issues in Comparative Ethio-Semitic Phonology* and Morphology. PhD thesis, McGill University.

Rubach, Jerzy. 2000. Backness switch in Russian. *Phonology 17(1)*, pp. 39–64.

Rubach, Jerzy. 2003. Polish palatalization in Derivational Optimality Theory. *Lingua* 113, pp. 197–237.

Rudzīte, Marta. 1993. *Latviešu valodas vēsturiskā fonētika [Historical phonetics of the Latvian language]*. Riga: Zvaigzne

Rūķe-Draviņa, Velta. 1959. *Diminutive im Lettischen*. Lund: AB PH. Lindstedts Univ.-Bokhandel.

Sagey, Elizabeth. 1986. *The representation of features and relations in non-linear phonology*. PhD diss., Massachusetts Institute of Technology.

Sapir, Edward. 1925. Sound patterns in language. *Language 1*. pp. 37-51.

Smolensky, Paul, Lisa Davidson and Peter Jusczyk. 2004. The initial and final states: theoretical implications and experimental explorations of the Richness of the Base. In Rene Kager, Joe Pater, Wim Zonneveld (eds.) *Constraints in Phonological Acquisition*. Cambridge University Press.

Smolensky, Paul. 1993. Harmony, Markedness, and Phonological Activity. Handout to talk presented at the Rutgers Optimality Workshop 1, New Brunswick, N.J

Sokols, E., A. Bergmane, R. Grabis, and M. Lepika (eds.). 1959. *Mūsdienu latviešu literārās valodas gramatika, I: Fonētika un morfoloģija*. [Grammar of Modern Literary Latvian. Volume I: Phonetics and Morphology] Rīga: LPSR Zinātņu akadēmijas izdevniecība.

Steinbergs, Aleksandra. 1977. *The Phonology of Latvian*. PhD dissertation. University of Illinois at Urbana-Champaign.

Steriade, Donca. 1982. *Greek prosodies and the nature of syllabification*. Doctoral Dissertation, MIT.

Thráinsson, H. 1978. On the phonology of Icelandic preaspiration. *Nordic Journal of Linguistics 1*, 3-54.

Uffmann, Christian. 2005. Optimal geometries. In Marc van Oostendorp & Jeroen van de Weijer (eds.) *The internal structure of phonological segments*, Mouton de Gruyter. 27–62.

Uffmann, Christian. 2007. Restricting GEN. In Sylvia Blaho, Patrik Bye & Martin Krämer, (eds.), *Freedom of Analysis?* Berlin: Mouton de Gruyter, pp. 281-312.

Weijer, Jeroen van de. 1996. *Segmental structure and complex segments.* Tübingen: Max Niemeyer.

Winitz, Harris, M.E. Scheib, and James A. Reeds. 1971. Identification of stops and vowels for the burst portion of /p,t,k/ isolated from conversational speech. *Journal of the Acoustical Society of America 51,* pp. 1309-1317.

Wolf, Matthew. 2007. For an autosegmental theory of mutation. In Bateman, L., O'Keefe, M., Reilly, E., Werle, A. (eds.), *University of Massachusetts Occasional Papers in Linguistics 32: Papers in Optimality Theory III*. GLSA, Amherst, pp. 315–404.

Yavas, M., A. Ben-David, E. Gerrits, K. E. Kristoffersen and H. G. Simonsen. 2008. Sonority and cross-linguistic acquisition of initial s-clusters. In *Clinical Linguistics & Phonetics. Vol. 22*, pp. 421-441.

Youssef, Islam. 2013. *Place Assimilation in Arabic: Contrasts, Features and Constraints*. PhD dissertation, University of Tromsø.

Zimmermann, Eva and Jochen Trommer. 2013. Moraic prefixes, suffixes, and infixes. A talk presented at Linguistics Colloquium, University of British Columbia, Vancouver, 22th April 2013.

Zubritskaya, Ekaterina. 1995. *The Categorial and Variable Phonology of Russian*. PhD dissertation. University of Pennsylvania.