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The Incidence and Evolution of Palatalized Consonants in Latvian

Linda Zalite
Graduate Center, City University of New York

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THE INCIDENCE AND EVOLUTION OF PALATALIZED CONSONANTS IN LATVIAN

by

LINDA ZALITE

A master’s thesis submitted to the Graduate Faculty in Linguistics in partial fulfillment of the requirements for the degree of Master of Arts, The City University of New York

2015
This manuscript has been read and accepted for the Graduate Faculty in Linguistics in satisfaction of the dissertation requirement for the degree of Master of Arts.

Juliette Blevins

Date

Thesis Advisor

Gita Martohardjono

Date

Executive Officer

THE CITY UNIVERSITY OF NEW YORK
Abstract

The Incidence and Evolution of Palatalized Consonants in Latvian

by

Linda Zalite

Advisor: Professor Juliette Blevins

This thesis traces the evolution of the palatalized rhotic /rü/ in Baltic languages with focus on the continuation of this segment in Latvian and its recent neutralization with /r/. Historical, phonological, phonetic, and synchronic data is gathered as evidence to further our understanding of the Latvian palatalized rhotic and its near-disappearance in the 20th century. Previous typological works of Endzelīns (1922, 1951), Dini (1997), Rūķe-Draviņa (1994) and Ābele (1929) were considered intending to answer three central questions. Was the Latvian palatal rhotic a palatalized segment or a true palatal? What factors played a role in the depalatalization of Latvian /rü/? What are the linguistic and social implications of the loss of contrast between /rü/ and /r/ in Latvian?

Theoretical foundation laid by Evolutionary Phonology (Blevins, 2004, 2006, 2013) explains how co-articulatory and perceptual factors can be considered as possible explanations of the origins of palatalization processes. The advanced Latvian diachronic palatalization patterns combine three “sources” of sound change within the CHANGE-CHANCE-CHOICE model portrayed in Evolutionary Phonology. This paper further examines the nature of the Latvian /rü/, evaluating primary vs. secondary palatalization, and providing evidence of the articulation in native speakers.

Cross-linguistically, palatalized rhotics are extremely rare sounds and are disappearing fairly quickly from the consonant inventories of world’s languages. In Latvian there are two
potential sources affecting gradual loss of palatalized “r”. Neutralization results due to the limitations of the physical abilities of human vocal tract. The process also may be affected by intentional removal of the segment from the Latvian language in 1946. The subsequent sociolinguistic implications are evaluated following the loss of the palatalized /r/ in Latvian.
Acknowledgements

I would like to thank many people who supported me throughout this academic journey. I want to say thank you to my mom Brigita, my sister Inga and my brother Ģirts for encouragement and appreciation. You gave me strength and stubbornness much needed to succeed.

This thesis would not see daylight without my adviser Dr. Juliette Blevins. Thank you so much for your insights, your incredibly vast knowledge and guidance. I am grateful for respecting my ideas, and appreciating Latvian language and culture. I will never forget your support when times were tough. Thank you for believing in me.

I have been incredibly lucky to have several Latvian friends Kristīna Putene, Ilze Kancāne, Jana Anča-Tetere, Ieva Kreichelt and many more who are as crazy as I am and who are always ready to enjoy discussions about Latvian grammar and aspects of its history. Thank you all for your support and patience. A special recognition also goes out to one of my American friends – Jennifer Nikou – thank you for all your guidance and care.

Finally my greatest gratitude belongs to my favorite best friend – my husband Edgars - and my three beautiful sons Ēriks, Emīls and Kārlis. You are the ones who walked with me through this journey every day and every minute. You saw and heard my ups and downs. Thank you for being so grown up and independent while mommy was busy reading or writing. Edgar, thank you for our discussions and debates, I hope they will never end. Thank you for the support no one can give, but you.
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### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acc.</td>
<td>Accusative</td>
</tr>
<tr>
<td>Adj.</td>
<td>Adjective</td>
</tr>
<tr>
<td>Conj.</td>
<td>Conjugation</td>
</tr>
<tr>
<td>Dat.</td>
<td>Dative</td>
</tr>
<tr>
<td>Fem.</td>
<td>Feminine</td>
</tr>
<tr>
<td>Gen.</td>
<td>Genitive</td>
</tr>
<tr>
<td>Instr.</td>
<td>Instrumental</td>
</tr>
<tr>
<td>Loc.</td>
<td>Locative</td>
</tr>
<tr>
<td>Masc.</td>
<td>Masculine</td>
</tr>
<tr>
<td>N.</td>
<td>Noun</td>
</tr>
<tr>
<td>Nom.</td>
<td>Nominative</td>
</tr>
<tr>
<td>p.</td>
<td>grammatical person</td>
</tr>
<tr>
<td>PIE</td>
<td>Proto-Indo-European</td>
</tr>
<tr>
<td>Pl.</td>
<td>Plural</td>
</tr>
<tr>
<td>Sing.</td>
<td>Singular</td>
</tr>
<tr>
<td>V.</td>
<td>Verb</td>
</tr>
<tr>
<td>Voc.</td>
<td>Vocative</td>
</tr>
</tbody>
</table>
I Introduction

This thesis traces the evolution of the palatal or palatalized rhotic /rl/ in Baltic languages with focus on the continuation of this sound in Latvian and its recent neutralization with /r/. In addition to tracing the phonological and phonetic processes through which palatalized and palatal segments emerged in Baltic languages, this thesis attempts to answer three central questions. Was the Latvian palatal rhotic a palatalized segment or a true palatal? What factors played a role in the depalatalization of Latvian rl? What are the linguistic and social implications of the loss of contrast between /rl/ and /r/ in Latvian? Earlier studies of Latvian historical phonology give little attention to the history of /rl/. Here, historical, phonological, phonetic, and grammatical evidence is gathered to further our understanding of the Latvian palatalized rhotic and its near-disappearance in the 20th century.

The palatal or palatalized rhotic, once a contrastive sound in Latvian, is of general linguistic interest for several reasons. Cross-linguistically, palatalized rhotics are uncommon, yet there is still debate as to why this is so. The evolution of palatalized rhotics in Baltic may allow for an understanding of how such segments arise. Second, though it is a relatively archaic sound, presumably inherited from the Proto–Baltic mother language, the palatalized rhotic is missing in modern standard Latvian. It is not unusual that certain sounds fall out of use in any language through natural phonological processes. However, palatalized /rl/, among other segments in Latvian, may have an unnatural history, as the orthographic symbol for this sound was intentionally removed from use by the occupying regime in 1946.

The falling together of the plain and palatalized rhotics is controversial and complex. Those who consider language as one of the symbols of national pride argue that Latvian
language without /rʲ/ is not true Latvian. For these speakers, the neutralization of the rhotic contrast represents Soviet occupation era values. They argue that /rʲ/ should be reintroduced into Latvian to make it more “authentic” or “pure”. There are others who argue that the neutralization of the plain vs. palatalized rhotic is just a case of natural language change, and that there is no need to force this archaic sound back into the language. Under this view, one hears a reasonable, pragmatic argument: Latvian speakers have survived many generations without the palatalized /rʲ/, so why bring it back now? While the political, social, and pragmatic perspectives are valuable, serious linguistic study of this issue may also be illuminating. Given the politically charged nature of the status of the Latvian palatalized rhotic, this paper sets out to examine evidence regarding Latvian r-sounds from a scientific historical-phonological perspective. As far as I am aware, this is the first detailed linguistic historical study of Latvian /rʲ/ to date.
II Background

2.1 Preliminaries

For the phonetic notation in this paper I follow the International Phonetic Alphabet (IPA) taken from https://www.internationalphoneticassociation.org. I also use Latvian orthography which is based on the Latin alphabet; separate segments in Latvian orthography will be put in angle brackets < >. Translated words from Latvian into English are shown in quotes “ ”. Square brackets [ ] are used for phonetic transcriptions a given segment or segmental sequence. I use parenthesis ( ) to indicate that a segment is an allophone of a given phoneme. Phonological segments are enclosed in slashes / / to distinguish them from phonetic transcriptions. An asterisk * denotes that a sound or form is a theoretical reconstruction based on comparative evidence, or internal reconstruction.

I also use very specific terminology and symbols for r-sounds and their palatal or palatalized counterparts. The symbol for the palatalized rhotic is [ɾ], while a true palatal rhotic is shown as [r], the symbol used also in Latvian orthography <ŗ>, but not represented in the IPA chart. When, the r-sound I refer to in the text is some sort of palatal, but not specifically a palatal or palatalized, I refer to it generally as palatalized “r”. This last term encompasses both variants – palatal and palatalized, without being more specific.

In Figure 1 is a diagram of vocal tract taken from http://dylansung.tripod.com/sapienti/phon/ipasymb.htm showing active articulators, parts of the tongue, and points of articulation in the oral cavity. This diagram will be useful in the discussion of rhotic articulations which follows. Most importantly, we will focus on the difference between so-called “palatalized” coronal segments, where the primary constriction is made with the tongue.
tip/blade, with secondary constriction of the tongue body at the hard palate, and pure palatal segments, where the primary constriction is made with the tongue body at the hard palate.
2.2 The Proto-Indo-European consonant system

Latvian is a Baltic language within the bigger Indo-European family (see Figure 2). Before going into detail about specific Latvian consonants and their development, first we briefly examine the consonant inventory of Proto-Indo-European (PIE). This will enable us to follow the historical developments from PIE proto-segments to Proto-Baltic segments, to the Latvian consonants of interest, the plain and palatal series of consonants, and in particular, the rhotics.
The science of linguistics flourished in the nineteenth century, with methods of comparative linguistics and linguistic reconstruction set in place. During this time, great progress was made on Indo-European language classification, and on the reconstruction of the proto-language. The consonant system of Proto-Indo-European, shown in Table 1 was pretty much in place by the late nineteenth century (Fortson 2010: 9).

The standard view of PIE consonants, assumed here in Table 1, includes: voiceless stops *p, *t, *k, *kw; voiced stops *b, *d, *g, *gw; and breathy voiced stops *bʰ, *dʰ, *gʰ, *gw. An additional place of articulation for these three laryngeal series was fronted or palatalized velar series including *c <k>, *ʃ <ʃ>, and *jʰ. Following Fortson (2010: 50) these velar palatals were very close to the plain velars [k] and [g], but produced farther forward in the mouth. Many of the PIE palatals occur before front vowels *i and *e, and there is a good reason to believe that
at one time they were allophones of the plain velars. However, by PIE times, they were phonemic, contrasting before /a/ and other vowels.

Table 1: Assumed Consonant inventory of Proto-Indo European

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Alveolar</th>
<th>Velar</th>
<th>Laryngeal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>plain</td>
<td>palatal</td>
</tr>
<tr>
<td>Stops</td>
<td>voiceless</td>
<td>*p</td>
<td>*t</td>
<td>*k</td>
</tr>
<tr>
<td></td>
<td>voiced</td>
<td>*b</td>
<td>*d</td>
<td>*g</td>
</tr>
<tr>
<td>Voiced aspirated</td>
<td>*bʰ</td>
<td>*dʰ</td>
<td>*gʰ</td>
<td>*jʰ</td>
</tr>
<tr>
<td>Sonants</td>
<td>nasals</td>
<td>*m</td>
<td>*n</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquids</td>
<td></td>
<td></td>
<td>*r</td>
</tr>
<tr>
<td>semivowels</td>
<td>*w (*u)</td>
<td></td>
<td></td>
<td>*y (*j)</td>
</tr>
<tr>
<td>Spirants</td>
<td></td>
<td>*s</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional PIE consonants were a voiceless alveolar fricative *s and two nasals *n, *m as well as liquids *l and *r. The vowels *u and *j had non-syllabic (glide) counterparts corresponding to [w] and [j], respectively. Proto-Indo-European *r is continued as *r in Baltic, and is the source of most of the inherited Latvian rhotics discussed in this thesis.

From a typological perspective, palatalization in PIE was not unusual: it was restricted to the velar series, and minimally contrastive there. For Baltic, Slavic and Celtic languages that show full palatalized series contrasting with non-palatalized counterparts, consonantal splits appear to post-date the break up of the Indo-European family. I turn now to this split in Proto-Baltic.

2.3 Consonants and phonotactics of Proto-Baltic

Proto-Baltic, the mother language of all Baltic languages, was thought to have split off from other Indo-European languages around the 3rd millennia BC. The reconstruction of
Proto-Baltic is widely agreed upon (see Dini, 1997 section 1.4 pp 62), with an early stage of consonants as reconstructed in Table 2.

Several major sound changes have taken place in the development from Proto-Indo-European to Proto-Baltic. One sound change was the loss of breathy voiced in the breathy voiced series: *bʰ, *dʰ, *ɡʰ > *b, *d, *ɡ. Another major change characterizing this “satem” branch, was the shift of PIE palatals *kʷ and *ɡʷ to Proto-Baltic *š and *ž (Dini, 1997: 92). This sound change co-occurred with the merger of the labiovelars *kʷ, *ɡʷ with plain velars in Proto-Baltic. Another change, the “Ruki Rule”, occurred where *s > *ʃ after *r, *u, *k or *i. PIE nasals *m and *n, lateral *l and rhotic *r correspond to Proto-Baltic *m, *n *l and *r respectively.

**Table 2: Stage I Proto-Baltic consonants (Dini, 1997: 94)**

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Alveolar</th>
<th>Postalveolar</th>
<th>Velar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>plain</td>
</tr>
<tr>
<td><strong>Stops</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiceless</td>
<td>*p</td>
<td>*t</td>
<td></td>
<td>*k</td>
</tr>
<tr>
<td>voiced</td>
<td>*b</td>
<td>*d</td>
<td></td>
<td>*ɡ</td>
</tr>
<tr>
<td><strong>Sonants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nasals</td>
<td>*m</td>
<td>*n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquids</td>
<td>*r, *l</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>semivowels</td>
<td>*v</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spirants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiceless</td>
<td>*ʃ&lt;ʒ&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiced</td>
<td>*ʒ&lt;ʒ&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After these changes, a second major change appears to have occurred, as illustrated in Table 3. For every consonant, with the exception of *ʃ, a palatalized counterpart arose before /i/ or /j/, as detailed below. From the Proto-Baltic system in (3), a small number of changes give rise to the standard Latvian consonant inventory.
### Table 3: Stage II Proto-Baltic consonants (Dini 1997: 94)

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Alveolar</th>
<th>Postalveolar</th>
<th>Velar</th>
<th>Palatal</th>
<th>Labial</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stops</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiceless</td>
<td></td>
<td>*p *p ′</td>
<td>*t *t ′</td>
<td></td>
<td>*k *k ′</td>
<td></td>
</tr>
<tr>
<td>voiced</td>
<td></td>
<td>*b *b ′</td>
<td>*d *d ′</td>
<td></td>
<td>*g *g ′</td>
<td></td>
</tr>
<tr>
<td><strong>Sonants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nasals</td>
<td></td>
<td>*m *m ′</td>
<td>*n *n ′</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>liquids</td>
<td>*r *r ′</td>
<td>*l *l ′</td>
<td>*j *j ′</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>semivowels</td>
<td></td>
<td>*v *v ′</td>
<td></td>
<td>*j</td>
<td></td>
<td>*w</td>
</tr>
<tr>
<td><strong>Spirants</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiceless</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>voiced</td>
<td></td>
<td>*ʃ &lt;š&gt; *ʃ ′</td>
<td>*ʒ &lt;ž&gt;</td>
<td>*ʒ</td>
<td></td>
<td>*ʒ ′</td>
</tr>
<tr>
<td><strong>Nasal</strong></td>
<td>m</td>
<td>n</td>
<td>(ŋ)</td>
<td>ɲ &lt;ŋ &gt;</td>
<td>ļ &lt;ļ &gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Glide/Approximant</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trill</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 2.4 Latvian consonantal system

The Table 4 lists contrastive consonant inventory of modern standard Latvian. I will discuss the phonological innovations in detail in section 3.4. In this table, I have placed the palatal or palatalized /r/ in parentheses, since its status is the focus of discussion. Note that modern Latvian has a series of pure palatal consonants as shown in the last column of the table.

### Table 4: Standard Latvian consonant inventory (Laua, 1997: 30)

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Dental/Alveolar</th>
<th>Velar</th>
<th>Palato-Alveolar</th>
<th>Palatal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stop/Plosive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>p</td>
<td>t</td>
<td>k</td>
<td>ą &lt;ą &gt;</td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>b</td>
<td>d</td>
<td>g</td>
<td>j</td>
<td>ą &lt;ą &gt;</td>
</tr>
<tr>
<td><strong>Affricate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>ts &lt;c&gt;</td>
<td>tʃ &lt;tʃ&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>dz</td>
<td>dʒ &lt;dʒ&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fricative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>f</td>
<td>s</td>
<td>ʃ &lt;ʃ&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>v</td>
<td>z</td>
<td>ʒ &lt;ʒ&gt;</td>
<td>x</td>
<td>ą &lt;ą &gt;</td>
</tr>
<tr>
<td><strong>Nasal</strong></td>
<td>m</td>
<td>n</td>
<td>(ŋ)</td>
<td>ɲ &lt;ŋ &gt;</td>
<td>ļ &lt;ļ &gt;</td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td>l</td>
<td></td>
<td></td>
<td></td>
<td>ą &lt;ą &gt;</td>
</tr>
<tr>
<td><strong>Glide/Approximant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trill</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
III The rise of palatal consonants in Latvian

3.1 Palatalization defined

Palatalization is a technical term a process whereby a sound that formerly did not involve active involvement of the tongue body near the palate acquires this articulation. Palatalization typically affects consonants: a consonant is modified under certain conditions such that the tongue body is moved upward and nearer to the hard palate. Palatalization can be phonetic or phonological, and diachronic or synchronic, and may be one of the most common phonological processes in the world’s languages. At the phonetic level, nearly all languages have sequences like /ki/ or /ti/, and in these sequences, co-articulation of the consonant and vowel yields some degree of consonant palatalization.

Palatalization is typically an assimilatory process where non-palatalized consonants occurring before or after high front (palatal) vowels or glides like /i/, /j/ are paltalized. The origin of this palatalization is thought to be phonetic coarticulation: the natural overlap of sequential gestures results either in a consonant with secondary constriction in the palatal region, or in a consonant with a change of primary place of articulation, usually from coronal to palatal, with a shift from the tongue blade to the tongue body as primary articulator.

Palatalization, however, is not always described in a simple and clear manner. Hock and Joseph (2009) write: “The term “palatalized” is confusing, because it sounds very similar to “palatal”… palatalized consonants are closely related to palatals; and the term “palatalized” is too deeply ingrained in linguistic terminology to be abandoned anyway.”

In articulatory terms, there are multiple ways of describing palatalization, each with nuanced different meanings. In the literature, palatalization has been defined as tongue-raising (Bhat 1978), tongue-fronting (Bhat, 1978), just palatalization (Hume, 1994) and coronalization
(Fromkin et al. 2011). These different terms highlight potential articulatory nuances of different segment types, but could be just different terms for one phenomenon – palatalization at different stages of development. Bateman (2011) provides a useful summary of distinct terms and definitions of palatalization as shown in (5).

**Table 5: Various terms used to describe “palatalization” (Bateman, 2011)**

<table>
<thead>
<tr>
<th>/t/ → [tᵩ]</th>
<th>tongue raising</th>
<th>Bhat (1978)</th>
</tr>
</thead>
<tbody>
<tr>
<td>palatalization</td>
<td>Hume (1994)</td>
<td></td>
</tr>
<tr>
<td>/k/ → [tʃ] or /t/ → [tʃ]</td>
<td>tongue fronting with simultaneous spirantization</td>
<td>Bhat (1978)</td>
</tr>
<tr>
<td>palatalization</td>
<td>Fromkin et al. (2011)</td>
<td></td>
</tr>
<tr>
<td>coronalization</td>
<td>Hume (1994)</td>
<td></td>
</tr>
<tr>
<td>posteriorization</td>
<td>Hall &amp; Hamann (2006)</td>
<td></td>
</tr>
<tr>
<td>full/primary palatalization</td>
<td>Bateman (2007)</td>
<td></td>
</tr>
</tbody>
</table>

In this thesis, I follow Bateman’s (2007) classification and distinguish two types of palatalization: primary, or full; and secondary. The process of secondary palatalization takes a non-palatalized consonant to a palatalized consonant and is most common before high, front vowels or glides. For example, [t] becomes palatalized [tᵩ] before /i/, /e/, or /j/ in many languages (Bhat, 1978). Phonetically, the primary place of articulation for [tᵩ] still is alveolar, and the primary articulator is still the tongue blade, but the segment also acquires an additional secondary place of articulation superimposed on the primary (Ladefoged & Maddieson 1996). This secondary palatalization is associated with the tongue blade raising towards the hard palate. In contrast to Cj sequences, palatalized segments like [tᵩ] function as single segments, taking up one timing slot, and not two, in the assessment of phonotactics, syllable structure, and syllable weight.
In the case of primary palatalization a consonant which is non-palatal changes into a pure palatal or alveo-palatal. The consonant does not acquire an additional secondary articulation, but changes its primary place of articulation, typically from pure alveolar to pure palatal or alveo-palatal. Quite often the change to alveopalatal place is accompanied by a change in manner, from stop to affricate or fricative. For example, a voiceless (non-palatalized) alveolar stop [t] may become a voiceless palato-alveolar affricate [tʃ] by primary palatalization (Bateman, 2007). The active organ is still the tongue blade as it was for [t], but the place of constriction for [tʃ] has shifted from alveolar to alveo-palatal, moving back on the palate, where the narrower opening between the palate and the tongue produces friction.

Table 6: Proto-types of primary and secondary palatalizations

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Secondary palatalization: /t/ → [tʃ]</td>
</tr>
<tr>
<td>b.</td>
<td>Primary palatalization: /t/ → [tʃ]</td>
</tr>
</tbody>
</table>

A reasonable question is whether secondary palatalization is a first and necessary component in the diachronic developments leading to primary palatalization. As Dieterman (2008) points out, both types of palatalization make legitimate distinctions that appear necessary. At the same time, the status of a process as primary vs. secondary palatalization may be difficult to evaluate without language-specific phonetic evidence. The distinction between secondary and primary palatalization may be central to understanding both the evolution and devolution of the Latvian palatalized rhotic.

3.2 Phonetic sources of palatalization

Recurrent synchronic sound patterns like palatalization tend to have their origins in regular phonetically based sound change. One of the fundamental premises of the theory of
Evolutionary Phonology (Blevins 2004, 2006, 2013) is that the majority of recurrent sound patterns can be explained in terms of speech perception and production, without need of phonological markedness principles or universals. She observes that “[…] the most common sound changes and the most common types of synchronic alternations are nearly coextensive” (Blevins 2004: 4), an assessment that holds true of palatalization processes as well as many others, and goes on to detail how a model of sound change that incorporates articulatory-based variation, perceptual biases, and mislocalizations of phonetic features can result in what is commonly referred to as regular sound change. In the context of Baltic, historical palatalization sound changes give rise to synchronic sound patterns of consonant palatalization. Within this context, I examine Latvian synchronic consonant alternations where a non-palatalized consonant alternates with a palatalized counterpart, and highlight the diachronic origins and development of palatalization. I consider co-articulatory factors as one of the possible explanations of the origins of palatalization, and then contemplate how perception might also play a role in this process.

Language transmission is intrinsically imperfect. Though a speaker of Proto-Baltic might intend to produce a non-palatalized sound before /i/, a listener might interpret the ambient co-articulation as a feature of the language, and hence, pass it on to future generations in his or her own speech. As this process of language transmission continues, the /i/ following the palatalized consonant may weaken or disappear, and a contrast between palatalized and non-palatalized consonants may be phonologized. So, it may have occurred in the Baltic languages.

3.2.1 Articulatory factors

It has long been observed that there is great variation in how words are produced, and that this variation can provide the seeds for sound change. Articulatory accounts of sound change directly focus on the speaker. Sound production depends on the physical constraints of the vocal
tract of the speaker, thus affecting the production of certain sounds and sound sequences or clusters, and on the rate of speech, - slow hyperarticulated speech is very different from fast hypoarticulated speech. Ohala (1989) describes a case where particular aerodynamic constraints influence the production of apical stops followed by high, front vowels or a glide /j/. “…Friction increases in intensity as a function of, first, the shape of the channel through which the air flows and, second, the velocity of the air. For a given quantity of air flow (volume velocity), the velocity increases as it is forced through a channel with a smaller diameter. This is the basis for the more fricated release of stops, especially apical stops, before high vowels and glides vis-à-vis their release before /j/ or /i/ than before /a/...” By this aerodynamic process, a /ti/ sequence may come to be produced as [tsi]. The physical explanation accounts for why the inverse shift from /tsi/ > [ti] is much less common as a regular sound change. Blevins (2004: 33, 37, 141) focuses on unstressed vowel reduction and loss as a typical case of “choice”, where the transforms of speech along the hyper-to-hypoarticulated continuum give rise to undershoot of vowels and/or coarticulation of vowels and consonants which can result in a percept of no vowel. If this occurs, a listener may decide (“choice”) that the word in question has no vowel, reinterpreting a vowel-full word as vowel-less. Both aerodynamic and co-articulatory factors appear to be involved in many cases of palatalization.

As noted earlier, palatalization may occur as a result of phonetic co-articulation when a consonant is adjacent to a palatal vowel or glide. As the name implies, co-articulation is a process where the place of articulation of a given sound is affected by adjacent sounds. Co-articulation may result in simplified sound sequence or in a more complex articulation. When coarticulation is no longer phonetic, gradient and variable, but phonological, categorical and predictable, it is termed “assimilation”. Synchronic assimilation of palatalization, or, simply,
palatalization, is usually a conditioned phonological and/or morphological process that involves consonants adjacent to front vowels or the palatal glide /j/. In the case of both secondary and primary palatalization, the articulation of the resulting segments is more complex because two separate segments fuse together to form a new type of segment.

Let us first consider velar palatalization, a frequent assimilatory process that may involve voiceless velar stop [k] preceded or followed by high unrounded vowel /i/. In one case the velar may change to [k̂] a velar with secondary palatalization, articulated as a velar stop produced by tongue dorsum against the soft palate with additional simultaneous palatalized articulation where the body of the tongue is in a high front position (Bhat 1974, Keating 1993 Ladefoged 2001). In another case, /k/ may be produced as a voiceless palato-alveolar affricate [tʃ], a case of primary palatalization, with a shift from velar to alveo-palatal place of articulation. Velar palatalization is cross-linguistically very common as both a sound change and a synchronic sound pattern is well studied in terms of both its phonetic and phonological characteristics (Guion, 1996, Bhat 1978).

3.2.2 Perceptual factors

The other component that plays a crucial role in sound change is perception. The interpretation of the effects of perception is focused on the listener and not so much on the speaker as it was in the case of articulatory variation. Experimental paradigms show that a listener may perceive distinctly articulated sounds as the same or very similar. Ohala (1986, 1992) argues that velar palatalization might not, after all, be entirely articulatorily-motivated, but rather may also be explained by acoustic-perceptual similarity, and confusion on the part of the listener. Consider, again, the case of velar palatalization. If co-articulation was the only source
of sound change, a /ki/ sequence might give rise to a pure palatal or a palatalized velar. The numerous languages where /k/ > /ʃ/ before palatals suggests that other factors may be at work.

Chang et al.’s (2001) acoustic/perceptual study evaluated the effects of vowel context on consonant place (C-place) identification. They showed that perceived place of articulation for [b] and [d] was affected by the following vowel. “If certain place features are less distinct preceding a front (i.e. palatal) vowel, then it is possible that palatalization may serve to further enhance the perceptual distinction. [...] This account offers a perceptual motivation for palatalization, but does not rule out an articulatory motivation as well, and does not indicate whether one source for the phonological process is primary. One possibility is that a sound change, such as palatalization, is conditioned in the first place by coarticulation, but then may offer additional advantages for perception.”

Guion (1998) presents empirical evidence supporting perceptual conditioning of velar palatalization as well. She writes “While it might be possible to imagine a purely articulatory account in which the tongue begins at a velar articulation and gradually creeps up to a palatoalveolar place of articulation (from dorsum to blade) as well as acquiring a fricative release along the way, the actual fleshing out of this account is problematic.” Guion (ibid.) provides empirical data that generally support the hypothesis claiming that velar palatalization arises from a perceptually conditioned reanalysis of speech. She demonstrates convincingly that voiceless velars, before high front vowels, are acoustically similar to palatoalveolar affricates, and can be misperceived as palatoalveolars, while the reverse is not true.

3.3 Synchronic palatalization contrasts in Lithuanian and Latvian

Modern standard Lithuanian and Latvian have distinct patterns of palatal/non-palatal consonantal contrasts. However, both of these genetically related languages will allow us to
understand details of the history of Latvian palatalization. The palatalization process in Baltic had presumably barely begun with the velar palatalization in late PIE, just as proto-Baltic was developing (see Tables 2 and 3). This suggests that palatalization as synchronic variation originated before the break-up of Baltic. Subsequent to this split, separate paths of phonologization occurred in each dialect. Synchronic variation in the form of innovations may take place within a single group of speakers sharing a common language. However, part of this group of speakers may become geographically, culturally and/or socially more isolated from the other. Gradually the effects of articulatory and acoustic properties may be neutralized in one group but made more contrastive in the other. Linguistic isolation of a group may eventually result in dialect divergence and the rise of two unintelligible languages.

3.3.1 Standard Lithuanian and Latvian consonants

In Lithuanian sound change has resulted in a consonant system that has consonantal contrasts between plain and secondary palatalized consonants, as illustrated in Table 7 for standard Lithuanian. Note that standard Lithuanian has a full series of palatalized consonants, including palatalized labials, and a palatalized /r/; - all rare segments cross-linguistically.
Table 7: Standard Lithuanian consonantal inventory

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Dental/Alveolar</th>
<th>Palato-Alveolar</th>
<th>Palatal</th>
<th>Velar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop</td>
<td>voiceless</td>
<td>p, pʲ</td>
<td>t, tʲ</td>
<td>k, kʲ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>voiced</td>
<td>b, bʲ</td>
<td>d, dʲ</td>
<td>g, gʲ</td>
<td></td>
</tr>
<tr>
<td>Sonant</td>
<td>nasal</td>
<td>m, mʲ</td>
<td>n, nʲ</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Liquid</td>
<td>r, rʲ</td>
<td>l, lʲ</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glide</td>
<td>v, vʲ</td>
<td></td>
<td>j</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affricate</td>
<td>voiceless</td>
<td>ts, tsʲ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>voiced</td>
<td>dz, dzʲ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fricatives</td>
<td>voiceless</td>
<td>f, fʲ</td>
<td>s, sʲ</td>
<td>x, xʲ</td>
<td></td>
</tr>
<tr>
<td></td>
<td>voiced</td>
<td>z, zʲ</td>
<td>ʒ, ʒʲ</td>
<td>y, yʲ</td>
<td></td>
</tr>
</tbody>
</table>

Latvian palatalizing sound change also resulted in phonemic splits. However, comparing Lithuanian to Latvian in Table 8, we see that Latvian underwent slightly different processes that resulted in a significantly distinct consonantal inventory. Some Latvian consonants have become pure palatals, while others have plain and palatalized counterparts. With respect to palatalization, Latvian seems to have gone “further” in the development of coronal sounds: sonorants /l/ and /n/ contrast with /ʎ/ and /ɲ/ in terms of major place of articulation, not in secondary palatalization.
Table 8: Latvian consonantal inventory as I propose it

<table>
<thead>
<tr>
<th></th>
<th>Labial</th>
<th>Dental/Alveolar</th>
<th>Velar</th>
<th>Palato-Alveolar</th>
<th>Palatal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stop/Plosive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>p (pʲ)</td>
<td>t</td>
<td>k</td>
<td>c &lt;ķ&gt;</td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>b (bʲ)</td>
<td>d</td>
<td>q</td>
<td>j &lt;ģ&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Affricate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td></td>
<td>ts &lt;č&gt;</td>
<td>tʃ &lt;č&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td></td>
<td>dz</td>
<td></td>
<td>dʒ &lt;dʒ&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Fricative</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiceless</td>
<td>f</td>
<td>s</td>
<td></td>
<td>ʃ &lt;ș&gt;</td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>v (vʲ)</td>
<td>z</td>
<td>x &lt;h&gt;</td>
<td>ʒ &lt;ž&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Nasal</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voiced</td>
<td>m (mʲ)</td>
<td>n</td>
<td>(ŋ)</td>
<td>n &lt;ŋ&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td></td>
<td>l</td>
<td></td>
<td>A &lt;l&gt;</td>
<td></td>
</tr>
<tr>
<td><strong>Glide/Approximant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Trill</strong></td>
<td></td>
<td>r</td>
<td></td>
<td>r &lt;ŗ&gt;</td>
<td></td>
</tr>
</tbody>
</table>

Today in Lithuanian all consonants, have plain and palatalized counterparts, where the palatalized segments involve secondary palatalization. However, in Latvian some consonants have shifted to pure palatalals and display palatal/non-palatal primary place contrasts.

3.3.2 Synchronic consonant palatalization in Latvian

Let us briefly illustrate the grammatical and phonological system of synchronic consonant alternations in Latvian that involve palatalization. In standard Latvian all second declension nouns (masculine nouns with the ending /-is/), feminine fifth declension nouns (ending with /-e/), feminine sixth declension nouns, and first conjugation verbs in certain forms, undergo stem final consonant alternation. In Latvian, this process is called *vēsturiskā līdzskaņu mīja*: by this process, a consonant plus glide /j/ sequence (C+j) arises across the stem-suffix boundary and results in consonant alternations. Tables (Table 9) - (Table 11) (Table 14) - (Table

---

1It is not a general convention of standard Latvian phonology to include [pʲ] [bʲ] [mʲ], and [vʲ] as the alternating counterparts (allophones) of /p/, /b/ /m/, /v/ respectively, but I will give my logic behind it below as to why I consider them as part of Latvian sound system.
illustrate this synchronic consonant alternation for stem-final labials in nominal and verbal inflectional paradigms.

**Table 9: p ~ pj, b ~ bj**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom.</td>
<td>klēp-is</td>
<td>klēpj-i</td>
<td>gulb-is</td>
<td>gūlj-i</td>
</tr>
<tr>
<td>Gen.</td>
<td>klēpj-a</td>
<td>klēpj-u</td>
<td>gūlj-a</td>
<td>gūlj-u</td>
</tr>
<tr>
<td>Dat.</td>
<td>klēp-im</td>
<td>klēpj-īem</td>
<td>gūlb-im</td>
<td>gūlb-īem</td>
</tr>
<tr>
<td>Acc.</td>
<td>klēp-i</td>
<td>klēpj-us</td>
<td>gūb-ī</td>
<td>gūlj-usal</td>
</tr>
<tr>
<td>Instr.</td>
<td>ar klēp-i</td>
<td>ar klēpj-īem</td>
<td>ar gūlb-ī</td>
<td>ar gūlb-īem</td>
</tr>
<tr>
<td>Loc.</td>
<td>klēp-ī</td>
<td>klēpj-īem</td>
<td>gūb-ī</td>
<td>gūlj-īem</td>
</tr>
<tr>
<td>Voc.</td>
<td>klēp-ī!</td>
<td>klēpj-ī!</td>
<td>gūlb-ī!</td>
<td>gūlj-ī!</td>
</tr>
</tbody>
</table>

**Table 10: m ~ mj; v ~ vj**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nom.</td>
<td>kūrm-is</td>
<td>kūrmj-i</td>
<td>ziv-s</td>
<td>ziv-is</td>
</tr>
<tr>
<td>Gen.</td>
<td>kūrmj-a</td>
<td>kūrmj-u</td>
<td>ziv-s</td>
<td>zivj-u</td>
</tr>
<tr>
<td>Dat.</td>
<td>kūrm-im</td>
<td>kūrmj-īem</td>
<td>ziv-īj</td>
<td>ziv-īm</td>
</tr>
<tr>
<td>Acc.</td>
<td>kūrm-i</td>
<td>kūrmj-īem</td>
<td>ziv-īj</td>
<td>ziv-is</td>
</tr>
<tr>
<td>Instr.</td>
<td>ar kūrm-i</td>
<td>ar kūrmj-īem</td>
<td>ar ziv-ī</td>
<td>ar ziv-īm</td>
</tr>
<tr>
<td>Loc.</td>
<td>kūrm-ī</td>
<td>kūrmj-īem</td>
<td>ziv-ī</td>
<td>ziv-īs</td>
</tr>
<tr>
<td>Voc.</td>
<td>kūrm-i!</td>
<td>kūrmj-i!</td>
<td>ziv-īs</td>
<td>ziv-ıs</td>
</tr>
</tbody>
</table>

**Table 11: p ~ pj**

<table>
<thead>
<tr>
<th>I” conj. verb kāpt “to climb”</th>
<th>pres.</th>
</tr>
</thead>
<tbody>
<tr>
<td>es “I”</td>
<td>kāpj-u</td>
</tr>
<tr>
<td>tu “you”</td>
<td>kāp</td>
</tr>
<tr>
<td>viņš/viņa “he/she”</td>
<td>kāpj</td>
</tr>
<tr>
<td>Mēs “we”</td>
<td>kāpj-am</td>
</tr>
<tr>
<td>Jūs “you” pl.</td>
<td>kāpj-at</td>
</tr>
<tr>
<td>viņi/viņas “they” masc./fem.</td>
<td>kāpj</td>
</tr>
</tbody>
</table>
Notice that in the given paradigms in tables (Table 9-Table 11) above, the labials /p, b, m, v/ do not seem to undergo secondary or primary palatalization. Instead, the relevant inflected forms show consonant + glide sequences. However, in the literature, this synchronic consonant alternation has been defined in various ways. Among such descriptions are: ioticization (*jotāciija*) (Muižniece 2002: 45); *j* definite consonant shift (Laua 1997: 86); sequences of consonants with *j* (Endzelins, 1951: 57); and “palatalization” (Balode and Holvoet 2001:19). Balode and Holvoet (2001: 19) delineate this type of consonant shift as assimilatory palatalization and, depending on the dialect, describe the palatal consonants phonetically in terms of various degrees of palatalization: the consonants may be “slightly” palatalized, just palatalized, or shifted to pure palatals. It seems that from a phonetic perspective, labials within these paradigms are secondarily palatalized or phonetically palatalized as part of consonant-palatal glide clusters.

I propose a different interpretation of labials in the context of palatalization within these inflectional paradigms. The phonological consonant alternation in Latvian is regular and is simply characterized as palatalization. However, it applies differently to coronals and non-coronals as detailed in section 3.4. I propose that labials /p,b,v,m/ undergo secondary palatalization in palatalizing environments, while coronal consonants /l, n, r, t, d/ undergo primary palatalization in the same contexts, alternating with their pure palatal counterparts. As a result the labial system of alternations is as follows:

**Table 12: Labial palatalizing paradigms**

| p ~ p̊ | b ~ b̊ | m ~ m̊ | v ~ v̊ |

2 This suggestion is based on the phonological regularity of the system. Future phonetic studies should be carried out in the future to determine the precise articulatory and acoustic properties of labials in this context, and whether they contrast with Pj sequences (P a labial) elsewhere in the language.
Interestingly, A. Bielenstein in his 1863 “Lettische Sprachen” also proposed palatalized labials /pj, bj, mj, vj/ in the Latvian consonant inventory as Table 13: Latvian consonants as proposed by A. Bielenstein (Lettischen Sprache, 1863) shows. While Bielenstein does not explicitly state in his text the meaning of the parenthetical entries in the table, the usage seems to be consistent with and indication of allophones, or alternate variants. The term “allophone” in this context refers to contextual variants of particular phonemes.

Table 13: Latvian consonants as proposed by A. Bielenstein (Lettischen Sprache, 1863)

<table>
<thead>
<tr>
<th>Consonanten.</th>
<th>harte</th>
<th>mittlere</th>
<th>weiche</th>
<th>Halbvocale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rein</td>
<td>unrein</td>
<td>rein</td>
<td>unrein</td>
</tr>
<tr>
<td>Gutturales</td>
<td>k</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Palatales</td>
<td>h (a)</td>
<td>tsch</td>
<td>r</td>
<td>g</td>
</tr>
<tr>
<td></td>
<td>sch</td>
<td></td>
<td>t</td>
<td></td>
</tr>
<tr>
<td>Dentales</td>
<td>r</td>
<td>l</td>
<td>d</td>
<td></td>
</tr>
<tr>
<td></td>
<td>s</td>
<td>n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Labiales</td>
<td>p (pj)</td>
<td>m (mj)</td>
<td>b (bj)</td>
<td>w (wj)</td>
</tr>
</tbody>
</table>

Now let us consider coronal contrasts in Latvian. The coronals /t, d, l, n, r/ within synchronic grammatical system change their major place of articulation via primary palatalization in the same environment where labials become palatalized. These alternations are illustrated in the paradigms of Latvian consonant shift of 2nd declension masculine nouns vāciet-is “german”, bried-is “dear”, zirn-is “pea”, brāl-is “brother”, and asar-is “sea bass”.

3 Bielenstein uses /w/, /wj/ as it is in German, but it should be /v/ in Latvian.
This last paradigm, illustrated in (Table 16), gives a clear illustration of the important grammatical function served by rhotic palatalization in Latvia, prior to the loss of this contrast.
Recall that one of the phonological differences between Latvian and Lithuanian is that Latvian shows primary palatalization like that seen in (Table 14) - (Table 16), while Lithuanian does not. Let us now try to understand how these two Baltic languages diverged in terms of specific sound changes involving palatalization.

3.4 Diachronic palatalization in Lithuanian and Latvian.

Lithuanian on some accounts is considered a more conservative Baltic language than Latvian, meaning that it has gone through less sound change and contains more archaic forms (Balode and Holvoet, 2001). In some cases, Lithuanian conserves Proto-Baltic sound patterns that, themselves, reflect older Proto-Indo-European patterns, so that Lithuanian can be used in wider comparisons to illustrate sound changes that have taken place in other non-Baltic languages. For the purpose of this discussion, Lithuanian can be used for purposes of the comparative method as a conservative Baltic language, clearly reflecting certain sound changes that Latvian has undergone. In these cases, Lithuanian cognates can be used to exemplify Latvian developments, some of which took place in the paradigms presented earlier.

The palatalizations that took place in the development from Proto-Baltic to Latvian and Lithuanian have been detailed in earlier works by Dini (1997) and Endzelīns (1922, 1951) and I follow in large part the work of these authors.

There are two PIE palatal segments inherited by Baltic *c <⟨k⟩> and *J <⟨g⟩> which, according to Fortson (2010) might have been pronounced close to plain velars [k] and [g], but still farther forward in the mouth. As has been known for over a century, velar palatalization in Indo-European is quite old, and characterizes the “satem” groups, including Baltic. These inherited palatals underwent the well-known “satem” changes, with reflexes as shown in (Table 17). In satem languages the sound change took place as follows:
Table 17: Satemization in Baltic

<table>
<thead>
<tr>
<th>PIE</th>
<th>Baltic</th>
<th>Lithuanian</th>
<th>Latvian</th>
</tr>
</thead>
<tbody>
<tr>
<td>*c *γ *ʝʰ</td>
<td>*ʃ *ʒ</td>
<td>*ʃ *ʒ</td>
<td>s z</td>
</tr>
</tbody>
</table>

Indo-European palatovelars *k *g in Baltic presumably changed to alveo-palatals *ʃ and *ʒ, respectively (Dini, 1997: 92). In Lithuanian these alveopalatal were inherited without change, whereas in Latvian they shifted to alveolar fricatives /s/ and /z/; in the case of /s/, this constituted a merger with /s/ from Proto-Baltic /s/.

Baltic voiceless and voiced velar stops *k, *g before *i (j), *e in Lithuanian changed to palatalized velars [kʲ], and [gʲ] while in Latvian they underwent further development to /ts/ <c> and /dz/ respectively. For example, Baltic *tikiu in Lithuanian is <tikiu> and Latvian <tieu> 1p.sing. “(I) believe”; Baltic *regiu in Lith. is <regiu> and Latv. <redzu> 1p.sing. “(I) see” (Endzelins 1951: 59).

Baltic coronal stops *t, *d +*i changed into /č/, /dž/ in Lithuanian, but in Latvian, they again developed further into −/ʃ/, /ʒ/. For example, Baltic *vākietsia in Lith. is <vokiečiai>, in Latv. <vācieši> “germans”; Baltic *briediai in Lith. is <briedžiai>, in Latv. <brieži> “deer”.

Proto-Baltic coronal sonorant sequences *nj, *lj, and *rj in Lithuanian changed to secondary palatalized segments [ɲʲ], [lj], [rj], but in Latvian they developed further into pure palatals [ɲ] <ņ>, [ʎ] <ļ>, and [r] respectively. For example, in Lith. sing. Gen. žirmio, but in Latv. zirņa “(of a pea)”; in Lith. sing. Gen. brolio, but in Latv. brāja “brother’s”, in Lith. 1p.sing ariu, but in Latv. āru “I plough” (Dini, 1997: 94) In Latvian pure palatals [ɲ] <ņ>, [ʎ] <ļ>, and [r] are still reflected as such in standard Latvian (Endzelīns 1922). There are no Latvian words containing nj, lj and rj sequences; the regular palatalization of these sounds has been
phonologized. In Lithuanian these consonants are written as <ni>, <li>, and <ri>, but they are articulated with a secondary palatalization as \([n^i], [l^i]\) and \([r^i]\) (<i> is an orthographic convention for the pronunciation of secondary palatalized consonants).

Secondary palatalization in Baltic, directly inherited in Lithuanian, and further evolution to primary palatals and alveo-palatals in Latvian, are natural phonetically motivated sound changes. As detailed earlier, secondary palatalization has articulatory origins in coarticulation, while primary palatalization has a clear perceptual component as well (Ohala 1981, 2012; Guion 1998). Within Evolutionary Phonology the advanced Latvian palatalizations combine three “sources” of sound change, within the CHANGE-CHANCE-CHOICE model: co-articulation is intrinsic to the production of CV and CG sequences, giving rise to palatalized consonants in the first place, in earlier stages of Baltic, that can be taken as phonetic articulatory and acoustic targets themselves (CHOICE); perceptual biases (CHANGE) can result in hearing palatalized sounds as a pure palatal or alveo-palatal; and ambient palatalization, a long-domain feature, can be interpreted as a feature of the consonant, rather than the original vowel or glide (CHANCE) (Blevins 2004: 33ff). Again, it is clear that Latvian is less conservative than Lithuanian. Where the coronals in Latvian shift in major place of articulation, in Lithuanian the contrast between plain consonants and their secondary palatalized counterparts reflects the earlier stage of contextual automatic palatalization in pre-palatal contexts.
IV Palatalized vs. palatal rhotics

The alternations just illustrated show primary palatalization of coronals but secondary palatalization of non-coronals in Latvian. A central question of this paper is whether, in the same contexts of palatalization, Latvian *r underwent secondary or primary palatalization. Since /r/ is typically classified as a coronal sonorant, one’s expectation might be that Latvian /r/ should pattern with /l/ and /n/, undergoing a primary shift of articulation to a pure palatal. On the other hand, palatal rhotics are uncommon in the world’s languages, so perhaps Latvian palatalized <ŗ> was, like the labials, a consonant with secondary palatalization.

In order to answer this question, we will examine the historical evidence for the existence of a palatalized “ŗ” in Baltic languages, and Latvian in particular. Retrieved written texts of Old Prussian, Lithuanian and Latvian show two separate phonemes [r] and [ŗ] suggesting that the two segments existed already before the standardization of Latvian language around 1920 (Rūķe-Draviņa, 1994). Old Prussian Elbing vocabulary (circa 1300 AD) also showed separate [r] and [ŗ] segments. Careful examination of Latvian historical texts also shows that palatalized <ŗ> was used in written forms throughout the territory constituting present-day Latvia. From this basis, we can conclude that a contrast between separate phonemes /r/ and /ŗ/ was present in Latvian from its earliest attestations, and that both *r and *ŗ can be reconstructed for late Baltic, with the contrast continued in Old Prussian, Lithuanian and Latvian. Though the evidence for the /r/ vs. /ŗ/ contrast in early Latvian is overwhelming, we review facts here, since many native speakers have questioned whether this contrast is a significant or inherited one.

Useful sources are early Latvian grammatical descriptions. Since Latvian consonantal palatalization is embedded within the grammatical system of conjugations, it is discussed in historical grammars. One difficulty that arises, however, is that early documentation of Latvian
was often done by local German-speaking gentry who were not native Latvian speakers. As non-native speakers, these authors sometimes show inconsistencies in their grammatical descriptions and other features suggesting that their understanding of the complexities of the grammatical constructions was only partial. German does not have a contrast between plain and palatalized (non-velar) consonants, so that a contrast between a palatalized and non-palatalized rhotic may not have been noticed. Even so, there are examples in several of these texts indicating an existing palatalization process consistent with current day usage.

The first such grammar known to us, *Manductio ad linguam lettonicam*, was put together and published in 1644 by Johann Georg Rehehusen, a philologist and Lutheran pastor residing in Latvia of German descent. Relatively soon after his publication, in 1685, three other Latvian grammars by Langius, Dreszell, and Adolphi were published. An extensive analysis of the first written Latvian grammars concentrating particularly on Latvian palatalization was done by Australian linguist T. Fennel. Fennel (1980) specifically examined how Latvian noun declension paradigms involving consonant palatalization were described. Fennel concludes that all of the three grammar prescriptions lacked a sufficient framework, in the first place, to successfully show the right palatalization paradigms. Rehehusen and Langius distinguished only two declensions and categorized them as masculine and feminine. Dreszell in his *Gantz kurtze Anleitung zur Lettische Sprache* distinguished 5 nominal declensions, but still failed to illustrate complete paradigms of palatalization. Although Adolphi recognized the second masculine declension ending */-is/*, and showed some palatalization patterns, he still did not describe the palatalization paradigms sufficiently and systematically. However, this does not mean that all authors were entirely oblivious to consonant palatalization in noun declension paradigms. It means only that the given paradigms with consonant alternation patterns were extremely
inconsistent with no rules or explanations provided. Fennel (1980) concludes that these inaccurate and inconsistent descriptions “should be ascribed to careless inconsistency in presentation” and to the native German speakers being “unaware of the phenomenon”. A similar conclusion is reached by Rasma Grīšle (1958) in her examination of Langius’s grammar. She also suggests that the failure to describe Latvian inflectional paradigms correctly was due to the incomplete knowledge and lack of mastery of the language.

Another important German scholar born in Latvia was G.F. Stender. In Figure 3 we see the cover of his 1783 Latvian grammar.

Figure 3: The cover of Fr. G. Stender “Letische Grammatik” 1783
Now consider Figure 4. In Stender’s 24th paragraph he significantly lays out the necessary framework of noun declensions in order to properly show palatalization as a regular consonant alternation within inflectional paradigms. We see that he describes three masculine and three feminine declensions. And further on, as shown in Figure 5, we see that Stender recognizes and exemplifies masculine second declensional paradigms containing palatalization which is consistent with current usage. In modern Latvian there are six noun declensions - three masculine and three feminine. The first masculine declension nouns end in /-sl/, /-šl/ (<-sch> in Stender’s orthography) (e.g. vīrs- “husband, man”, tēv- “father”, kar-š “war”), second – in /-is/ (e.g. brālis- “brother”, laud-is “folks, people”, brīdis- “moment”) and the third with -us (e.g. med-us “honey”, liet-us “rain”, led-us “ice”). The three following feminine declension nouns end with /-al/ (e.g. māja “house, home”, siev- “wife, woman”, māsa- “sister”), /-el/ (e.g. māte- “mother”, svec- “candle”, saul- “sun”) and the last feminine declension noun ends with -s (e.g.
sāl-s “salt”, sird-s “heart”, ugun-s “fire”). In order to successfully show the noun inflectional paradigms in modern Latvian, one must distinguish and classify these six declensions. The examples in Stender’s paragraph 30 (Figure (5)) show inflectional paradigms of second declension noun sapn-is “dream” which has palatal nasal [ɲ] in sapn-a in sing. Gen. “(of the) dream” and also in all of the plural examples: sapn-i, sapn-u, sapn-iem, ar sapn-iem, sapn-us, sapn-i, sapn-os. The second noun in this paragraph is sun-s “dog”. This noun is classified in second declension even it ends in -s, because historically it used to be sun-is. Therefore its inflection shows consonant alternation sun-s sing. Nom. “dog” – suņ-a sing. Gen. “(of the) dog”, which is still consistent with the current use. Under 2) in Figure 5 Stender also describes in prose how certain stem final consonants undergo palatalization. Consider how he also illustrates and describes the palatalization pattern of stem final /rl/. In this passage, he says explicitly that stem final l, n, and r alternate with l, Ň and ņ.

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4 Stender writes this noun with double <ņņ> which is not the current convention. This orthography contains many Germanic elements, since the Latvian orthography in 1783 was not yet standartized.
Based on written historic texts, for example, the pages shown in (6), and the first attempts of grammar descriptions in the 17th and 18th centuries, I maintain that palatalized <ŗ> contrasted with <r> in all Latvian dialects, and was pronounced with either primary or secondary palatalization. Since we do not, at present, have recorded materials or native speakers of modern <ŗ> dialects available for acoustic or articulatory analysis, I will speculate on the phonetics of contrastive Latvian <ŗ> on the basis of Latvian phonology and phonetics, and phonological and phonetic typology more generally.
4.1 Articulatory and acoustic characteristics of Latvian rhotics

How was Latvian palatalized “r” pronounced? Was it a pure palatal or did it have secondary palatalization?

Historical linguists have speculated as to how Proto Indo European rhotics would have been pronounced. Quiles (2009: 140) hypothesizes that Indo-European *r was probably articulated more like an alveolar slightly trilled r-sound [r], as this is the most common reflex of *r in Indo-European languages today. Latvian, Lithuanian (Endzelins, 1922), Russian, Polish, Ukrainian, Finish (Ladefoged, Maddieson, 1996), Spanish and Catalan (Recasens, Espinoza 2007) among others all have alveolar trills in their phonemic inventories. Perhaps PIE *r varied allophonically with an alveolar flap [ɾ] intervocally (Quiles 2009: 140). Solid evidence for the precise pronunciation of *r in Proto-Baltic is lacking as well, however, we might suggest that its articulation could have been very close to PIE alveolar trill, since the most common reflex of *r in Baltic and Slavic languages is a trill.
Today, standard Latvian contains one rhotic phoneme, the voiced alveolar trill [r], written as <r> in the native orthography. The active speech organ involved in the articulation of the Latvian trill is the tongue tip. The tongue tip taps multiple times or vigorously vibrates on average 2 to 3 times against dental or alveolar ridge region. The body of the tongue is slightly tensed; however the tip of the tongue must be relaxed so that the airflow can result in periodic vibration of the tongue tip (Muižniece, 2002). This kind of tongue vibration or repeated rapid closure and release is primarily achieved by certain aerodynamic conditions (Ladefoged, Maddieson, 1998).

A preliminary acoustic study (Grigorjevs, 2012) of Latvian trills shows that word “initial trill was produced with only one vibration, in some cases with two. The final trill was produced mostly with two vibrations, but could also consist of one or three vibrations.” The dynamic spectrograms in this same study showed that the open or the release phase of Latvian trills “were characterized by a well defined vowel-like formant pattern with one to three short interruptions corresponding to the closed phase of vibration”. Interestingly, the results also showed that the formant frequencies of [r] depend on the quality of the following vowel. For instance, if [r] was followed by a high vowel [i] or [u] in a CV transition, it had the lowest frequency value of F1 as opposed to before mid and low vowels. In addition, in the context of palatal vowels [i] and [e], the trill had the highest frequency values of F2. In contrast, in the context of the back vowels [ɔ] [u], F2 for [r] was the lowest, but if followed by [æ] and [a] its F2 was intermediate between the two other vowel contexts. The scalar nature of these figures suggests classic phonetic coarticulation, not evidence of a palatalized /r/. Nevertheless, one can not rule out the possibility...
that, in contexts of grammatical palatalization, variations in the pronunciation of /r/ could reflect earlier phonological palatalization of rhotics in the same context.

4.2 Palatalized vs. palatal trills

Above, I argued that Latvian once had a clear contrast between a plain rhotic and a palatalized rhotic. Minimal pairs illustrating this contrast were present in at least some dialects of Latvian until modern times. Whether these dialects are still represented is unknown.

Table 18: Minimal pairs

<table>
<thead>
<tr>
<th>Latvian</th>
<th>Gloss</th>
<th>Latvian</th>
<th>Gloss</th>
</tr>
</thead>
<tbody>
<tr>
<td>asaru</td>
<td>N. Sing. Gen. &quot;(of) see bass&quot;</td>
<td>asaru</td>
<td>N. Pl. Gen. &quot;tear&quot; (from an eye)</td>
</tr>
<tr>
<td>meŗa</td>
<td>N. Sing. Gen. &quot;(of) plague&quot;</td>
<td>meŗa</td>
<td>V. 3rd p. Sing. &amp; Pl. Pres.&quot;to measure&quot;</td>
</tr>
<tr>
<td>bēŗu</td>
<td>N. Sing. Gen. &quot;(of) funeral&quot;</td>
<td>bēŗu</td>
<td>V. 1st p. past &quot;pour&quot;</td>
</tr>
<tr>
<td>vara</td>
<td>N. Sing. Gen. &quot;copper&quot;</td>
<td>vara</td>
<td>N. Sing. Nom. &quot;power&quot;</td>
</tr>
<tr>
<td>gara</td>
<td>Adj. Nom. &quot;long&quot;</td>
<td>gara</td>
<td>N. Sing. Gen. &quot;(of) spirit&quot;</td>
</tr>
<tr>
<td>duŗ</td>
<td>V. 3rd p. Sing. &amp; Pl. &quot;poke&quot;</td>
<td>tu dur</td>
<td>V. 2nd p. Sing. &quot;poke&quot;</td>
</tr>
<tr>
<td>aŗ</td>
<td>V. 3.rd p Sing. &amp; Pl. &quot;plough&quot;</td>
<td>ar</td>
<td>Prep. &quot;with&quot;</td>
</tr>
</tbody>
</table>

We also have detailed information about the Latvian trill, as discussed in the previous section. However, details of the articulation and acoustic properties of the palatalized trill “r” in Latvian are problematic.

In 1946 the palatalized “r” symbol <ŗ> was formally removed from the standard written language (see section 1). As a consequence, the sound quickly disappeared from usage in subsequent generations. It is a significant challenge to obtain precise physical and acoustic data and to determine actual usage. To my knowledge, only a few linguists have touched on the subject of palatalized “r” in Latvian (Rūķe-Draviņa, 1994). Even in these references, mention is
typically incidental and limited to just a small paragraph or a few sentences, usually stating that this segment was once a separate phoneme in the language, but no longer exists in current standard usage.

Native Latvian speakers who fled the Soviet occupation after World War II have lived outside of Latvia during the Soviet regime from 1945-1990. Latvian as spoken by some of this population has been relatively unchanged since Latvian schooling in the 1920’s and 1930’s, a period before the official orthography was changed to eliminate palatalized “r”. Some of these speakers still maintain a contrast between the plain and palatalized rhotics, however, many do not. People who grew up in occupied Latvia only vaguely know the grammatical use of the palatalized rhotic. These same speakers have difficulty producing the contrast, and may not even perceive a distinction between palatal and non-palatal “r”. There are hardly any older speakers in Latvia who still pronounce this sound. However, there are documented exceptions in some remote regions, as will be discussed below.

A significant difficulty in this analysis is to attempt to pinpoint language internal linguistic characteristics to determine whether palatalized “r” in Latvian became a pure palatal [ɾ] or just palatalized [ɾ̥] as it is in standard Lithuanian and other Slavic languages today. The following detailed analysis will shed some light on this question by providing several different perspectives.

4.2.1 Secondary palatalized r – [ɾ̥]

Despite the scarcity of descriptive and accurate acoustic data on Latvian palatalized “r” given in 4.1 above, in the next two sections I offer phonological and phonetic arguments for the existence and nature of this sound based on descriptive data given by Endzēlīns, Mülenbach,
Rūķe-Draviņa, Ābele and others. Comparison with Slavic rhotics is also useful in attempting to determine the phonetic nature of rhotic palatalization.

As we saw already in the articulatory description of the plain trill in Latvian, the main articulator for the plain rhotic is the tongue blade/tip. If a sound like this is palatalized, then the major articulator will remain the same: for apical trills and their (secondarily) palatalized counterparts it is the tip of the tongue that is rapidly vibrating against alveolar region and that is the primary articulator (Bolla 1981). This is confirmed by Bolla’s description of Russian palatalized \( r^3 \): “voiced apico-alveolar coronal […] the taps (3-4 times) are made with the tip of the tongue. The rims of the tongue form a wide area of contact with the upper row of the teeth from the eye teeth backward and shut off the lateral regions”. In Russian, the palatalization of “\( r \)” is classified as secondary, and Bolla describes it as an additional articulation – “with the body of the tongue moving forward and raising towards the palatum the front part of the resonator is decreased, while the back part is increased in volume”.

Bolla’s description of Russian secondary palatalized \( r^3 \) seems to be close to Endzelīns (1951: 27) description of Latvian palatalized “\( r \)”. Endzelīns gives a brief description of the articulation of this sound: “the tip of the tongue is raised slightly more than in the articulation of plain [\( r \)], in addition the front part of the tongue is formed flat. The middle part of the tongue is moved closer to the hard palate and with the sides slightly touching alveoli and/or upper teeth.” By Endzelīns’s description, the Latvian palatalized “\( r \)” has a primary constriction involving the tongue tip, with the tip of the tongue flat, but still vibrating. At the same time, there is secondary constriction at the middle and back of the tongue (dorsum), since he notes that the rims of the tongue blade are touching upper teeth. Is it possible at this point to determine whether Latvian
palatalized “r” was indeed secondary or primary palatalized? Before we answer this question, let’s examine characteristics of primary palatalization.

**4.2.2 Primary palatalized r – [r]**

Hall (2000) argues that palatalized coronal rhotic sounds (flaps, trills and approximants) are more marked, meaning generally much rarer in the languages of the world, than other a coronal non-rhotic segments like [t̚, d̚, n̚, l̚]. He suggests that this is the case because these rhotics are apical (articulated with the tip of the tongue) and not because they are trills (tongue tip vibrating against the dental/alveolar ridge region). Hall emphasizes that non-rhotic coronal consonants (stops, fricatives, nasals and laterals) all have pure palatal counterparts like [c, ɕ, ɲ, ʎ], where the blade of the tongue constricts at the hard palate. However pure “palatal trills” and “palatal flaps” are non-existent. He writes: “Indeed, ‘palatal trills’ and ‘palatal flaps’ – if they existed at all – would be segment types that would require an amazing amount of articulatory effort. Since trills and flaps can only be produced if the vibrating articulator has a small mass, the implication is that places of articulation like palatal, which necessitate an articulator with a large mass, are highly unlikely.” Hall (ibid.) further affirms that this statement holds if the assumption is made that “coronal flaps and trills are universally [-distributed]”. He uses this feature value as defined by Chomsky and Halle (1968) in terms of “length of constriction on the midsaggital section on the upper surface of the tongue”. Since trills and flaps/taps are apical ([−distributed]) and palatals are laminal ([+distributed]), palatal trills and flaps cannot exist. Latvian was not included in Hall’s study, but since his claims are meant to hold universally, the prediction is that Latvian could not have a pure palatal rhotic; the Latvian sound under study here must have been a rhotic with secondary palatalalization. Is there evidence to support or dispute this view?
One starting place for more evidence of articulatory properties of the Latvian palatalized “r” is written materials. Orthography is not always the most reliable source for such an endeavor, but Latvian orthography is highly transparent, and, historically, Latvian speakers pride themselves on having an essentially phonemic writing system, where each symbol has a single phonological interpretation, and each phoneme has a unique orthographic symbol. The grammarians who determined the appropriate approach to Latvian orthography may have taken this fact into consideration and thus the orthography may shed some light on the potential pronunciation of existing segments. Palatalized “r” is found in 16th century Latvian texts, and in those texts it appears as a single segment <ŗ>. From the phonemic perspective, this gives us a clear indications that the palatalized rhotic was not a sequence of two separate segments /rj/, but rather one single sound that contrasted with <r>. However, the precise phonetic distinction remains unclear, and requires further evidence.

One of the earliest attempts at describing the palatalized rhotic is found in Stender’s 1783 “Letische Grammatik” briefly mentioned above. In his description of the pronunciation of Latvian alphabet sounds, Stender includes palatalized “r” and explains that it should be “read as [erj], except that j must not be distinctly heard” (Figure 7). This description suggests that Latvian palatalized “r” most likely was primary palatalized and articulated as pure palatal trill [ɾ] as opposed to a secondary palatalized trill [ɾʲ]. In sounds with secondary palatalization, the CV transition is marked by glide-like formant transitions that can give the impression of [j]. One interpretation of Stender’s remarks is that no glide-like transition should be heard. Yet, another interpretation is that the transition should be extremely SHORT, unlike the full length of a [j]-sound.
Finally, let us consider the diachronic sound change of palatalization in Latvian specifically regarding the palatalization of the coronal sonorants *n, *l and *r. A part of the palatalization paradigm of the grammatical system is repeated below for the convenience. Consider Baltic *n, *l, *r + *i > Lith. ni, li, ri and Latv. ņ, ļ, ŗ (Lith. sing. Gen. žirnio “of a pea” Latv. zirņa; Lith. sing. Gen. brolio “brother’s” Latv. brāļa, Lith. 1p.sing ariu “I plough” Latv. aŗu) (Dini, 1997).

The natural class of /l, n/ in Latvian are the coronal (non-rhotic) sonorants. If primary palatalization is affecting all coronals, as suggested earlier, in contrast to labials, which consistently undergo secondary palatalization, then one expects /r/ to pattern with /l/ and /n/. On phonological grounds, then, one can conclude that the place of articulation for the palatalized rhotic shifted from dental/alveolar to alveo-palatal or palatal. Dialectal evidence for this position can be found in Ābele’s (1929) description of a South-Western dialect of Latvian (see below). In this dialect, the palatal rhotic sounded “strange” to her ear. Interestingly, in transcribing the verb <nobaŗuat> ‘to overfeed’, Ābele transcribes [nuabag’ot] and [nuabad’ot]: in both cases, the [g’] and [d’] symbols are describing a sound with significantly backed palatal place of articulation, with the first seemingly palatal, and the second alveo-palatal.
V The fall of palatal ŗ in Latvian

Latvian once had a contrast between plain /r/ and palatalized /ŗ/. In the modern standard language, this contrast is gone, and neutralization has been to the plain, non-palatalized /r/. There are at least two ways of understanding the loss of the palatal rhotic. One possibility is that the contrast between the two rhotics was a natural phonetic development: because, as discussed earlier, palatality and trilling are not entirely compatible, the palatal component of this sound was gradually lost, with a merger of the two sounds by regular sound change. A second possibility is that the loss of <ŗ> was distinctly unnatural: the symbol <ŗ> was taken out of the Latvian orthography in 1946. As speakers became literate in Latvian, they would change pronunciation to conform to spelling, since the spelling system is phonemic. Over the course of one generation or so, the earlier contrast could be lost. A third possibility is that both natural and unnatural forces were at play: neutralization of the contrast had already taken place in some dialects, but the change was sped up dramatically when the symbol for <ŗ> was eliminated from the writing system in 1946.

5.1 Phonetic naturalness of rhotic depalatalization

Although palatalized rhotics are relatively rare sounds within consonant inventories, there are a few languages, such as Lithuanian and some Slavic languages that maintain them. However, within Baltic and Slavic there has been a tendency toward depalatalization, which acts to neutralize the palatal/non-palatal contrast between rhotic segments (Kochetov, 1998).

Rhotic depalatalization is attributed to articulatory incompatibility: sustaining a trill and palatalization are “different constraints that make conflicting demands”. Kavitskaya et al (1997) seek the exact nature of this incompatibility and propose that “conflicting physical constraints on the tongue dorsum can be held responsible for the sound changes that involve depalatalization”.
Kavitskaya et al focuses on Slavic languages. From the phonetic and acoustic studies of Russian rhotics Kavitskaya et al. conclude that; “palatalization requires the dorsum of the tongue to be fronted into the palatal region” which interferes with trilling, because trilling requires dorsum to be retracted.

Two additional aspects of rhotic trills that could play a role in neutralizing palatal articulations are aerodynamic properties and the tongue mass to sustain the needed aerodynamic force. Palatalization and trilling require the tip and blade of the tongue acting together, which impacts the freedom of the tongue and results in increased tongue mass. This increase directly affects the control of the aerodynamic force required to sustain the trilling (McGowan 1992).

In sum, there are natural phonetic factors that inhibit trilling in palatalized rhotics. The plain /r/ in Latvian is trilled; the historical palatalized or palatal rhotic was also, seemingly trilled. As a trill, palatalization was compromised and may have been gradually lost.

5.2 Gradual rhotic depalatalization in Latvian

While evidence of palatalized “r” in spoken Latvian over a historical period is scarce, four sources have been identified that indicate a progression of loss. First, the previously cited documentation of Latvian phonology in the 17\textsuperscript{th} and 18\textsuperscript{th} century typically includes reference to a palatalized “r” sound as distinct from a plain trill. While these sources are incomplete, the ubiquitous mention of this distinction would indicate that usage was fairly wide-spread.

Second, Endzelīns (1922) documents Latvian phonology based on data collected in the late 19\textsuperscript{th} century. He states that Latvian \(<\!r\!\! > < *rj, was preserved only in some parts of the Central (Vidzeme), and Tamian (South-West Latvia) dialects in the speech of unsophisticated rural folk. Endzelīns lists such North-East regions as Skulte, Dunte, Pabaži, Bīriņi Bauņi (see
map bellow) as <ŗ>-ful areas. Palatal <ŗ> was also recorded around Jelgava, Tērvete and Dobele in the end of the 19th century, but by the beginning of the 20th century it had already lost its palatalization and neutralized to plain trill (Endzelīns, 1951: 181). In the rest of the territory <ŗ> had become neutralized to plain trill.

Since Endzelīns notes that the information on the loss of the palatal [ŗ] was collected at the end of the nineteenth century, it suggests that the process of the loss of the palatal [ŗ] had already begun to take place earlier, although it is impossible to determine the exact time period when this process precisely began. Despite the loss of the palatal [r] in people’s pronunciation, Endzelīns, following the previous scholars, included it in the alphabet of the standardized language system in the beginning of the 1920s.

In more recent times, Anna Ābele (1929) described a dialect spoken in South-Western part of Kurzeme in a region called Gramzda (see map). She noticed that there were some people pronouncing the palatal [ŗ] that to her sounded “strange”. Instead of saying nobaŗot, they said something like [nuabag'ot] or [nuabad'ot] “feed too much”.

Figure 8 Territories where Latvian palatalized “r” has been documented
The Southwest and North-central areas on the map are edges of the Latvian-language area, and suggest a relic feature. Neutralization may have begun centrally, and gradually diffused outward, not yet reaching these extreme geographic areas.

What is the situation today? Latvian palatal [r̟] appears to be a very rare feature. The contrast between plain and palatalized rhotics does not exist for most speakers, including those living outside Latvia who were then educated in Latvia during 1920s, 1930s and the first part of 1940s and were not affected by Russification or Soviet regime language policies. However, many of these speakers whose parents may have maintained the contrast consider rhotic palatalization an integral part of Latvian grammar, and a contrast that should be maintained.

An indirect source of current usage of the palatal [r̟] in Latvian has been identified in the voice recordings of oral history done by Zirnīte (2006). Within the research project called National Oral history – “Time of change” a scholar of Latvian Institute of Philosophy and Sociology Māra Zirnīte in the end of the 1990s and the beginning of the 2000s recorded many personal life stories of people all over the Latvian regions. Zirnīte (2006) shares her insights about striking aspects that remain the same with the person throughout the history of their lives. She writes “The language used in the life stories, the imagery and forms of expression which dominated were features created by a particular era, a geographical and social milieu which had been adopted in the youth of the narrators. These were the most resistant to change”. An initial discussion with Prof. Zirnīte led to the discovery that she had noted some “strange” pronunciations of the ‘r’ sound in certain recordings. Within her collection of recordings of these interviews, a few people in the South-Western regions still pronounced the palatal trill in their speech. A comprehensive review of this information is beyond the scope of this paper.
However, these recordings may allow for future acoustic study of Latvian palatalized rhotics in at least one dialect.
VI The sociolinguistics of Latvian <ŗ>

6.1 Positive associations: Latvian national pride and cultural identify

As noted earlier, there are ex-patriot Latvians living in the United States and Canada who were educated in Latvia during the 1920s, 1930s and the first part of the 1940s. Those who continue to speak Latvian were not affected by Russification or Soviet regime language policies. Some of these speakers may have a slight palatalized rhotic and maintain a contrast between <r> and <ŗ>. However, many speakers who may not make the contrast themselves have strong feelings about the palatalized rhotic. In their view, the contrast between plain and palatalized rhotic is an integral part of Latvian grammar; it distinguishes declensional paradigms, and minimal word pairs. It is part of the cultural heritage passed down from Baltic ancestors, and therefore is of great value. For these Latvian speakers, the palatalized rhotic is integral to language and culture, and should be maintained or reintegrated into the language by reintroduction of the symbol <ŗ> into the orthography, and explicit language teaching of proper pronunciation (Kalniņš 1976).

6.2 Negative associations: the Russification of Latvia and Latvian

As mentioned earlier palatal <ŗ> was officially removed from the Latvian grammatical system and orthography in 1946 when Latvia was under Soviet occupation. There is little to no information as to how this policy was received by the Latvian people or by prominent linguists like Endzelins, who decided to stay in Latvia at the time of occupation. Disobeying or disagreeing with the regime meant deportation or execution. In this context, it is not surprising that there is no written documentation of reactions to the new language policies.

As mentioned earlier, the Latvian diaspora that fled soviet occupation, continued to maintain the language standards they were familiar with in pre-soviet Latvia, and were angry, worried and
upset about Soviet-imposed linguistic policies. In my personal conversations with Latvian speakers living in the New York City area I learned that they still use and support Endzelins’ grammar and orthography in order to keep “pure” Latvian alive.

Among Latvians living in America, the prevailing view is that the official elimination of the palatal ř in 1946 was carried out by the Soviet regime as part of Russification ideology propaganda. Under this view, the main purpose of language policy change was to make Latvian language more like Russian. However, this view is linguistically unsupported. Slavic languages like Russian have full plain (velar) and palatalized series of consonants, including palatalized rhotics. Palatalized r-sounds would not present any obvious articulatory difficulties for Russian speakers learning Latvian, and, if anything, maintaining the contrast would make Latvian more like Russian. In fact, the prominence of the palatalization contrast in Russian would make Russian speakers sensitive to the palatalization contrast in Latvian. Given this, it could well be that the elimination of ř from the Latvian orthography in 1946 was actually due to the fact that in the dialects of major cities where Russian authorities lived, the Latvian palatalization contrast in rhotics was either very weak, or had already been neutralized. This is supported by the fact that the only native consonant symbol that was eliminated from use was the ř. If Russification had been behind orthographic changes, more sweeping changes might be expected.

While it is hard to tell what kind of language planning the Soviet regime had in mind in the long term given the overall secrecy of the regime, a linguistic explanation for this small revision of the Latvian orthography seems more plausible than the alternatives where it is viewed as “Russification”.
6.3 Orthography wars

The positive associations of \(<r>\) sketched above, along with negative feelings regarding its elimination from the standard orthography have given rise to a debate about Latvian rhotics that goes well beyond grammar, linguistic science and rationale inquiry. This is a debate that bares a heavy national weight. It is about the integrity of being a true Latvian, free of any leftover elements of Russification, and it touches on the painful experiences of occupation.

The debate has been fueled, in recent years, by some Latvian linguists and scholars as well. Rasma Grīsle (2005), Velta Rūķe-Draviņa (1994), Jānis Kušķis (2004), and Aleksis Kalniņš (1976) have all published articles calling for the need to reintroduce the palatalized “r” into the Latvian language system by providing a detailed grammatical accounts and citing the logical grammatical and phonological structure that would indicate a need for this sound. The intent seems to be that a more detailed description of the usage logic can lead to the realization that its use within the grammar is not as complicated as it may seem. Currently their pleas are not being seriously considered by language policy makers and the prospects of returning to “Endzelīns’ grammar” are very thin. A language policy change of this nature would require substantial financial and intellectual investment. Crafting an effective reintroduction plan among other things, would include changing the content of grammar books, teaching materials, and software programs. At a time when financial resources are short and Latvian is spoken by a small minority of Europeans, still losing ground to Russian, it is reasonable to ask if spelling/grammar reform is a good use of time and money.

The debate on what to do about Latvian \(<r>\) is the topic of lively discussion on Internet blogs and forums as well. Questions range from “what is palatal \(<r>\)?”, “Did Latvian ever have an \(<r>\)-sound?” to the most controversial question “Should \(<r>\) be reintroduced into Latvian
orthography and grammar?" On this last question, opinions differ widely. Some are dismissive, considering it an archaic element that must belong to history. Others adhere to the belief that the restoration of this phoneme is vital to Latvian national identity, both within the Latvian community and in the global context. Currently, there are no substantial public surveys or referendums conducted to know how many Latvians would be supporting the re-introduction of <ŗ> and how many would be against it.
VII Conclusions and future research

Palatalized rhotics are relatively rare segments in the sound inventories of the world’s languages, and Hall (2000) argues that primary palatalized rhotic trills do not exist. In this linguistic context, Latvian <ŗ> is of special interest. This sound clearly emerged through the natural process of palatalization before palatal vowels and glides. Given the morphology of Baltic languages, this palatalization was associated with grammatical paradigms within a system of consonant alternations known, in Latvian, as Līdzskanu mija. It is assumed that the development of palatalization took place at the late stages of Proto-Baltic. In Latvian as opposed to Lithuanian, palatalization of coronals led to pure palatals like, Ž, Ū, Ř. The phonetic and phonological evidence examined above leads us to suggest that Latvian <ŗ> could have been a pure palatal trill. There are, however, at least two challenges to this hypothesis. First, the available evidence indicates that the process of neutralization of the plain/palatal contrast for was underway throughout the Latvian territory in 19th century. Second, the palatal <ŗ> was officially removed from the Latvian orthography and grammatical system almost 70 years ago, contributing to the disappearance of this sound in the remaining pockets of the Latvian territory, and leading to lack of research on this segment.

These near loss of this phonological contrast make it difficult to conduct laboratory studies to determine phonetic and acoustic properties of Latvian palatalized rhotics. However, despite these challenges, there is hope that some experimental research can be done in the future. Several old recordings from films and interviews have been found where speakers are articulating palatal trills. If these recordings can be appropriately filtered and acoustically analyzed, many questions posed above regarding Latvian <ŗ> could be answered, advancing our understanding of Latvian sound patterns and their unique qualities.
References:


