Monosyllabic Circumflexion in Lithuanian

Yoko Yamazaki

Monosyllabic Circumflexion in Lithuanian

Yoko Yamazaki

Abstract

This PhD thesis examines a phenomenon known as Monosyllabic Circumflexion (MC, hereafter) from a historical linguistics / phonological point of view. MC denotes a Lithuanian or Balto-Slavic phenomenon according to which long vowels and diphthongs in monosyllabic words exhibit a circumflex tone instead of the expected acute tone. It is observed in the following four categories:

I. 3rd person future forms of monosyllabic stems:
šõks – šókti 'to jump;' *vỹs – výti* 'to drive,' etc.

II. reflexes of PIE root nouns:
Latv. *gùovs* 'cow' (< $*g^{w}\acute{o}\underset{\frown}{u}s$ ←-- acc.sg. $*g^{w}\acute{o}m$); *šuõ* 'dog' (< $*\hat{k}\underset{\frown}{u}\acute{o}$), etc.

III. prepositions/adverbs:
nuõ 'from' ∼ *núotaka* 'bride;' *vẽl* 'again' ∼ Latv. *vêl* 'still, yet' < PB $*v\bar{e}li$;[1] *tẽ* (permissive particle) < $*teh_1$; cf. Gk. τῆ 'there,' etc.

IV. pronominal forms:
tuõ (< $*toh_1$ m. sg. instr. ∼ *geráoju* 'the good (m. sg. instr.)'), *tiẽ* (< **toi* pl.nom. ∼ *geríeji* 'id. (pl.nom)'), *tuõs* (< **tŏns* pl. acc. ∼ *geráosius* 'id. (pl.acc.)'), etc.

The unexpected circumflex tone in these categories is problematic and important for the solution of a Balto-Slavic accentological question on the etymological background of acute and non-acute tones. The aim of this thesis is to partially contribute to the solution of this problem by establishing the existence of MC and its relative chronology.

The first category, the 3rd person future forms, provides a substantial number of examples and counterexamples. The examination of them has revealed the fact that the counterexamples constitute a morphosemantic group of verbs whose future stems underwent considerable

morphological changes in the prehistory, hence not exhibiting MC. This shows that the regular tonal reflex of the 3rd person future forms of monosyllabic acute stem must be circumflex, allowing for the establishment of MC as a regular phonological process, although this category does not provide much information on the relative chronology of MC. The second category, the reflexes of Proto-Indo-European root nouns, gives an important clue as to where MC is located in the relative chronology of Balto-Slavic sound changes. Next, there is a discussion of whether the results of the examinations of the first two categories can be maintained for the data of the third and fourth categories, which show an irregular distribution of the acute and circumflex tones in monosyllabic forms. It is shown that various morphological factors, such as homonymic clashes within the paradigms for pronouns, can explain why some monosyllabic forms have acute tone. Also, the linguistic feature of West Aukštaitian dialects of Lithuanian that tend to preserve the results of MC is revealed. These dialects are known to have played an important role in the formation of standard Lithuanian.

In this way, the monosyllabic forms with unexpected circumflex tone in Lithuanian are explained as a combination of MC in the Proto-Balto-Slavic time and the dialectal tendency of West Aukštaitian dialects of Lithuanian.

Keywords: *historical linguistics, comparative linguistics, Monosyllabic Circumflexion, Lithuanian, Lithuanian 3rd person future forms, root noun, preposition, adverb, pronoun, Baltio-Slavic accentology.*

ISBN 978-91-7649-457-8

Printed in Sweden by XXXX, Stockholm 20XX

Distributor: Department of Slavic and Baltic studies, Finnish, Dutch and German, Stockholm University

to the Balto-Slavic accentologists
and historical linguists.

Contents

Abbreviations

Dictionaries

ALEW Hock, W., Bukevičiūtė, E-J., & Schiller, C. 2015. *Altlitauisches etymologisches Wörterbuch*.

ĖSSJa Trubačev, O. N. 1974–. *Ėtimologičeskij slovar' slavjanskix jazykov*.

EH Endzelīns and Hauzenberga 1934–46. *Ergänzungen und Berichtigungen zu K. Mülenbachs lettisch - deutschem Wörterbuch*.

IEW Pokorny, J. 1959. *Indogermanisches etymologisches Wörterbuch*.

LIV Rix, H., & et al. (Eds.) 2001. *Lexikon der indogermanischen Verben.* 2nd edition.

LKŽ Lietuvių kalbos institutas (Ed.) 1968–87. *Lietuvių kalbos žodynas*.

ME Mīlenbachs and Endzelīns 1923–32. *Latviešu valodas vārdnīca / Lettisch-deutsches Wörterbuch*.

PEŽ Mažiulis, M. 1988–1997. *Prūsų kalbos etymologijos žodynas*.

General

1–3 1st–3rd person

acc. accusative

adj. adjective

AP accentual paradigm

coll. collective

dat.	dative
def.	definite
dial.	dialectal (form)
du.	dual
f.	feminine
fut.	future
gen.	genitive
Gp.	Group
instr.	instrumental
ill.	illative
impr.	imperative
loc.	locative
m.	masculine
MC	Monosyllabic Circumflexion
n.	neuter
nom.	nominative
obl.	oblique
p.	person
part.	participle
pass.	passive
pl.	plural
pres.	present
prep.	preposition
pret.	preterit
sg.	singular

voc.	vocative

Languages/Dialects

Att.	Attic
Arm.	Armenian
Aukšt.	Aukštaitian dialect
CLuw.	Cuneiform Luwian
CS	Common Slavic
Cur.	Curonian
Cze.	Czech
Dor.	Doric
Gk.	Greek
Goth.	Gothic
Hitt.	Hittite
IE	Indo-European
Ion.	Ionic
Lat.	Latin
Latv.	Latvian
Lith.	Lithuanian
OAv.	Old Avestan
ON	Old Norse
ONovg.	Old Novgorod dialect
OCS	Old Church Slavic
OLith.	Old Lithuanian
OPru.	Old Prussian

PA	Proto-Anatolian
PEB	Proto-East-Baltic
PGmc.	Proto-Germanic
PIE	Proto-Indo-European
Pal.	Palaic
PB	Proto-Baltic
PBS	Proto-Balto-Slavic
PI-Ir.	Proto-Indo-Iranian
Pol.	Polish
PS	Proto-Slavic
PS	Proto Slavic
Skt.	Sanskrit
SCr.	Serbo-Croatian
Sln.	Slovenian
std.	standard
YAv.	Young Avestan
Žem.	Žemaitian dialect

List of Tables

Acknowledgements

I am incredibly lucky to have been accepted as a PhD student at Stockholm University, where I found the ideal research environment. First I would like to thank my advisors at Stockholm University, Proff. Jenny Larsson and Pēteris Vanags. Jenny provided structure to my idea for this dissertation, giving me encouragement and proper guidance at proper moments. She made me believe that I could write a dissertation on this topic. Pēteris helped me with his immense knowledge in Baltic philology and linguistics. In the last stage of writing this thesis, according to the Stockholm tradition, a mock defence (sluttseminarium) was held with the final reading performed by Miguel Villanueva Svensson. He read my draft thoroughly and gave me a number of helpful comments. I am indebted to him, as well as Proff. Ronald Kim, Norbert Ostrowski, and Marek Majer for their valuable discussion. Also, I would like to thank the faculty members, administrative officers, and my fellow PhD students of the institution for their help, especially my peer PhD students in the Baltic section and Linguistics department from the FoSpråk program for sharing with me the struggle of writing a thesis. I am also grateful to the director and staff of the FoSpråk program, where we shared intriguing discussions.

This thesis was in preparation long before I came to Stockholm. The idea of writing a thesis about Monosyllabic Circumflexion in Lithuanian originally occurred to me at Kyoto University in Japan. On the way from there to Stockholm, many people helped me, which I cannot forget because they helped make my last four years in Stockholm the most productive in my life. Therefore, I would like to thank some additional people outside of Stockholm University as well. At Kyoto University, I learned historical linguistics with Prof. Kazuhiko Yoshida. What he taught me is the basis of my knowledge of historical linguistics. When I told him that I was interested in Baltic accentology, he immediately invited Prof. Toshikazu Inoue to Kyoto University for Lithuanian courses where I learned the Lithuanian language. My thesis, as well as my lin-

guistic knowledge, owes these people a great deal. In addition, I got acquainted with various linguistic theories, ideas, and very knowledgeable people at Leiden Summer Schools and a number of conferences. Among them, I would like to name the *Conference on Indo-European Linguistics* held at Kyoto University in 2012. I am indebted to the organizer and the participants of the conference, especially Prof. Aurelijus Vijūnas for drawing my attention to the present-tense formations of the verbs treated in §4.1. Also, I am grateful to Proff. Thomas Olander, Frederik Kortlandt, Alexander Lubotsky, Tijmen Pronk, Alwin Kloekhorst, among many others, for insightful lectures and discussions during conferences and the Summer Schools.

Afterwards, I had a chance to visit Harvard University as a special student for my research on the thesis, with which I had been struggling. It was my first chance to experience an international research institution, with researchers on various interests from many different parts of the world. It was a challenging and exciting time for me, being introduced to further advanced theories in the class of Prof. Jay Jasanoff, in a reading group with Laura Grestenberger and Hannes Fellner, and also while casually mingling with the brilliant people there.

All of the meetings with these people and their insights have helped me with shaping the idea for my dissertation. I am grateful to all of them.

Last but no least, I thank my parents for their ceaseless efforts to provide me with chances for a good education. These have formed the basis of my research activities since my years as an undergraduate. And I am grateful to Luzi for his encouragement, tolerance, and assistance in every respect.

July 2016, Stockholm

1. Introduction

1.1 The Purpose

There has been a long-lasting discussion as to whether the Proto-Indo-European long vowels are reflected with the acute or circumflex tone[1] in the Balto-Slavic languages. Among the first studies focusing on the direct comparison of Greek and Lithuanian accents was the work contributed by de Saussure (1894: 492ff.). He showed a highly systematic correspondence between the long vowels in old Indo-European languages, such as Greek, Sanskrit, and Gothic, and the acute tone of the equivalent vowels in Lithuanian; e.g. Skt. *vīrá-* ∼ Lith. *výras* 'man,' Skt. *gūrta-* / Lat. *grātus* ∼ Lith. *gìrtas* 'praised.' This method, i.e., comparing the length with the tone of long vowels in equivalent or nearly equivalent words in regard of their formations, is generally accepted, although opinions vary as to what sort of long vowels yielded the acute tone in Balto-Slavic, since the development of laryngeal theory has revealed that many Proto-Indo-European long vowels are actually tautosyllabic sequences of a short vowel and a laryngeal.

At present, it is agreed that the Proto Indo-European sequence which included a laryngeal in the coda positions (i.e., $*VH]_\sigma$ and $*VRH]_\sigma$)[2] and the long vowels resulting from Winter's Law[3] produced acute syllables in Balto-Slavic. Nonetheless, there seem to be two main streams for the opinions as to whether the lengthened-grade long vowels yielded

[1] Balto-Slavic languages distinguish tones on bimoraic nuclei (long vowels and diphthongs) and, in some cases, on short vowels as well. In the Lithuanian case, two kinds of tones are distinguished on bimoraic syllable nuclei: a falling tone (called "acute" accent) and a rising tone (called "circumflex" accent). This will be presented in more detail in chapter 2.

[2] **doh$_3$-* 'give' → Lith. *dúoti* 'to give,' Latv. *duõt/duôt* 'id.,' SCr. *dȁti* 'id.;' **u̯l̥H-neh$_2$* 'wool' > Lith. *vìlna* 'wool,' Latv. *viļ̃na* 'id.,' SCr. *vȕna* 'id.'

[3] Winter's Law denotes the lengthening of a vowel before a non-aspirated voiced stop ($\breve{V} > \bar{V}$ / __ D; Winter 1978). See §2.3.5.

the acute or non-acute quality of the syllable nucleus.

One opinion maintains the view that the Proto-Indo-European long vowels should be represented with “acute" intonation, which has different phonetic realizations in each Balto-Slavic daughter language. De Saussure (1984: 492ff.) demonstrated that the Lithuanian long vowels that correspond to long vowels[4] in other Indo-European languages usually have an acute accent, while long vowels of loan words from Slavic and Germanic languages, as well as normal diphthongs, are usually circumflex, e.g. Lith. *gìrti* ‘praise,’ *gìrtas* ‘praised’ ∼ Skt. *gūrtás* ‘pleasant,’ Lat. *grātus* ‘beloved.’ This view has been adopted by a number of researchers with slight theoretical modifications, such as Kuryłowicz (1948), Stang (1957), Illich-Svitych (1979), Jasanoff (2004a), and Olander (2009), and thus has become the traditional view.

On the other hand, Frederik Kortlandt maintains a different view, according to which only what he calls a “glottalic feature” could have produced the acute tone in Balto-Slavic. There are mainly two sources for the glottalic feature according to him: the Proto-Indo-European laryngeal as mentioned above, and the “glottalized consonants," which are traditionally reconstructed as unaspirated voiced stops (cf. Kortlandt 1977; 1985 among others).[5] Thus, he maintains that the Proto-Indo-European lengthened-grade, which did not involve any laryngeals or glottalic consonants yielded the circumflex tone instead of the acute.

While a few examples, e.g., *žvėrìs* (3) ‘wild animal’ (acc.sg. *žvė́rį*) < PIE **ĝʰu̯ḗr*, *várna* (1) ‘crow’ (< **u̯ōrneh₂*), Latv. *pruôjãm* ‘away’ (see p. 148), undoubtedly indicate the traditional view, the nominative singular ending of consonantal stems (*-uõ, -ė̃*) and many monosyllabic forms speak for Kortlandt’s view.

Nevertheless, some monosyllabic forms pose a problem from either point of view. For example, a pronominal form *tuõ* (m.sg.instr.;

[4] Also the reflexes of long syllabic sonants and long diphthongs; Kuryłowicz 1948: 11ff.

[5] Traditionally unaspirated voiced stops (D), unaspirated voiceless stops (T), and aspirated voiced stops (D^h) are reconstructed for the Proto-Indo-European consonant system. The poor occurrence of the voiced stops especially in the bilabial position (**b*) and the lack of the evidence for the root structure **DeD-*, etc. led some researchers to consider that the unaspirated voiced series of consonant could have been glottalic consonants, which Kortlandt advocates.

$<$ *-oh_1) exhibits the circumflex tone, although an acute tone is expected because the final laryngeal of the instrumental singular ending must have yielded the acute tone according to either hypothesis. The expected acute tone is found in the definite adjectival form *ger**úo**ju* 'the good ∼.'[6] This sort of circumflex tone requires further explanation. Indeed, it has been known, since Hanssen (1885) pointed it out, that the monosyllabic words exhibit the unexpected circumflex tone instead of the acute tone, e.g., *ti**ẽ*** (pl. nom. m. pronoun), as opposed to *ger**íe**ji* 'the good ∼' (def. masc. pl. nom.). This phenomenon is called "Monosyllabic Circumflexion" (introduced below in CHAPTER 3).[7]

Since Monosyllabic Circumflexion was first mentioned in Hanssen (1885: 166), various remarks and interpretations have been made by Pedersen (1933), Stang (1966), Senn (1966), Kortlandt (1985, 2014), Zinkevičius (1998), Rasmussen (1999; 2007), Petit (2002), Olander (2009), and Villanueva Svensson (2011). Despite these remarks, the opinions diverge on the relative chronology of Monosyllabic Circumflexion and on whether to recognize the existence of the phenomenon at all. Although even its existence is not unanimously agreed upon by all researchers, the study of Monosyllabic Circumflexion was recently taken up by theoretical phonologists (Blevins 1993). This also motivates me to maintain that the accentuation of monosyllabic forms in Lithuanian needs to be examined in a historical context in more detail, especially as related to the relative chronology of Monosyllabic Circumflexion with other sound/accentual laws in Balto-Slavic, i.e., Winter's Law, Osthoff's Law, *i*-apocope, Leskien's Law. It also deserves some mention that a possible impact of monosyllabic words with the

[6]Lithuanian has definite forms for adjectives. The definite forms are based on the inflectional form of adjectives followed by the "long ending," which originated from the declensional form of the 3rd person pronoun *jìs, jì*. Therefore, the adjective ending is not in the final syllable of the definite form, protected by the long ending. As a result, the original form of the adjective ending, which is not affected by Leskien's Law, can be observed in definite forms. Additionally, the nom.pl. ending of *o*-stem adjectives has been replaced by the pronominal ending **-oi*, and therefore, the endings in *ti**ẽ*** and *ger**íe**ji* are etymologically identical to each other.

[7] It is also called "Monosyllabic Metatony" in Villanueva Svensson (2011). But in this thesis, "Monosyllabic Circumflexion" is employed, since this term more explicitly indicates the resulting tone.

unexpected circumflex tone on the tonal system of Lithuanian. The Lithuanian monosyllables certainly form a prosodically specific group in that they do not follow the normal development in regard to tones, yielding an unexpected circumflex tone. The possibility cannot be overlooked that the unexpected tone of monosyllables could be one of the sources of the irregularity in the tonal system of Lithuanian.

Thus, the monosyllabic words constitute a distinctive group for their peculiar accentual behavior. The purpose of this thesis therefore is to examine the development of this phenomenon and its phonological facts, since the category of the monosyllabic words is one of the categories that speak for the second hypothesis of the Proto-Balto-Slavic tonogenesis, but has not been fully examined by the advocates of the first hypothesis.

The structure of this thesis is as follows: first, preliminary notions and topics are presented in CHAPTER 2. In CHAPTER 3, relevant data and a summary of the history of the research of this topic will be presented. CHAPTER 4 will be devoted to the analysis of the data. Furthermore, I will examine the possibility of the circumflex tone of monosyllables resulting from Monosyllabic Circumflexion to have influenced the tone of polysyllabic forms. CHAPTER 5 is the conclusion.

1.2 Specific Issues Handled in this Thesis

The first aim of this thesis is to establish the phenomenon of Monosyllabic Circumflexion and to provide examples, primarily in Lithuanian and in other Baltic languages, when necessary. Slavic data will be introduced into the discussion at appropriate points as supplementary data. There have been a few doubts to the existence of Monosyllabic Circumflexion. Pedersen (1933) assumed that monosyllabic forms with unexpected circumflex tone could be the result of analogy, and Senn (1966) assumed that Leskien's Law did not operate on monosyllabic forms, which caused the circumflex monosyllables. I will first argue against such views represented by Pedersen. The relation of Leskien's Law and Monosyllabic Circumflexion as also discussed in Petit (2002) is an important issue as well. This will be discussed in depth in CHAPTER 3.

Secondly, the relative chronology of Monosyllabic Circumflexion needs to be established. There are some monosyllabic forms resulting

from recent syncope (in 16th ∼ 17th C; e.g. *jóg* < *jógi*, *kíek* < *kíekas*). The acute tone of such forms could merely indicate that Monosyllabic Circumflexion was not active anymore around that time, and must have been prior to that time. Rasmussen presumes that Monosyllabic Circumflexion took place in PBS times based on pronominal forms and the reflexes of PIE root nouns. Villanueva Svensson (2011) agrees with him on the basic estimation of the chronology of Monosyllabic Circumflexion, although disagreeing on some data. Alternatively, Kortlandt (1985, 2014) assumes two chronological layers of the circumflex tone of monosyllables in PBS and after Leskien's law in Lithuanian. But the more detailed relative chronology of Monosyllabic Circumflexion with other sound laws, such as Winter's Law and Osthoff's law, should be established by analyzing the tones of the categories which underwent morphological changes, i.e., root nouns. This thesis will aim to provide both direct and indirect evidence for the relative chronology from the Baltic data. In fact, the preservation of the tonal distinction in mobile paradigms in the Baltic languages is expected to provide substantial data for the analysis. Kortlandt's hypothesis will also be examined especially based on the accentuation of some monosyllabic particles (e.g., *laĩ*, *vė̃l*, see §4.3).

For these purposes, the following discussions will be arranged in accordance to the categories where the examples of Monosyllabic Circumflexion have been found so far in the preceding works. The categories handled in this thesis will be as follows:

I. 3rd person future forms of monosyllabic stems:
šõ̃ks – *šókti* 'to jump;' *vỹ̃s* – *výti* 'to drive,' etc.

II. reflexes of PIE root nouns:
Latv. *gùovs* 'cow' (< $*g^{w}\acute{o}\underset{\frown}{u}s$ ←-- acc.sg. $*g^{w}\acute{o}m$); *šuõ̃* 'dog' (< $*\hat{k}\underset{\frown}{u}\acute{o}$), etc.

III. prepositions/adverbs:
nuõ̃ 'from' ∼ *núotaka* 'bride;' *vė̃l* 'again' ∼ Latv. *vêl* 'still, yet' < PB $*v\bar{\underline{e}}li$;[8] *tẽ* (permissive particle) < $*teh_1$; cf. Gk. τῆ 'there,' etc.

IV. pronominal forms:
tuõ̃ (< $*toh_1$ m. sg. instr. ∼ *geráoju* 'the good (m. sg. instr.)'),

tiẽ (< **toi* pl.nom. ∼ *ger**íe**ji* 'id. (pl.nom)'), ***tuõ**s* (< **tŏ̆ns* pl. acc. ∼ *ger**úo**sius* 'id. (pl.acc.)'), etc.

These are discussed in CHAPTER 4, starting with the category (I), which is decisive in the approximation of when Monosyllabic Circumflexion took place. It will be followed by the category (II), which is informative for the investigation of the relative chronology of Monosyllabic Circumflexion and other sound laws, since they were monosyllabic before joining the *i*-stem (e.g. PIE $\hat{g}^h\underset{\frown}{u}\bar{e}r \rightarrow$ Lith. *žvėr**i**s* (3) 'wild animal'). In addition, the exceptions of Monosyllabic Circumflexion will be discussed in the relevant sections. They are found in the following categories:

(i) pronouns, numerals, as in Lith. *tà* 'that' (demonstrative pronoun in f. nom. sg.; < PB **tā́* ← PIE **seh₂*), *dù* (m.)/*dvì* (f.) 'two' (< PB **du̯ṓ*/**du̯ḗ* < PIE **du̯oh₁*/**du̯eh₂ih₁*), etc., as opposed to *tiẽ*, *tuõ*;

(ii) 3rd person future forms with monosyllabic acute roots, as in *bùs* 'will be' (< **bū́st*), *lìs* 'will rain' (< **lī́st*), etc, as opposed to *duõs* 'will give,' *šõk* 'will dance.'

1.3 Materials

Quite a few Lithuanian monosyllabic forms have been mentioned in the works since Hanssen (1886). In addition to the forms mentioned in Būga (1923–24), Senn (1966), Stang (1966b), Petit (2002), Rasmussen (1999), Zinkevičius (1998), some more data have been collected via the etymological dictionaries, as in Fraenkel (1962–65), Derksen (2008), Dunkel (2014), and ALEW.

The accentuation of Lithuanian data is based on LKŽ. For Prussian Lithuanian forms, I refer to Kurschat (1883). The first Lithuanian publication is *Mažvydas Catechism* (1547), which unfortunately does not include accentual information. Its data were adopted from Ford (1971). The oldest accented text is *Daukšos Postilė* in 1599. Its data

[8] The underline below long vowels denotes the "acuteness" as a quality of syllable nuclei that will be introduced in §2.3.7 below.

were adopted from Skardžius (1935) and Kudzinowski (1977). The dialectal forms were taken from Zinkevičius (1966, 1978) and Rosinas (1995).

Latvian accentuation is based on Mīlenbachs and Endzelīns' (1923–1932) dictionary and Endzelīns' (1923) grammar.

Old Prussian attested forms and their information is taken from Mažiulis's (1988–1997) etymological dictionary of the Old Prussian language (PEŽ).

The Slavic data are also discussed for the purpose of comparing it with the Baltic data. They were taken from an etymological dictionary ĖSSJa, as well as from relevant preceding works, e.g., Vaillant (1958), Stang (1957), Dybo (1981), Rasmussen (1999), Kapović (2006).

2. Preliminaries: Long Vowels and Tones

Balto-Slavic Accentology has a relatively long history of research, the origins of which date back to the middle of the 19th century. The studies conducted in the very early phase mostly focused on the direct comparison between Greek and Lithuanian accentuations (e.g., Hanssen 1885). A turning point toward a better understanding of the matter was brought about by de Saussure (1894), who focused on a highly systematic correspondence between Lithuanian acute accent and long vowels in other Indo-European languages, i.e., Greek, Sanskrit, and Germanic languages. Since this demonstration, the acute intonation as the descendant of Proto-Indo-European long vowels (including lengthened grade vowels) has been the dominant view as anticipated in §1.1.

In this chapter, I will sketch the accentual system of the relevant Balto-Slavic languages and their historical background, with remarks on the history of the research.

2.1 Lithuanian Accent System

2.1.1 Tones

Lithuanian is a language with a free-accent system. It is not predictable but lexically determined whether a given word is immobile (root-accented) or mobile (end-accented), and what kind of tone it bears. Any word can bear one accent on one of its syllables. When a monomoraic syllable nucleus bears the accent, it receives a grave accent that is not recognized as a tonal contour. Usually, short vowels followed by obstruents serve as monomoraic syllable nuclei. Lithuanian has historically four short

vowels that can bear a grave accent: ⟨a⟩ [a], ⟨e⟩ [æ], ⟨i⟩ [ɪ], ⟨u⟩ [ʊ].[1,2]

Bimoraic syllable nuclei, on the other hand, can bear two kinds of tones, i.e., acute tone (a falling tone in Lithuanian) and circumflex tone (a rising tone in Lithuanian). What can be counted as bimoraic syllable nuclei are six long vowels,[3,4] six diphthongs, and sixteen "mixed" diphthongs, as follows.

- long vowels: ⟨ą⟩ [aː], ⟨ę⟩ [æː], ⟨ė⟩ [eː], ⟨į, y⟩ [iː], ⟨o⟩ [oː], ⟨ų, ū⟩ [uː]
- diphthongs: ⟨ai, au, ei, ie, uo, ui⟩[5]

[1] PIE **o* and **a* merged to PB **a*, as shown by Lith. ***a**kìs*, OCS ***o**či*, Gk. ὄσσε, Skt. *akṣi-/akṣan-* 'eye' < PIE **h₃ok^{w}-/*h₃ek^{w}-*. Therefore, Lithuanian does not have a short vowel *o* except in loan words such as *òpera* 'opera.'

[2] Short vowels *a* and *e* are phonetically lengthened in accented open syllables, receiving a circumflex tone (*ã, ẽ*). Thus, *rãtas* 'wheal' < PB **rấtas* (< PIE **roth₂-o-*), *mẽdis* 'tree' < PB **mẹ́dio-* (< PIE **med^{h}io-*). This lengthening is supposed to have taken place in a relatively late stage after the change of long vowels *ā* > *o* and **ē* > *ė* (see below), which *ã* and *ẽ* have not undergone.

[3]Old Lithuanian texts testify the sound change: OLith. *ā* > *o*, e.g., OLith. *bralis*> ModLith. *brólis* 'brother.' The other sound change, **ē* > *ė*, took place earlier, as *ė* is sometimes spelled with ⟨ie⟩ in *Mažvydas Catechism*, e.g., *milieia* (33_{12}, *milėja* 'loved [3p. pret.]'), *Tiewai* (35_{11}, *tėvai* 'fathers'), cf. Zinkevičius (1984–95: II, 156), Stang (1929: 50).

These two letters, *o* and *ė*, always denote long vowels in Modern Lithuanian orthography, which the notation of Lithuanian forms in this thesis follows unless otherwise noted.

[4] Lithuanian experienced a development by which a tauto-syllabic sequence of a vowel and a nasal turned to a nasalized vowel before sibilants and in word final position. They eventually merged to long vowels: /*aN, *eN, *iN, *uN/ > /*ã, *ẽ, *ĩ, *ũ/ > /aː, eː, iː, uː/. Those vowels are now denoted with vocalic signs with a small subscript hook as ⟨ą, ę, į, ų⟩. The merger must have taken place later than the sound change *ā* > *o*, since *ą* has not merged to *o* together with *ā*: e.g., acc. sg. ending of feminine *ā*-stem *-ą* < **-an*.

[5] The diphthongs *uo* and *ie* are often distinguished from other diphthongs, often called non-homogeneous monophthongs, in that they behave in a way similar to long vowels and the first element of the diphthongs is narrower than the second. Other diphthongs, *ai, au, ei*, have broader vowels as the first member than the second. As we will see later, they can be shortened through the process called Leskien's Law, just as regular long vowels shortened in the same

- mixed diphthongs: ⟨an, am, ar, al,
  en, em, er, el,
  in, im, ir, il,
  un, um, ur, ul⟩

  The tauto-syllabic sequence of a vowel and a resonant is analyzed as a type of diphthong, because they can bear tonal accents that can be born only to bimoraic nuclei.

The acute tone is denoted with an acute sign (V́), and circumflex tone with a tilde (Ṽ), as follows:

(1) a. *výras* 'man' (falling tone on *ý*)

b. *vỹnas* 'wine' (rising tone on *ỹ*)

Several ways have been suggested to synchronically describe the tones of Lithuanian. In one of the standard handbooks (Stang 1966b: 131ff.), the Lithuanian tonal system is analyzed in terms of *ictus* (Germ. *Iktus*, V̀) and the ictus-bearing morae. Ictus there means a stress accent or a prominence falling on a mora. Stang analyzed that the tonal contour results from an *ictus* falling on one of the morae of a bimoraic syllable nucleus. Thus, /a̗a/ surfaces with a falling contour, and /aa̗/ with a rising contour.

Halle and Jean-Roger Vergnaud (1987: 190ff.) describes the Lithuanian tones in autosegmental method and metrical stress theory. On the other hand, Blevins (1993) assumes that the tone-bearing unit in Lithuanian is a mora rather than a syllable nucleus, and a mora can be associated with a high tone. Thus, the stress/syllable-based representations in Halle and Vergnaud (1987) are updated as below by Blevins (1993).

- stress accent on monomoraic vowels:
  (i) grave ⟨V̀⟩ = /V́/

way. Moreover, *uo* and *ie* have developed from Proto-East-Baltic long vowels *ō* and *ē̗* as follows:

- PIE **oi* > PBS **ai* > PEB **ē̗* > Lith. *ie*, as in PIE **snoi̯go-* → PEB **snē̗gas* > Lith. *sniẽgas* 'snow;' PIE **ei* > PEB *ē̗* > Lith. *ie*, as in PIE **dei̯u̯o-* > PEB **dē̗va-* > Lith. *diẽvas*, Latv. *dìevs* 'god.'
- PIE **ō* > Lith. *uo* as in *dúoti*, Gk. δίδωμι ← PIE **deh*$_3$- 'to give.'

$[\mu]_\sigma$
|
H

- two tonal accents on a long vowel, a diphthong, or a mixed diphthong (a tautosyllabic sequence of a vowel and resonant):

  (ii) acute (falling) $\langle \acute{\tilde{V}} \rangle$ = /V́V/ (iii) circumflex (rising) $\langle \tilde{\acute{V}} \rangle$ = /VV́/

  $[\mu\ \mu]_\sigma$ $[\mu\ \mu]_\sigma$
  | |
  H H

Blevins's moraic interpretation is, in my opinion, more favorable in that this fits the fact that when an accented vowel is lost, then, its tone is associated with the immediately preceding mora: e.g., *galvonà* > *galvõn* 'into a head.' The assumption in Halle and Vergnaud (1987: 192) that the function of a diacritic accent would be shifted to the head of the nucleus would predict an illative form ✗*galvóna*, while the tonal analysis allows one to assume that the H tone associated to the lost mora is set afloat, then, associated to the immediately preceding mora.

This moraic analysis will be taken as the basis of the discussion in this thesis.

2.1.2 Accentual Paradigms

Lithuanian nominal paradigms of monosyllabic roots are classified into four types according to their patterns of accent shift throughout the paradigms and the type of accent on the root (acute/non-acute). For example, the masculine *o*-stem nouns have four types of accent-shift patterns, as the following paradigms show.

The first to be mentioned is *výras* 'man,' which has an acute tone static on the root throughout the paradigm. The paradigm characterized by the static acute accent on the root is traditionally called Accentual Paradigm 1 (AP1). The word *rãtas* also used to have the accent fixed on the non-acute root, but some mobility has been introduced as the result of a shift of the ictus (or High tone) from a non-acute root to the following acute ending in sg. instr. and pl. acc. by Saussure's Law. This

	‘man’	‘wheel’	‘window’	‘god’
sg.nom.	*výras* (AP1)	*rãtas* (AP2)	*lángas* (AP3)	*diẽvas* (AP4)
gen.	*výro*	*rãto*	*lángo*	*diẽvo*
dat.	*výrui*	*rãtui*	*lángui*	*diẽvui*
acc.	*výrą*	*rãtą*	*lángą*	*diẽvą*
instr.	*výru*	*ratù*	*lángu*	*dievù*
loc.	*výre*	*ratè*	*langè*	*dievè*
voc.	*výre*	*rãte*	*lánge*	*diẽve*
pl.nom./voc.	*výrai*	*rãtai*	*langaĩ*	*dievaĩ*
gen.	*výrų*	*rãtų*	*langų̃*	*dievų̃*
dat.	*výrams*	*rãtams*	*langáms*	*dieváms*
acc.	*výrus*	*ratùs*	*lángus*	*dievùs*
instr.	*výrais*	*rãtais*	*langaĩs*	*dievaĩs*
loc.	*výruose*	*rãtuose*	*languosè*	*dievuosè*

Table 2.1: Four accentual paradigms of *o*-stems

type of paradigm, characterized by non-acute root and mobility that was introduced by Saussure’s Law, is called Accentual Paradigm 2 (AP2). In addition, we have two types of mobile paradigms: one with acute roots and the other with non-acute roots. As the paradigm of *lángas* shows, the accent is on the ending in loc. sg., nom. pl./voc. pl., gen. pl., dat. pl., instr. pl., and loc. pl., exhibiting the mobility of the accent in the paradigm.[6] This type of paradigm with acute roots is known as Accentual Paradigm 3 (AP3), whereas the same type of paradigm with non-acute roots and with additional mobility introduced by Saussure’s Law is classified as Accentual Paradigm 4 (AP4), as the paradigm of *diẽvas* exemplifies.

The APs will be provided with Lithuanian nouns in the following parts of this thesis, mainly for the purpose of identifying the acute or non-acute feature of the root syllable: AP1 and 3 for acute roots, whereas AP2 and 4 for non-acute.

[6] A detailed discussion on the phonological and morphological development of the accentuation of the nominal paradigms in all sorts of stems in Balto-Slavic is found in Olander (2009).

2.1.3 The Accent Laws of Lithuanian

In this section, two important historical accent changes anticipated in the previous sections will be introduced: Saussure's Law and Leskien's Law. Both of them affected the final syllables with an acute tone, indicating a special treatment of the feature of acute syllables.

2.1.3.1 Saussure's Law

De Saussure (1896: 157ff.) proposed an accent shift from non-acute syllable to the following acute syllable, as seen in accusative plural forms *dievùs, ponùs* of *diẽvas* (4) 'god,' *põnas* (2) 'mister,' in contrast to the accusative forms *kélmus, výrus* from *kélmas* (3) 'stump,' *výras* (1) 'man.' The accusative plural ending is acute, as can be seen in *ger**úo**sius*, and, only when the preceding syllable is non-acute (AP2 and 4 in the examples above), the prominence is retracted to the ending, while when the preceding syllable is acute, the retraction does not take place. This is observed also with other acute endings, e.g., instr. sg. *dievù*, *ponù*; f. *ā*-stem nom. sg./instr. sg. *rankà* (2) 'hand,' *dienù* (4) 'day,' *vedù* 'I lead,' *vedì* 'you lead' (∼ *vẽda* 's/he leads, they lead'). In addition to the mobility which produced the mobile paradigm (Saussure 1894; Olander 2009), further mobility was introduced by this rule. This resulted in the split of paradigmatic patterns: AP2 split out of the pattern of AP1, AP4 out of that of AP3.

2.1.3.2 Leskien's Law

Leskien (1881) noticed the following alternation in the short and long adjective endings, or the 1sg./pl. endings in non-reflexive and reflexive verbal finite forms. He assumed that these alternations are evidence of an old sound change by which the acute long vowels in the word-final position were shortened.

(2) a. m. pl. nom. *ger**ì*** 'good' ∼ *ger**íe**-ji*

b. m. pl. acc. *ger**ù*** ∼ *ger**úo**-ju*

c. m. du. nom./acc. *ger**ù*** ∼ *ger**ű**-ju*

d. f. sg. nom. *ger**à*** ∼ *ger**ó**-ji*

e. 1sg. pres. *suk**ù*** ‘I turn’ (non-reflexive) ∼ *suk**úo**-s(i)* (reflexive)

f. 1pl. pres. *sùkam**e*** ‘we turn’ ∼ *sùkam**ė**-s* (< *sùkamė-si*)

g. m. *i*-stem du. nom./acc. *ak**ì*** ‘a pair of eyes’ ∼ OCS *oč**i*** (< PBS **-ī* < **-ih*$_2$)

(Leskien 1881: 189 [some of the spellings are changed by the current author according to Modern Lithuanian orthography]; Stang 1966: 115–116)

The etymologically acute diphthongs (except for *ie* and *uo*, which originated from older monophthongs) in word-final position turned to circumflex, not being shortened. Contrastively, the original acute accentuation on the ending seems to be still preserved in the dialectal forms from Žemaitian dialects.[7]

(3) a. *suk**aũ*** ‘I turned’ (1sg. pret.), *suk**aĩ*** (2sg. pret.) ∼ *suk**áu**-si*, *suk**ái**-si* (refl.); Žem. *soˌk**âu***, *soˌk**â***

b. *sak**aũ*** ‘I say,’ *sak**aĩ*** ‘you (sg.) say’ ∼ Žem. *sak**âu***, *sak**â***

Petit (2002) considers this to be a part of the process Leskien’s Law. From this viewpoint, this may suggest that Leskien’s Law did not take place in Žemaitian dialects, as pointed out by Stang (1966b: 116–117, 127–128). Stang (1966b: 127–128) in fact also adduces a distinction maintained in Žemaitian dialects between *-ęˌ*, *-oˌ* (from short **-i*, **-u*) and *-i*, *-u* (from long **-ī́*, **-ū́*) as support for his assumption. For this matter, alternatively, Olander (2009: 113) assumes that this indicates that the short vowels resulting from Leskien’s Law did not merge to the etymologically short vowels in all the dialects of Lithuanian.

In fact, acute diphthongs in word-final position are problematic. Some do not trigger Saussure’s Law, e.g., dat. sg. *rãtui*, nom. pl. *rãtai* (*rãtas* (2) ‘wheel’), while others do, e.g., in 1sg. and 2sg. of *ā*-present

[7]The acute tone in Žemaitian dialects is more like a broken tone, rather than a falling tone. Therefore it is denoted with a sign ˆ, which is also utilized to denote the Latvian broken tone.

sakaũ 'I say,' *sakaĩ* 'you say.' In his lecture in Vilnius in 2015,[8] Jay Jasanoff proposed that the acute diphthongs were de-acuted in word-final position already prior to Saussure's Law. The exceptional personal endings of *ā*-present (and *ē*-preterit) in 1/2sg. that alone triggered Saussure's Law have the secondary introduced acuteness, according to him. The Baltic *ā*-presents without *-i̯-* (e.g., Lith. *sakaũ* [*sãko-*], *stataũ* 'I build' [*stãto-* < **sth₂téh₂-*]) are cognate with the Hittite factitive presents of the type *newah̯h̯-* 'make new' (∼ *newa-* 'new;' < **neu̯éh₂-*), which inflect according to the *h̯i*-conjugation descending PIE *h₂e*-conjugation (Jasanoff 2003: 139–141; Rau 2009: 185–186). PIE *h₂e*-conjugation is shown to be thematized in the remaining IE languages, and therefore, the endings of Baltic *ā*-present should be traced back to 1sg. **-eh₂oh₂*, 2sg. **-eh₂esi* (→ **-eh₂ei*). He continued that such endings should have given rise to non-acute 1sg. **-ā* or **-ō* and 2sg. **-ai* (cf. *ā*-stem dat. sg. *-ai* < **-eh₂ei*), and the attested endings should be from the reconstituted structure, 1sg. **-āō̲* and 2sg. **-āē̲*, with the stem **-ā-* plus productive endings 1sg. **-ō̲* and 2sg. **-ē̲*. Jasanoff also suggested that the new diphthongs resulting from this process kept their acuteness until today in Žemaitian dialects, or at least until Saussure's Law elsewhere. According to this view, the acute diphthongs were usually de-acuted even before Saussure's Law, and can be understood as a phenomenon independent from Leskien's Law.

2.2 Notes on Accent Systems of Other Balto-Slavic Languages

2.2.1 Baltic

2.2.1.1 Latvian

Latvian distinguishes between three kinds of tones: sustained tone (Germ. *Dehnton*) Ṽ; falling tone (Germ. *fallende Ton*) V̀; broken tone (Germ. *Stoßton*) V̂.

Just as in Lithuanian, all long vowels, all diphthongs, and all the

[8] A plenary lecture entitled *Saussure's Law: A new interpretation and its consequences for Baltic morphology* given at 12th International Congress of Balticists held at Vilnius University, 28th–31st October 2015.

tautosyllabic sequences of a short vowel and the immediately following resonant (*r, l, m, n*) can bear intonation. Endzelīns (1922a: 3ff.) describes those tones as follows:

(4) a. SUSTAINED TONE is expiratory weak rising or even. In diphthongs and mixed diphthongs, the second component is longer than the first component. This intonation is indicated with a winding circumflex sign, e.g. *mãte* 'mother,' *bãrt* (with a long vowel) 'to scold.'

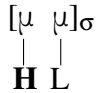
b. FALLING TONE starts with a stronger tone and falls towards the end. Therefore a diphthong with a falling tone consists of accented syllabic and unaccented non-syllabic parts. This intonation is indicated with a grave sign, e.g. *dràugs* 'friend.'

c. BROKEN TONE is decomposed into two parts. After the very intense start of the syllable, a glottal catch occurs (this is often replaced with merely a weakness of the voice), after which the second part is ejected. The intonation is indicated with an angular circumflex sign, e.g., *rîts* 'morning.' In the case of diphthongs and mixed diphthongs, the sign is placed on the second component as in *raût* 'to rip,' *iêt* 'to go,' *aît* 'to plow' (beside dialectal *ârt* with a long vowel).

To mention briefly the synchronic phonological behavior of these Latvian tones, an analysis in the doctoral dissertation of Kariņš (1996) is introduced below. In this work (Kariņš 1996: 142ff), the following analysis is proposed, in which the bold face H denotes a phrasal/metrical high tone that is not lexical:

(i) sustained tone $\langle \tilde{\tilde{\text{V}}} \rangle = \mathbf{H}$H (ii) broken tone $\langle \hat{\tilde{\text{V}}} \rangle = \mathbf{H}$?LH

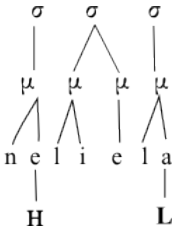
(iii) falling tone $\langle \grave{\tilde{\text{V}}} \rangle = \mathbf{H}$L



The sustained tone is considered to have no lexically marked tone in Kariņš (1996: 142ff.) because its prefixed form *neliẽla* 'not large,

small' (cf. *liẽla* 'large') loses its high tone to the prefix as described in the following representation:

(5) tonal representation of *neliẽla* adopted from Kariņš (1996:144)



Therefore, he assumes that the high tone recognized in the beginning of the sustained tone is not the 'underlying marked tone' but a 'metrically determined phrasal tone.'

Apart from the phonetic realization of the tone, another important feature of Latvian accentuation is that the prominence is always fixed on the word-initial syllable. We do not find mobile accent paradigms, but some remnants of these are found, according to Endzelīns. Endzelīns (1899: 263ff.) observed a correspondence between Lithuanian accentual paradigms and Latvian intonation patterns in word-initial syllables. The correspondence is as follows:

> Lith. acute (AP1) ∼ Latv. even tone (Ṽ)
> e.g. Lith. *výras* 'man' ∼ Latv. *vĩrs* 'id.,' Lith. *dúona* 'bread' ∼ Latv. *duõna* 'id.,'
>
> Lith. circumflex (AP2) ∼ Latv. falling tone (V̀)
> e.g. Lith. *rankà* (*rañką* [sg.acc.]) 'arm' ∼ Latv. *rùoka* 'id.,' Lith. *iẽšmas* 'spit' ∼ Latv. *ìesms* 'id.'
>
> Lith. acute (AP3) ∼ Latv. broken tone (V̂)
> e.g. Lith. *núogas* 'naked' ∼ Latv. *nuôgs* 'id.,' Lith. *širdìs* 'heart' ∼ Lattv. *sirds* 'id.'
>
> Lith. circumflex (AP4) ∼ Latv. falling tone (V̀)
> e.g. Lith. *baL̃sas* 'voice' 'id.,' ∼ Latv. *bàlss*, Lith. *draũgas* 'friend' ∼ Latv. *dràugs* 'id.'

Thus, Latvian even tone corresponds to Lithuanian acute tone in words that have immobile paradigms, and Latvian broken tone to Lithuanian acute tone of mobile nouns. Latvian falling tone corresponds to

Lithuanian circumflex tone of either AP2 or 4. This means that Lithuanian and Latvian have almost opposite phonetic realizations, assuming that they have developed from the same 'proto tones.' This is the case with the Slavic tones in comparison to the Lithuanian tones that will be mentioned in the following parts of the chapters, where Slavic tones also have the opposite phonetic realizations of Lithuanian tones.

The initial stress in Latvian is the result of the accent retraction that took place in the prehistory of Latvian. According to Illich-Svytych (1979 [1963]: 51–52):

> "The process of accent retraction to the initial syllable in Latvian took place at an early date: it is a proto-Latvian process, (...) the tone contrast of ˜ and ˆ in initial syllables in Latvian reflects an older distribution of nominals by accent class than does modern Lithuanian (...)"

Thus, Latvian accentuation is often found with an older state of affair compared to Lithuanian accentuation, which can be a result of *métatonie*: for instance, Lith. *saldùs* (4; *saldų̃* [acc. sg. m.]) 'sweet' has a non-acute root in Modern Lithuanian, while *saldùs* (3; *sáldų* [acc. sg. m.]) is attested with an acute-root in an Old Lithuanian text *Daušos Postilė*. This means that the Lithuanian word for sweet has undergone a process of *métatonie douce*, while the original accentuation is still preserved in Latv. *saldˆs.*

2.2.1.2 Old Prussian

Old Prussian is attested in a few documents, i.e., Elbing Vocabulary (EV), Grunau Vocabulary (Gr), three Lutheran Catechisms, and some fragmentary texts.[9] The information of accentuation is only available in the 3rd Catechism, where some vocalic graphemes are marked with a macron. As the translator of the 3rd Catechism, Abel Will himself noted in the preface that long vowels are basically denoted with a macron. Nonetheless, the macron is usually considered to indirectly mark the accent, under the assumption of the correlation of stress and length of vowels.

Thus, it has been commonly assumed that Old Prussian had a free-accent system like Lithuanian, based on the correspondence between

[9] An overview of all the attested texts is available in Dini (2014: 329ff.).

the place of macron in Old Prussian and that of Lithuanian or Russian forms, e.g., OPru. *mūti* ∼ Lith. *mótė* 'mother,' OPru. *antrā* ∼ Lith. *antrà* 'second,' OPru. *twaiā* ∼ Ru. *tvojá* 'yours,' OPru. *dessīmts* ∼ Lith. *dešim̃tas* '10,' etc. (Endzelīns 1944: 25ff.; Stang 1966: 125, 143ff.).

But for the phonetic reality which the macron on one of two graphemes of a diphthong could have expressed, it is not easy to identify because the language became extinct at the end of the 17th century, leaving only a limited number of documents. Despite this, there have been several arguments on the topic, mainly concerning whether a macron denotes the tones or just the place of stress. The representative view that the Old Prussian macron denotes different tones is found in Mažiulis (2004: 13ff.), illustrated by the following data set.

circumflex:

OPru. *ēisei* 'you(sg.) go' ∼ Lith. *einì* (*eĩti*),

OPru. *gēide* 'he waits' ∼ Lith. *geĩdžia*, Latv. *gàidît*,

OPru. *rānkan* ∼ Lith. *rañką* (acc.), Latv. *rùoka* 'hand'

acute:

OPru. *aīnan* 'one' ∼ Lith. *víenas*, Latv. *viêns*

OPru. *kaūlins* 'bones' ∼ *káulus*, Latv. *kaũlus*

OPru. *steīmans* 'to them' ∼ Lith. *tíems*, Latv. *tiẽm*

Thus, the placing of the macron is considered to denote not only the place of accent, but also indirectly the tones. Cirumflex tone is realized as a falling tone, and the acute as a rising tone in Old Prussian, which is the opposite tonal realization to that of Lithuanian (also, Levin 1976: 7). The tone distinction is not marked on the long monophthongs spelled with just one letter, e.g., *turīt* (Lith. *turė́ti*) 'to have,' *mūti* (Lith. *mótė*) 'mother,' *dūsin* (Lith. *dū̃šią*) 'soul (acc. sg. f.)' *antrā* (Lith. *antrà*) 'the second,' *dātwei* (Lith. *dúoti*) 'to give.'

On the other hand, Rysiewicz (1956) assumes that the macron only denoted the place of stress, based on his statistical analysis of the data

attested with or without macrons. This view was later critically examined by Rinkevičius (2009: 63ff., 83ff.). He observed the usage of the macron in more detail, pointing out that the Old Prussian diphthongs corresponding to Lithuanian circumflex diphthongs never receives a macron on the second component, while that of the acute can receive a macron both on the first and second component of diphthongs. Out of this observation, he draws a conclusion that Abel Will was able to distinguish the tones as the length of the components of diphthongs (first component lengthened under the circumflex tone, the second under the acute tone), but he could not hear the lengthened sonants in the case of the acute mixed diphthongs, as the inconsistent use of the macron in the case of mixed diphthongs corresponding to Lithuanian acute indicates. Therefore, the identification of the tones on the Old Prussian mixed diphthongs requires a careful examination of the tones of Lithuanian and Latvian cognates.

2.2.2 Slavic

Slavic is a large language family, consisting of East Slavic (Russian, Belarusian, Ukrainian, etc.), South Slavic (Old Church Slavic, Bulgarian, Macedonian, Serbo-Croatian, Slovenian), and West Slavic (Czech, Upper/Lower Sorbian, Polish, Silesian, Kashubian, Slovak). Among them, only two languages (Serbo-Croatian and Slovenian) retain tone as a phonological feature. In this thesis, the forms from these two languages are occasionally referred to for the purpose of linguistic comparison.

Serbo-Croatian exhibits the following accentual system:

long vowel:	rising (V́; *gláva* 'head')	falling (V̂; *grâd* 'city')
short vowel:	rising (V̀; *òrah* 'walnut')	falling (V̏; *vȕna* 'wool')

Likewise, Slovenian also has two types of tones on the long syllables: the rising tone (V́) and the falling tone (V̂). It is well known that Serbo-Croatian and Slovenian tones correspond to each other systematically: SCr. short falling tone to Sln. long rising tone (SCr. *bȉti* ∼ Sln. *bíti* ∼ Lith. *bū́ti* 'to be;' SCr. *kȉpje* ∼ Sln. *kŕpja* ∼ *kùrpė* (1) 'shoe;'); SCr. long falling tone and Slovenian long falling tone (SCr. *zûb* ∼ Sln. *zȏb* 'tooth' ∼ Lith. *žam̃bas* (4) 'sharp edge'). They are also known to show a systematic correspondence with East Slavic languages where the tonal contrast is lost except in the *TORT/TERT* formula (Townsend

& Janda 1996: 99ff.):[10]

	Russ.	SCr.	Sln.	
circumflex (cf. Lith. *vařnas* (4)):	*vóron*	*vrân*	*vrân*	'raven'
acute (cf. Lith. *várna* (1)):	*voróna*:	*vrȁna*	*vrána*	'crow'

Serbo-Croatian short falling tone and Slovenian long rising tone are traditionally/conventionally called the acute tone, and the long falling tone in both languages is called the circumflex tone in the study of Balto-Slavic accentology. The syllable that does not occur with the acute tone is often labeled with the cover term "non-acute." The acute and circumflex tones in the Slavic languages are proven to correspond to the Baltic acute and circumflex tones in immobile paradigms (see §2.3.3 below).

Antoine Meillet observed a deviation of tonal correspondence between Baltic and Slavic (Meillet 1924: 141, 148). Lithuanian and Latvian distinguishes the acute roots from non-acute roots also in mobile paradigms (i.e., AP3 and 4 in Lithuanian, and broken tone and falling tone in the initial syllable in Latvian), but in Slavic, the mobile paradigms have only the non-acute roots. Thus, we observe Lith. *galvà* (3; acc. sg. *gálvą*) corresponding to Ru. *golová*, acc.sg. *gólovu*, SCr. *gláva*, acc.sg. *glâvu* 'head;' Lith. *sūnùs* (3; acc. sg. *sū́nų*) corresponding to SCr. *sîn* 'son.' Thus, the described loss of contrast between acute and non-acute roots of mobile paradigms in Slavic is called "Meillet's Law." This will recur occasionally in this thesis.

2.3 A sketch of the History of Research on Accentuation

2.3.1 Ferdinand de Saussure

Contrary to his predecessors, de Saussure (1894: 492ff.) compared the Lithuanian tones to the length of the vowels in the cognates of the corresponding formation in other Indo-European languages, instead of Lithuanian tones to the Greek tones. By doing so, he showed that the Lithuanian long vowels corresponding to the long vowels in other Indo-European languages basically bear an acute tone, as in the following examples.

[10]The Slovenian cognates were added by the current author.

(6) a. Lith. *nósis* 'nose' ∼ Skt. *nā́sā* '(a pair of) nostrils'; Lith. *stóti* 'to stand' ∼ Skt. *sthā-* 'id.'; Lith. *mė́nuo* 'month, moon' ∼ Goth. *mēna* 'moon'

b. Lith. *gìrti*, past pass. part. *gìrtas* ∼ Skt. *gūrtá-* 'pleasant,' Lat. *grātus* 'beloved' (< PIE **gr̥̄tos* [**gr̥̄Htos*])

Contrastively, when diphthongs correspond to short diphthongs in the cognates of other Indo-European languages or a PIE short syllabic sonant, they mostly appear with a circumflex tone.

(7) a. Lith. *dantìs* 'tooth' (*dañtį* acc.sg.) ∼ Skt. *dant-* 'tooth'(< PIE **dont-* [**h*$_1$*d-ont-*])

b. Lith. *vil̃kas* 'wolf' ∼ Skt. *vr̥kas* (< PIE **u̯l̥kʷos* 'wolf')

Also, long vowels found in loan words are usually found with a circumflex tone, as follows:

(8) a. Lith. *vỹnas* 'wine' (cf. Slav. *vyno*)

b. Lith. *blõgas* 'bad' (cf. Slav. *blazъ*)

He left out of his discussion the acute intonation of long diphthongs and their Proto-Indo-European origin, probably because the origin of many long diphthongs involves the Proto-Indo-European laryngeals, which had not been accepted before the discovery of Hittite in the 20th century. This issue was later pursued by Kuryłowicz.

Despite this general principle established by de Saussure, there are quite a few cases that do not adhere to it. For such forms, he introduced the notion of *métatonie*, which denotes changes in tones caused either by a morphological process or through a historical shift. There are two types of *métatonie*, i.e., *métatonie douce* and *métatonie rude*, depending on the resulting tone. If a circumflex tone changes to an acute tone, it is called *métatonie rude*, whereas a change of an acute tone to a circumflex tone is called *métatonie douce*.

The cases under (9) are the metatonies caused by morphological processes, i.e., adding a suffix, prefix, or both.

(9) a. *métatonie douce*:
dýgti 'to spring, shoot' → *dỹgis* 'prick, stab;' *šókti* 'to jump' → *šõkis* 'jump'

b. *kój**a*** ‘leg’ → *pakõj**ui*** ‘in step;’ *vė́j**as*** ‘wind’ → *pavẽj**is*** ‘lee, leeward’

c. *métatonie rude*:
*sv**eĩ**kas* ‘healthy’ → *sv**éi**kinti* ‘to greet’

(de Saussure 1894: 495)

A good example of *métatonie* caused by a historical shift may be the case of *u*-stem adjectives, as exemplified by *saldùs* ‘sweet.’

(10) *saldùs* (3; *sáldų* [acc.sg.]) → *saldùs* (4; *saldų̃* [acc.sg.]), cf. Latv. *saldûs* (Stang 1966b: 160ff.)

Métatonie was investigated in greater detail by later scholars including Būga (1923/24), Stang (1966a, 1966b), Derksen (1996), Larsson (2004, 2010b), and Villanueva Svensson (2014).

2.3.2 Jerzy Kuryłowicz

As mentioned in the previous section, de Saussure left long diphthongs and the Lithuanian accentuation of those segments out of his discussion. With the discovery of the Hittite language and the identification of the Hittite segment *h̲* and the so-called *laryngeals* in the early 20th century, Kuryłowicz (1948: 1ff.) treated the Proto-Indo-European long diphthongs and their origin as related to the laryngeals.

He elucidated that long diphthongs, as well as long syllabic sonants, received the acute accent when they were shortened in the Proto-Balto-Slavic stage. He proposed that those long diphthongs and long syllabic sonants are generated as the result of compensatory lengthening caused by laryngeal loss: **R̥H, *VRH* > **R̄, *V̄R* > Lith. *ìR, ÝR*. Indeed, we have the following cases:

(11) a. Lith. *v**ìl**na*, Skt. ***ū́r**nā-* < PIE **u̯l̥H-neh₂* ‘wool’; Lith. *g**ìr**ti*, past pass. part. *g**ìr**tas*, Skt. *g**ūr**ta-* ‘pleasant,’ Lat. *g**rā**tus* ‘beloved’ (< **gr̄tos*) < PIE **g**r̥H**tos*

b. *g**ér**ti* ‘to drink’ < PIE **g^{w}**er**h₃-* vs. *penkì*, f. *p**eñ**kios*, Skt. *páñca*, Gk. πέντε ‘five’ < PIE **p**en**k^{w}e-*.

Thus, he showed that quite a few cases of long sonants and long diphthongs can be traced back to a syllable with a laryngeal coda.

2.3.3 Christian Stang

Christian Stang (1957) made a further contribution to show the systematic correspondence of Slavic and Baltic tones and accentual paradigms. Although previous researchers had recognized the Baltic and Slavic acute/non-acute tones related to PIE quantity (e.g., Trautmann's (1923) dictionary) and the identity of Baltic and Slavic mobile nominal paradigms (e.g., Sedláček, Meillet, as discussed by Dybo [1977: 594]), Stang's achievement was to demonstrate these correspondences with rich data, including that of early accented texts in the Cyrillic tradition (cf. Vermeer 1998: 249).

Stang reconstructed three Accentual Paradigms for Proto-Slavic (Stang 1957: 56ff.):

- (a) constant root stress (SCr. *dȉm*) ∼ Lith. *dū́mai* (1), Latv. *dũmi* 'smoke'
- (b) constant end stress (SCr. *krât* 'once, time' Čak. *ženä*, ORu. *žená* 'woman')
- (c) mobile stress (SCr. *gláva, glâvu* (acc.sg.) 'head,' SCr. *drûg* 'friend') ∼ Lith. *gálvą* (3; acc. sg.), Latv. *galva* 'head;' Lith. *draũgas* (4), Latv. *dràugs* 'friend'

He points out the correlation between Slavic APa and Lithuanian immobile paradigms (AP1, 2), and Slavic APc and Lithuanian mobile paradigms (AP3, 4), although the correlations between Lithuanian AP1 and Slavic APa, and between Lithuanian AP2 and Slavic APb remain unclear. For Slavic APb, although its corresponding Lithuanian AP remains unclear in his work, Stang formulated a stress shift that is now known as Stang's Law. Slavic APb has the stress on the medial vowel (or on the first syllable of the ending in the case of a disyllabic ending), and the stress was retracted to the preceding vowel if it had been on a circumflex vowel, thus CS nom. sg. **dvòrъ* (gen. sg. *dvorà*) 'court' > SCr *dvôr*, Sln. *dvòr* 'door'; CS gen. pl. *žènъ* (nom. sg. **ženà*) 'woman' > ORu. *žénъ*, Čak. *žén*; loc. pl. *dvòrěvъ* 'court' > ORu. *na dvórěxъ* (Stang:1957: 168–170). The syllable with the new ictus received a secondary rising tone called "neo-acute."

Agreeing with Kuryłowicz (1931: 75ff.) on his rejection of Saussure's Law in Slavic, Stang also demonstrated that Saussure's Law did

not take place in Slavic (p.15ff.), giving examples where the Slavic and Baltic data exhibit discrepancy regarding Saussure's Law. For example, in loc. sg., where Saussure's Law operates in Lithuanian, polysyllabic forms also have the end-stressed forms in Slavic. e.g., Ru. *na ostrobú* 'on the island,' *na ploščadí* 'on the square.' However, Saussure's Law does not operate over medial syllables in Lithuanian, e.g., *ãsilas* (1), instr. sg./nom.-acc. du. *ãsilu*, etc. He attributes the end-stressed forms in those Slavic forms to a mobile paradigmatic pattern that has arisen in Slavic. Also, Saussure's Law does not operate on *ā*-stems in gen. sg. (e.g., *rañkos* 'hand') since the ending is not acute, but Slavic *ā*-stems do have the end-accented forms in gen. sg. (e.g., **rǫkỳ* 'hand'). The Slavic accent shift is not conditioned by the acuteness of the final syllable contrastively to Lithuanian.

As for the correspondence between Slavic acute/non-acute and Baltic acute/non-acute (p. 5ff.), Lithuanian phonetic realizations of "acute" and "circumflex" tones are opposite to those in the other Balto-Slavic languages. This means that Lithuanian experienced a shift of ictus in its prehistory (Kuryłowicz 1958: 168f.; Zinkevičius 1998), which was mentioned in §2.2.1.1. This systematic correspondence proved that the distinction of acute and circumflex tone both in Baltic and Slavic was inherited from their common ancestor, i.e., Proto-Balto-Slavic, and that allowed us to interpret that the acute syllables in Baltic and Slavic must have been assigned with *some kind of* feature as "acute" in the Proto-Balto-Slavic stage. The phonetic realization of such a feature of acuteness in Proto-Balto-Slavic could be equated to a glottalic feature or present-day Danish *stød*, as suggested in Vaillant (1936: 114–115), Stang (1966b: 137), and Jasanoff (2004a: 251). This new interpretation resulted in an updated definition of Leskien's Law, which will be discussed in a section below.

Stang's progress on the correspondence between Baltic and Slavic mobile and immobile Accentual Paradigms, however, has left a few questions unresolved: how has the Slavic APb arisen and how has the stress been fixed on the first syllable of the ending in this paradigm, and what is the exact correlation of APa and APb with the Baltic Accentual Paradigms. Shortly afterwards, these problems were treated by the Moscow researchers Dybo and Illich-Svytich.

2.3.4 Moscow Researchers: Vladislav Illich-Svitych and Vladimir Dybo

Illich-Svitych and Dybo were inspired by Stang's (1957) monograph to work on the correlation between Slavic and Baltic Accentual Paradigms in more depth, taking Stang's reconstruction of Slavic Accentual Paradigms as the starting point. In the review of Stang's (1957) *Slavonic accentuation*, Dybo (1962: 224–225) suggested that Slavic APb corresponds to Lithuanian AP2, and this issue is later pursued in a great detail by himself and his colleague Illich-Svitych (e.g., Illich-Svitych:1979, Dybo: 1981). The monograph (Illich-Svitych 1979) treats the Baltic and Slavic nominal reflexes of PIE nouns, organized in accordance with the length of the root and the place of accent (baryton/oxyton) in the PIE stage. Examining the correspondence between PIE long roots and Baltic immobile/mobile nominals, (Illich-Svitych 1979: 61ff.) proposed a modification of Hirt's Law. The law was proposed by Hirt (cf. Hirt 1895: 94, 165–166), formulating a leftward accent shift in Balto-Slavic to explain the different accent placement in the Balto-Slavic and other Indo-European words, e.g., Lith. *dū́mai*, SCr. *dȉm* ∼ Skt. *dhūmá-*, Gk. θῡμός 'smoke.' Illich-Svitych finds out that the accent retraction in Balto-Slavic is sensitive to the *seṭ* root structure (**CVH-*), therefore no retraction in a form like PB **pēdá(n)* 'foot,' or PBS **jūngó(n)* 'yoke.' Now this modified version of Hirt's Law is accepted in general, and the current thesis is not an exception.

Illich-Svitych's extensive examination of Baltic and Slavic nouns with respect to the length of the root and accent placement in the PIE stage has elucidated that Slavic APa and APb were originally in complementary distribution. It was a Slavic process that the nominals with short (or non-acute) roots were transformed from the columnar barytone to an oxytone paradigm (pp. 80–81, 140ff.), which is parallel to Dybo's (1960) conclusion on the verbal paradigms.

- (a) constant root stress (SCr. *dȉm* 'smoke,' *vȕna* 'wool') ∼ Baltic immobile paradigm with acute root, e.g., Lith. *dū́mai* (1), Latv. *dũmi* 'smoke,' Lith. *vìlna* (1), Latv. *viļ̃na* 'wool'

- (b) constant end stress (SCr. *krât* 'once, time' *snȇg, snēgȁ* 'snow') ∼ Baltic immobile paradigm with non-acute root, e.g., Lith. *kar̃tas* (2) 'once, time,' *sniẽgas* (2 > 4), Latv. *snìegs* 'snow'

Illich-Svitych (1979: 143–4) proposed an accent shift law that transformed the APb from a single barytone paradigm of the nominals with circumflex roots in Proto-Slavic, which is a nominal version of the same law proposed by Dybo (1962) for verbs. According to the law, a non-acute root lost its falling tone to the following syllable in a barytone paradigm, e.g., PS acc. sg. **lôkǫ* > **lǫkȍ* 'water-meadow,' gen. sg. **lôka* > *lǫkà*, etc. This rightward accent shift created the oxytone paradigm and fed the environment for Stang's Law (see above). This law is called Illich-Svitych's Law or Dybo's Law in recognition of the two scholars' findings.

2.3.5 Werner Winter

Werner Winter discovered that a Proto-Indo-European short vowel before an unaspirated voiced stop is reflected as a long acute vowel in the Balto-Slavic languages, while a short vowel before an aspirated voiced stop remains short (Winter 1978). This sound law can be formulated as: $\breve{V} > \bar{V}$ / __ D. For example:

(12) a. PIE **h₂eb-* > Lith. *obelìs* (3^a), Latv. *âbele* 'apple tree,' Lith. *óbuolas* (3^a), Latv. *âbuols* 'apple,' Russ. *jabloko* 'apple,' cf. OHG *aphul* 'apple'

b. PIE **h₁ed-* 'to eat' > Lith. *ė́sti*, Latv. *êst* 'to eat,' OCS *jasti* 'to eat'

c. PIE **sed-* 'to sit' > Lith. *sė́sti*, Latv. *sêst*, SCr. *sjësti* 'to sit'

d. PIE **bʰegʷ-* 'to run, flee' > Lith. *bė́gti*, Latv. *bêgt*, OCS *běžati* 'to flee'

e. PIE **nogʷ-ós* > Lith. *núogas* (3) 'naked,' Latv. *nuôgs*

This sound change probably originated from a phonetic lengthening before voiced stops, which is observed in many languages, including English. In this respect, I consider it to be more plausible to maintain the traditional reconstruction rather than a glottalic interpretation that will be introduced in the next section. Investigations on more detailed condition of this sound law have been conducted.[11] Among them is

[11] A detailed overview of the topic is found in Sukač (2013: 159ff.).

Shintani (1985: 278), who hypothesized that the lengthening took place on unstressed vowels before unaspirated voiced stops. Olander (2009: 151) assumes that if this is correct, his Mobility Law must occur after Winter's Law.

Since the resulting long vowels are merged to the inherited long vowels or laryngeally-generated long vowels to receive the acute tone, the sound change has taken place before the rise of the acute feature among the long vowels (i.e., acute assignment, see §2.3.7, (14)). The relative archaic nature of Winter's Law can be suggested by its conditions. It had taken place before the loss of the three-fold distinction of stops (aspirated voiced / unaspirated voiced / voiceless), the assibilation of **ĝ* (Lith. *ožkà* 'goat,' Latv. *âzis* 'billy goat,' OCS *jazъno* 'skin' ∼ Skt. *ajás* 'billy goat'), and the Mobility Law. Although only the theoretical assumption requires Winter's Law to be prior to acute assignment, it may not be very implausible.

2.3.6 Frederik Kortlandt

Frederik Kortlandt holds a view different from the "traditional" view on the Balto-Slavic tonal reflexes of the PIE long vowels. He originally considered the only source of the old Balto-Slavic acute to be an Indo-European laryngeal (Kortlandt 1975: 22). The Balto-Slavic acute tone has developed from a laryngeal feature. Later this view was outfitted with the glottalic theory and his own interpretation of Winter's Law based on the theory, to extend the source of the old acute tone to the "glottalic consonants" (Kortlandt 1977, 1978b, 1988). By glottalic theory, it is assumed that the traditionally reconstructed voiced unaspirated stops **b, *d, *g* are in fact the glottalic consonants **p', *t', *k'* in Proto-Indo-European.[12] The remarkably infrequent occurrence of **b* was particularly adduced to support the reliability of the theory.

Werner Winter's presentation on his discovery in 1976 at the Ustronie conference provoked Kortlandt (1978b) to assume that the long acute vowels resulting from Winter's Law could provide a good piece of evidence for the glottalic theory, by assuming that the unaspirated voiced stop is in fact a glottalic stop. Its glottalic feature shifted to the preceding vowel, which he interprets as the acute feature of the vowel: $*VT' > *V\text{ˀ}D > *\acute{V}D$. He assumes that the laryngeals developed to a

[12] Cf. Gamkrelidze and Ivanov (1973).

glottalic feature in a sequence *VH]$_\sigma$, resulting in glottalizing the preceding vowel: **VH* > **V?* > **V$^?$* > **$\acute{V}$*. Those glottalizations are precisely the acute feature, later developing to the acute tone in the Balto-Slavic languages. Therefore, the glottalic vowels resulting either from Winter's Law or in a sequence *VH]$_\sigma$ are regarded as the main source of the acute tone in Kortlandt's theory. On the other hand, all other sorts of long vowels are assumed to have yielded the circumflex tone, including the lengthened grade vowels and monosyllabic words with phonetic lengthening assumed by him.

Certainly, it is likely that the phonetic feature of the acute nuclei was a glottalic feature, comparable to Danish *stød* or Latvian broken tone, which may have its phonetic origin in the lost laryngeals. However, the glottalic theory itself which Kortlandt bases his theory on has a number of problems as discussed in great detail in Vine (1988), among others. The most fundamental problem is that the typological rarity of a certain system does not necessarily mean the impossibility of its existence. One of the points that Gamkrelidze and Ivanov (1973) claim for the glottalic stop system in PIE is that the traditional stop system (voiceless unaspirated, voiced unaspirated, and voiced aspirated) is typologically rare among the world languages. However, as they themselves mention, there is a language with a stop system similar to that of PIE, an Austronesian language called Kelabit. The typological or statistical method cannot eliminate the possibility of the existence of "rare" cases. Also, the glottalic suggestion could certainly eliminate a few sound changes in Germanic and Armenian, but on the other hand, it requires equally complicated sound changes from the glottalic series to the voiced unaspirated series in Indo-Iranian, Greek, Italic, Celtic, and Balto-Slavic (Vine 1988: 399).

In addition, Kortlandt has worked on the relative chronology of the sound laws from Proto-Indo-European to Proto-Balto-Slavic (Kortlandt 1994, 2008, among others). His proposed relative chronology has been examined in other works, accepted with modifications and addendum. This will be entitled in a later section called "Further contributions."

2.3.7 Jay Jasanoff

Jasanoff (2004a) describes the process of the emergence of the contrast between acute and circumflex, calling the process "the acute assign-

ment" in which long vowels are assigned with "some kind of" feature that results in the acute feature.

He first of all classifies the Proto-Balto-Slavic long vowels inherited from Proto-Indo-European into four types:

(13) a. lengthened grades (e.g. sg.nom. *ph$_2$-tḗr* 'father,' *u̯ōrn-eh$_2$* 'crow');

b. inner-PIE production of vowel contraction (e.g. *o*- stem nom. pl. *h$_1$éḱu̯ōs < *-o-es* 'horse');

c. compensatory lengthening of laryngeal loss (e.g. 1sg. pres. *bhérō < *-oh$_2$* 'to bear');

d. vowel contraction over laryngeal as hiatus breaker (e.g. *ā*-stem nom. pl. *h$_1$éḱu̯ās < *-eh$_2$-es* 'mare')

The long vowels of type (a), (b), (c) were assigned as acute nucleus, whereas those of (d) were not. Following the convention in Jasanoff (2004a), the acute nuclei are marked with <u>underlines</u> in the following examples.

(a) i. in the word-internal position: realized with an acute tone under a prominence, e.g., *u̯ōrn-eh$_2$ > *u̯<u>ōr</u>nah$_2$ (> Lith. ***vár**na*; note the shortening of the ending by Leskien's Law) 'crow;' *ĝ^{h}u̯ēr- > *ź́u̯<u>ē</u>ri- → ***žvė́r**į* 'wild animal (acc. sg.)' [cf. Latv. *zvȩ̂rs*, OCS *zvěrь*, SCr. *zvȉjer*]

ii. in the word-final position: realized with non-acute accent: e.g., PIE *d^{h}uĝh$_2$-tēr* > Lith. *duktė̃* 'daughter'

(b) *o*-stem loc. sg. *-è* < *-ḗn* < endingless locative *-e* + *en*[13]

[13] This possible preform of the *o*-stem locative singular ending was introduced by Jay Jasanoff in a lecture entitled *Saussure's Law: A new interpretation and its consequences for Baltic morphology* in Vilnius, 2015 (see also p. 175). Otherwise, the ending has been differently reconstructed, e.g., pre-Lith. *-ę́ (< *-ei-én* with a postposition) (Stang 1966: 182–183; Zinkevičius 1984–1995: II, 179), according to which, the origin of the acute tone of the ending remains unclear. Apart from this locative ending, his argument on the acute tone of Baltic pronominal/adjectival *-íe, -ì* in the nominative singular, adopted from the original substantive nominative singular ending *-<u>ō</u>s*, sounds like a more convincing example. In addition, Latv. *nuõst* 'away'

(c) realized with an acute tone:

i. in the word-internal position: (*sth_2-$t\acute{\breve{e}}i$ →) *$steh_2$-$t\breve{e}i$ > *$stah_2$-$t\breve{e}i$ > *$st\bar{a}ti$ (> Lith. *st**ó**ti*, SCr. *st**ä**ti*) 'to stand;' *d^huH-*mó-es* → *$d^h\acute{\underline{u}}$-*moi* (> Lith. *d**ū́**mai* (1)) 'smoke', *$\hat{g}_{\circ}\acute{r}h_2$-*no-* > *$\hat{g}_{\circ}\acute{\underline{r}}no$- > *$z\acute{\underline{r}}no$- (→ *ž**ìr**nis* (1)) 'pea'

ii. in the word-final position: shortened through a process called Leskien's Law.
nom. sg. ending of *ā*-stems: *-eh_2 > *-ah_2 > *-$\bar{a}$ > *-$\underline{\bar{a}}$ (>Lith. -*a*) [e.g. *$\underset{\frown}{u}\underline{\bar{o}}rnah_2$ > *$\underset{\frown}{u}\underline{\bar{o}}rn\underline{\bar{a}}$ > *várna* 'crow']; thematic ending of 1st. sg. pres. *-oh_2 > *-$\bar{o}$ > *-$\underline{\bar{o}}$ > *-$\underline{uo}$ (> Lith. -*u*) [e.g. *$\underset{\frown}{u}ed^h$-oh_2 > *$\underset{\frown}{u}ed$-$\underline{\bar{o}}$ > *$\underset{\frown}{u}ed\underline{uo}$ > Lith. *vedù* 'to lead']

(d) circumflex tone under a prominence:
e.g., nom. pl. ending of *ā*-stem: *-eh_2-*es* > *-ah_2as > *-$\bar{a}s$ (> Lith. -*os*) [e.g., *várnos* AP1 'crow (gen. sg.)' [vacuous operation of Leskien's Law since the ending is non-acute]; *dienõs* AP4 'day (gen.sg.)']

For the non-acute vowels of type (d), Jasanoff (2002: 35f., 2004a: 249) supposes that the vowel contraction in a laryngeal hiatus *-*VHV*- produced a trimoraic long vowel ($\tilde{\bar{V}}$). The trimoraic long vowels contrasted with the normal bimoraic long vowels, as marked vs. unmarked long vowels. However, as the trimoraic long vowels later lost one mora to become bimoraic long vowels, the original contrast of "marked vs. unmarked" long vowels was reinterpreted as "unmarked vs. marked," which resulted in originally bimoraic long vowels obtaining "markedness," that is, acuteness.

2.3.8 Kazuhiko Yoshida

Yoshida (2012: 240) reacts to Jasanoff's proposal by presenting a counterargument against the trimoraic hypothesis from typological viewpoints:

(< *$n\bar{o}$-$steh_2$-), *pruôjãm* 'away' (< *$pr\bar{o}$-$\underset{\frown}{i}o$-) may provide good examples of the case of reflexes with the acute tone of early vowel contraction. See p. 148ff. in §4.3 for more detail.

- "Trimoraic long vowels are phonologically very rare in the world's languages."

- "Trimoraic long vowels do not occur by contraction of a sequence of two short vowels (...). Vowel lengthening is generally due to compensatory lengthening, but when it is observed, it is a segment in coda position that is deleted. Deletion of a segment in onset position does not result in lengthening; cf. Hayes (1989: 253ff)."

Based on the argument of Chene and Anderson (1979) that compensatory lengthening appears to be possible only in languages that have a pre-existing vowel length contrast, Yoshida also states "(...) trimoraic long vowels were not produced in the prehistory of Germanic and Baltic because Proto-Indo-European did not have pre-existing trimoraic long vowels" (2012: 242). Admittedly, the final long vowels which kept their length in both Germanic and Baltic must have behaved phonologically differently from the remaining long vowels. However, when the difference is attributed to a possible trimoraic length, the phonological process that could have given three moras to **VHV* remains unclear.

As an alternative solution, he suggests that the difference in acute or non-acute nuclei can be explained by assuming that the laryngeals in coda position disappeared earlier than those in onset position. He notes that intervocalic laryngeals in a sequence **-VHV-*, where **H* was an onset, must have been preserved longer than those in coda positions, while laryngeals in simple codas disappeared in the parent language or at a very early stage after the divergence from the common ancestor, as observed in the nom.-acc. pl. type in *-ōr*, which is traced back to pre-PIE **-or-h₂*; e.g., Gk. ὕδωρ, Hitt. *u̯idār* < **u̯édor-h₂* 'water (collective).' His proposal is shown schematically as follows with the examples of the 1sg. indicative present ending **-o-h₂*, *ā*-stem nominative singular ending **-eh₂*, and *o*-stem ablative singular ending **-oh₂-ed*, which later became the genitive singular ending in Balto-Slavic (adopted from (12) in Yoshida 2012: 244):

(14) revised relative chronology of acute assignment

	**-o-h₂*	**-eh₂*	**-oh₂-ed*
loss of laryngeals in coda posistion	**-ō*	**-ā*	—
acute assignment	**-ṓ*	**-ā́*	**-oh₂-ad*

loss of the remaining laryngeals		—	—	*-ād
*ō > *uo		*-uo	—	—
Saussure's Law		*-úo	*-á	—
Leskien's Law		*-ù	*-à	—
*ā > *ō		—	—	*-ōd
	Lith.	vedù	rankà	viĩko
		'I lead'	'hand'	'wolf'

This explanation seems theoretically more adequate for explaining how *$\bar{V}$/ *VH]$_\sigma$ and *-VHV- received different tones in the Balto-Slavic languages. This hypothesis means that the vowels had to be long already at the point of acute assignment to receive acute tone. This implicates that the operation of Winter's Law must be before acute assignment, since the long vowels resulting from the law have merged with the long vowels, including the ones resulting from VH]$_\sigma$, to receive acute tone together.

Despite its phonological adequacy, Yoshida's framework is inadequate for explaining the circumflex tone of the *n*-stem endings *-uõ*. One could argue that the lost **-n* in the word-final position was restored to the nominative singular ending analogically after the oblique cases (e.g., *akmeñs* 'stone (gen.sg.)') before Leskien's Law, and this restored nasal prevented the new nominative singular ending **-uon* from getting shortened by Leskien's Law. Since there was no way to represent the nasalized diphthongs, *-uo* came to be used as the ending. However, such a phonological sequence is actually allowed in Lithuanian, as in *namõn* 'to home,' *žemỹn* 'below.' Moreover, this sort of explanation does not account for the *s*-stem and *r*-stem endings (cf. *mė́nuo* 'month,' *sesuõ* 'sister'). This problem will be treated in §4.2.

2.3.9 Further Contributions

Much progress has been made on the accentological correspondence between Baltic and Slavic lexical items, and on the origin of the Balto-Slavic acute tone. In addition to the theories reviewed above, Klingenschmitt's view can be added. His view is distinct from others in postulating Saussure's Law in Proto-Balto-Slavic, adducing examples like PS **rǫkʲa* < **rańkʲá* < **rʲańká* 'hand' (Klingenschmitt 1994b: 248–

249), as Meillet does.[14] According to Schaffner (2001: 102[38]), Klingenschmitt rejects Hirt's Law, assuming that the alleged examples of Hirt's Law can be explained as the accent placement on different syllables in PIE (e.g., *u̯iH-ró > Skt. *vīrá-* beside *u̯íH-ro- > Lith. *výras* (1), Latv. *vīrs*). But basically he accepts the traditional view of the PIE long vowels obtaining the acute tone in Balto-Slavic. He is one of the researchers who assume that the long vowels resulting from vowel contraction obtained three moras and gained the circumflex tone in word-final position. The diphthongs *ai̯* and *ei̯* in word-final position are considered to regularly receive the acute tone.

However, some data are still left unexplained, or at least there is no agreed explanation for them, e.g., the *n*-stem ending in nominative singular and the unexpected circumflex tone in monosyllabic forms. There are a few recent contributions offering solutions to these problems. In addition, there are two hypotheses for the origin of the Balto-Slavic acute feature, which have not been settled yet.

Olander (2009: 114ff.) proposes that the Proto-Indo-European plain long vowels were treated differently in the word-internal and word-final positions. The PIE plain long vowels (lengthened grade vowels) merged with the long vowels from *VH]$_\sigma$ and from Winter's Law. Olander (2009: 148) assumes that they were glottalized altogether in Proto-Balto-Slavic in non-final positions to give rise to the acute tone, while they were not glottalized and therefore gave rise to the circumflex tone in word-final positions. This explains why the *n*-stem ending in nominative singular has the circumflex tone, although it is an inherited long vowel, which is expected to reflect the acute tone in Balto-Slavic.

[14] Cf. Meillet (1897: 89, 1900: 351). Criticism to this postulation is found in Stang (1957: 15ff.) and Olander (2009: 116). Some case-number forms in which Lithuanian forms go through Saussure's Law do not go through it in Slavic, i.e., nom. du. Lith. *abù/abì* 'both,' *akì* 'eyes' ∼ Ru. *óbu, óbe*, SCr. *öbu, öbje* 'both,' Ru. *óku*; acc. pl. Lith. *ponùs* 'mister,' *rankàs* 'arm' ∼ PS **zǫ̂by* (c) 'tooth,' **rǫ̂ky* (c) 'hand.' Furthermore, Rinkevičius (2009: 85ff.) discusses that the law did not take place even in Old Prussian. Also, the accent shift is in general limited to APb in Slavic, i.e., acc. sg. PS **lǫ̂kǫ* > **lǫkǫ̀* (b) 'water-meadow,' while **grę̂dǫ* (c) 'garden bed' did not shift its accent. The latter accent shift in Slavic is called Dybo's Law. Therefore, as Olander (2009: 116) concludes, the accent shifts in the two branches should best be kept as two different accent shift laws.

Villanueva Svensson (2011) thoroughly investigates all the materials that have been handled in the previous studies where the origin of Balto-Slavic acute tone is discussed. He concludes that the plain long vowels in the *s*-aorist, many of the root nouns, and Narten-type verbs point to the acute tone, while the *n*-stem ending in the nominative singular, some case endings, and some monosyllabic forms, such as the Lithuanian *s*-future and Latvian reflexes of PIE root nouns, agree with Kortlandt's hypothesis. As for why the long vowels of only those limited categories agree with Kortlandt's view, he suspects that Rasmussen's proposal of the monosyllabic metatony may hold the potential for solving the problems of the circumflex tone of the monosyllabic forms. In reply to Villanueva Svensson (2011), Pronk (2012) presents a detailed counterargument, agreeing with Kortlandt's view. Especially for monosyllabic forms, he assumes that the circumflexation in monosyllables can be a part of Leskien's Law, reformulating it as "a glottalized final syllable loses its glottalization and becomes short as a result." Thus, an acute diphthong would just lose its glottalization, surfacing as a circumflex diphthong, and the monosyllabic forms with long vowels, such as m. instr. sg. *tuõ*, m. nom. pl. *tiẽ*, can be attributed to an areal phenomenon in the Aukštaitian dialects of Lithuanian. Replying to the articles by Villanueva Svensson (2011) and Pronk (2012), Carrasquer Vidal (2013) presents a hypothesis different from both the traditional and Kortlandt's views. He assumes that the circumflex tone of the reflexes of a PIE lengthened grade vowel should be attributed to its following tautosyllabic resonant, adducing Latv. *sàls* 'salt,' *gùovs* 'cow,' but *nãss*, Lith. *nósis* 'nose,' while attributing the acute tone in Lith. *žvérį* 'wild animal (acc. sg.)' to the accusative (**ĝʰu̯ḗrm̥*) or oblique stem (gen. **ĝʰu̯ērés*), where the resonant is not syllabified as tautosyllabic to the root syllable.[15]

In this way, the discussion on the Balto-Slavic tonal reflex of Proto-Indo-European long vowels is ongoing. In this thesis, the monosyllabic forms, which are one of the categories contradicting to the traditional view but supporting Kortlandt's view, will be examined.

There are also contributions on the relative chronology of early sound changes in Proto-Balto-Slavic. Among Kortland's (1994, 2008) propos-

[15] However, the accusative stem must have been generalized in the paradigms of Latv. *sàls* 'salt' and *gùovs* 'cow,' as well, for it was the source of their *i*-stem declension (cf. §4.2).

als, relevant points are as follows:

- the loss of word-final **-t/d* precedes Winter's Law, because of PIE n. nom.-acc. sg. **tod* > PS **to*;
- Hirt's Law also precedes Winter's Law as the resulting glottalized long vowels didn't cause the stress retraction;
- the extension of syllabic resonants (**R̥ > iR*) is more recent than Hirt's Law: it is confirmed with the sustained tone of Latvian forms *iĩgs* (< **(d)l̥Hg^{h}o-* 'long'), *piĩns* (< **pl̥h$_1$no-*);
- It also precedes the loss of laryngeals (confirmed with Lith. *gìlė* (2) 'acorn' < **g^{w}l̥h$_2$en-*, cf. Matasović 2005: 152).[16]

Examining the relative chronology, Matasović (2005) assumes that the sound change **o > *a* should be also more recent than Winter's Law, since **o* gives rise to PBS *ō* as in **h$_3$ed-i̯o-* 'smell' > **odi̯o-* > Lith. *úodžiu* (1sg.), cf. Gk. ὄζω. Also, Olander (2015: 48) adds that the sound change **o > *a* should be more recent than the loss of laryngeal in the coda as well. In addition, he postulates two stages for the loss of word-final **-t/d* (2015: 50ff.). He assumes that the devoicing of voiced stops including **-d* should be earlier than Winter's Law, but the final **-t* alone can be lost afterwards.

Consequently, the proposed relative chronology of Hirt's Law, Winter's Law, and sound changes of vowels can be summarized as follows:

(15) relative chronology I:

$$\left.\begin{array}{r} *D > *T/\_\_\# \rightarrow \text{Winter's Law}^{17} \\ \text{Hirt's Law, } *\underset{\circ}{R} > iR \rightarrow *VH]_\sigma > *\bar{V}]_\sigma \end{array}\right\} \rightarrow *o > *a.$$

The acute assignment discussed in §2.3.7 and §2.3.8 could be placed after both Winter's Law and the loss of laryngeals in the coda position, but its relative chronology with **o > *a* will be discussed on p. 132ff.

[16] Lith. *pìlį* (4) 'castle (acc. sg.)' < **pl̥h$_1$-m̥* may support the assumption as well.

[17] If we accept Matasović's (1995) proposal that the operation of Winter's Law is restricted to the closed syllable, it is possible to postulate the loss of laryngeals after Winter's Law, based on examples like **eĝHŏ̆m* > PS **jazʁ* as Matasović (2005: 151) proposes, although the laryngeal would not be in the coda position, but syllabified as an onset of the following syllable.

2.4 Disputed Points

It has apparently been agreed upon that the long vowels from Proto-Indo-European **VH*, **VD* (Winter's Law) yielded the acute tone. Therefore, the main dispute concerns the long vowels that descended from the Proto-Indo-European lengthened-grade vowels, or *plain* long vowels, since the data point in different directions. What is more complicated, the morpho-phonologi-cal analyses of the material also differ, depending on researchers.

For word-final long vowels, most researchers observe that the consonantal endings in the nominative singular yielded the circumflex tone, while the historical interpretations vary; Kortlandt assumes that that is a regular outcome, which is partially agreed upon by Villanueva Svensson (2011c: 10–11, 16, 33), while Jasanoff maintains that it is derived from a trimoraic vowel. One could search for a way to explain it through analogical processes, which meets a phonological difficulty (cf. above). The very old proposal by Hanssen (1885) suggests that the *n*-stem ending *-uo* is analogical after the monosyllabic *n*-stems Lith. *šuõ* 'dog' and *žmuõ* 'man,' where he considers the circumflex tone to be regular in monosyllabic words. Despite reserved reactions in the scholarly society (cf. Olander 2009: 114ff; Villanueva Svensson 2011: 9), this view will be revisited in the excursus of §4.2.

On the other hand, the accusative plural endings (Lith. *-us, -as, -is* < **-ōs, *-ūs, *-ās, *-īs* < PBS **-ŏ̄ns, *-uns, *-āns, *-ins*) instead suggest that they yielded the acute tone, e.g. *gerúosius* 'the good (m.acc.pl. def. adj.),' *gerą́sias* 'id. (f.acc.pl. def. adj.).' Kortlandt (1975: 46) reconstructs **-HNs* for the accusative plural endings. Olander (2009: 183) proposes as an explanation for the acute tone that the vowel was lengthened before the word-final **-ns*. However, as Olander himself admits, this sound change has parallels *only* among those accusative plural endings. Also, its phonetic motivation is not entirely clear. Alternatively, Kim (2012: 148ff.) has proposed that the variant with the long vowel has been introduced through Szemerényi's Law. This proposal accommodates both acc. pl. endings with a short vowel and with a long vowel. For the absence of the nasal in some of the accusative plural endings in the Balto-Slavic languages, I would propose a possibility that the word-final -V(ː)ns]$_{\omega}$ developed to -Vːs]$_{\omega}$ at an early PBS stage before Osthoff's Law took place. While the loss of nasal (in, for example,

žąsìs ‘goose,’ *lȳja* ‘rain(s)’, etc.) took place much later in Lithuanian and Latvian independently if the sequence **-Vns-* stands in the word-internal position with a syllable boundary (-Vn]$_\sigma$ [s-...]$_\omega$), it took place much earlier in a sequence like -V(ː)ns]$_\omega$ found in the accusative plural endings. This will be discussed in more detail on p. 172ff.

On word-internal long vowels that originated from the Proto-Indo-European lengthened-grade vowels, researchers are not in agreement. Kortlandt maintains that they regularly yield the circumflex tone, while the traditional view and its advocates regard the regular reflex of them as acute. Another problem is that researchers advocating different views provide different historical / phonological / morphological interpretations of the relevant cognates. For example, Kortlandt reconstructs a laryngeal for ‘wild animal’ *ĝ^{h}u̯eh$_1$rs* [> Lith. *žvėrìs* (3) ‘wild animal;’ followed by Pronk (2012: 216)], while others reconstruct a lengthened grade vowel for the same item (**ĝ^{h}u̯ēr*) based on the mobile accentuation of Lithuanian and Latvian forms (Lithuanian AP3, Latvian broken tone, and Slavic APc) and Sanskrit forms, e.g., *á-hruta-* ‘not-gone-crooked,’ which speak against the existence of a laryngeal.

This sort of problem is well examined in Villanueva Svensson (2012), which concludes that Kortlandt’s claim seems to hold true for monosyllabic forms, beside the consonantal endings that mostly occur in polysyllabic forms. Indeed, the category of the monosyllabic forms includes a few forms with enigmatic circumflex tone for both viewpoints. Some pronominal forms, *tuõ, šiuõ, juõ, kuõ* (instr.sg.), *tuõs, šiuõs, juõs* (acc.pl.), are expected to be shortened by Leskien’s Law because of their original acute tone. The instrumental ending is reconstructed as **-oh$_1$*, which is attested with acute tone in the polysyllabic allomorph, i.e., the definite ending of adjective (*-úoju*) and the nominal ending *-ù* as predicted by either hypothesis. For the accusative plural ending, whereas different proto-forms are proposed (**-oHNs* according to Kortlandt, **-ŏ̄ns* traditionally), the expected acute tone is confirmed in their allomorph in the polysyllabic forms, e.g. *ger**úo**ju* and *ger**úo**sius*. Also, *nū̃* ‘now’ and *tė̃* (hortative particle) belong here, because their proto forms **nu-h$_1$* (see p. 152ff.) and **teh$_1$* (see p. 155ff.) respectively are expected to have yielded an acute tone according to either hypothesis. Thus, the circumflex tone of those monosyllables is unexpected and unexplainable phonologically for both hypotheses. Therefore, this constitutes an accentological problem to be investigated from the point

of either of the two major views. In addition, it is also a vexing problem that not all the monosyllables regularly have the circumflex tone. Some forms exhibit the result of Leskien's Law's shortening: e.g., *tà* 'that (f.nom.sg.),' *lìs* 'will rain' (3p. fut. of *lýti* 'rain'). This leads researchers to different opinions on Monosyllabic Circumflexion.

In this thesis, I would like to contribute to the partial solution of this long-standing problem in Balto-Slavic accentology by untangling the complexity of the distribution of Monosyllabic Circumflexion.

3. Monosyllabic Circumflexion

Ever since Hanssen (1885: 613, 616) pointed out a tendency for monosyllabic words in Lithuanian to have circumflex tone, this phenomenon has been observed or mentioned by many researchers, e.g., Pedersen (1933: 14–15), Endzelīns (1922b: 18), Blevins (1993: 243), Zinkevičius (1984–1995: II, 161ff.), Rasmussen (1999: 481ff.), Kortlandt (1985: 115, 2002: 15ff., 2014: 217ff.), and Villanueva Svensson (2011c: 16ff.). What Hanssen observed is called "monosyllabic circumflexion" in Jasanoff (2004b: 174) and "monosyllabic metatony" in Villanueva Svensson (2011c: 20, 33). In this thesis, "monosyllabic circumflexion" (MC hereafter) is employed, since this term explicitly denotes the tone resulting from the phenomenon.

In this chapter, an overview of the history of the research on this phenomenon will be given, and its definition will be established. Then, the refined data on which the discussion in the following sections and chapters is based will be presented.

3.1 The Preceding Works

This section will provide an overview of the preceding works describing MC, in accordance to some specific themes. First there are some simple descriptions of the phenomenon, then a discussion as to whether MC is a phonological phenomenon or just a result of analogical processes. A couple of suggestions of the possibilities of MC to be traced back to the Proto-Balto-Slavic stage will be taken up in the end.

3.1.1 The Description of Monosyllabic Circumflexion in the Preceding Works

3.1.1.1 Frederick Hanssen

The Lithuanian forms that have the unexpected circumflex accent instead of the acute were first reported in Hanssen (1885: 613, 616) with the following examples:

(16) a. Lith. ***jiẽ*** (m.pl.nom.) 'those' [1]

b. Lith. ***tiẽ*** 'they (m.pl.nom.),' cf. *ger**íe**ji* 'the good...' (def. m. pl. nom.)

Hanssen finds the pronominal masculine nominative plural ending *-ie* with a circumflex tone in monosyllabic forms such as *jiẽ* and *tiẽ*, while the same ending appears with the acute accent in the definite adjective form, which is polysyllabic. He further considered that polysyllabic pronouns, e.g., *aniẽ* 'that,' *kuriẽ* 'which (relative pronoun),' must have adopted the circumflex tone in the final syllable from the variant *-iẽ* in the monosyllabic forms. He also includes the two *n*-stem nouns, *šuõ* and *žmuõ*, in the examples, but that needs to be examined carefully with the support of a cross-linguistic parallel, which will be offered later in §4.2.

[1] Lithuanian has a definite form for adjectives. The definite form is built to the inflectional form of adjectives by adding the long ending, which originated from the declensional form of the 3rd person pronoun *jìs, jì*. Therefore, the adjective ending is not in the final syllable of the definite form, which is protected by the long ending. As a result, the original forms of the adjective endings that are not affected by Leskien's Law are observed in definite forms. Additionally, the nom.pl. ending of *o*-stem adjectives has been replaced by the pronominal ending **-oi*, and therefore, the endings in ***tiẽ*** and *ger**íe**ji* are etymologically identical to each other. The acute tone of the reflex of the ending **-oi* in *ger**íe**ji*, Latv. *tiẽ*, and possibly OCS *ti* (cf. §4.4.1.1) remains unclear phonologically. However, according to Jasanoff (2009: 56), the acute tone may have been analogical to its nominal-proper ending **-o̲s* (< pre- PIE **-o-es*).

The definite declension of adjectives is also found in Slavic (Frarenkel 1950: 82; Vaillant 1958: 429ff.), which, together with the Baltic definite declension, is assumed to be traced back to a relative construction in Koch (1992).

His proposal is later revisited by a few researchers. First, let's look at previous works by those researchers who handled this phenomenon to better understand how MC has been discussed in the literature.

3.1.1.2 Alfred Senn

Senn (1966) does not explicitly mention MC. In general, he observes that the shortening described by Leskien's Law does not take place in monosyllabic forms (p. 85). However, he does not pursue his observation as a phenomenon specific to monosyllables, nor analyze the mechanism of it. Rather he makes a few relevant observations and provides rich dialectal material especially with respect to for pronominal forms.

In one of the major categories where MC is observed, the 3rd person future forms, Senn (1966: 231) supposed that if the accented final syllable has acute tone, it turned to circumflex in the 3rd person future forms, including monosyllabic ones, but this did not take place in the cases where the final accented acute vowels were *ū́* or *ý*, e.g., *bùs* (*bū́ti* 'to be'), *gìs* (*gýti* 'to get better'), *dìgs* (*dýgti* 'to spring'), etc.

Such exceptions of this formulation are:

(17) a. *vỹs* (∼ *výti* 'to chase (away)')

b. *vỹs* (∼ *výsti* 'to fade, droop')

c. *lỹs* (∼ *lýsti* 'to become thin')

d. *sulỹs* (∼ *sulýsti* 'to become meagre')

e. *(at)lỹš* (∼ *(at)lýžti* 'to slacken')

f. *siū̃s* (∼ *siū́ti* 'to sew')

This formulation raises the question as to why the circumflex forms in (17) are exceptional only in the monosyllabic roots in *ū́* and *ý*, while the same pattern is regular elsewhere (a question also arises for polysyllabic cases as to why the "exceptional" metatony is applied to the stems ending in *ū́* or *ý*). However, this point remains unresolved there. Senn also pointed out that this tonal change (*métatonie douce*, including MC) did not take place in Žemaitian dialects. Those problems will be treated in §4.1 in the next chapter.

3.1.1.3 Zigmas Zinkevičius

Zinkevičius (1984–1995: II, 161ff.) briefly described in what grammatical categories the examples of MC are found. He gave the following examples:

(18) a. nom.2pl. *jūs* < **jū́s* 'you' cf. gen.2pl. ***jū́***sų

b. nom.pl.masc. *tiẽ* < **tíe* 'those' cf. *ger**íe**ji* 'good' [= (16a)]

c. acc.pl.masc. *tuõs* < **túos* 'those' cf. *ger**úo**sius* 'good'

d. 3fut. *duõs* 'will give', *dẽs* 'will put' < **dúos, *dés* cf. 1sg. *dúosiu, désiu*

e. prepositions: *į̃* 'into,' *nuõ* 'from,' *põ* 'under', *priẽ* 'by, near,' *prõ* 'through', *peř* 'through' < **į́, *núo, *pā́, *príe, *prā́, *pér* cf. *į́-noris* (*norė́ti, nór-* 'want') 'whim,' *núo-taka* (*tãkas* (4) 'path') 'bride,' *pó-traukis* (*traukà* (4) 'attraction') 'inclination,' *príe-tėmis* (*témti* 'to get dark') 'dusk,' *pró-tėvis* (*tėvaĩ* (4) 'parents') 'ancestor,' *pér-lipo* (*lìpti* 'to climb') 'climbed over.'

(18b) is a canonical example that is already named in Hanssen (1885) and mentioned in the previous section.

(18a) is regarded as a datum of MC based on the acute tone of its genitive plural form ***jū́***sų.

However in (18e), the accentuation of the nominal prefix involves a morphological process of derivation (cf. p. 144). In fact, the prepositions *peř* and *priẽ* do not have any comparative evidence for the original acute, as Petit (2011: 261ff.) points out. I instead think that the evidence for the original acute tone is found only for *nuõ* (i.e., Latv. *nuõst* 'away' (p. 147)) and possibly for *prõ* (i.e., Latv. *pruôjām* 'away' (p. 147)).

Zinkevičius also cites the 3rd person future forms of monosyllabic acute stems in (18d). He further considers the circumflex accent of the final syllables of the polysyllabic 3rd person future forms, e.g., *kalbẽs* 'will speak,' *norẽs* 'will want,' to be analogical after the circumflex long vowels of monosyllabic future forms. However, this hypothesis has met with counterarguments because of a relatively large number of counterexamples (*lìs* ∼ *lýti* 'to rain,' *bùs* ∼ *bū́ti* 'to be,' etc. listed in Senn 1966: 231; Petit 2002: 247ff.), and other attempts to interpret the *métatonie douce* in the 3rd person future forms have been made. This issue will be discussed in depth in §4.1.

3.1.2 Analogical or Phonological?

The early works taken up in the previous section consider Monosyllabic Circumflexion as an independent phenomenon. Therefore, they discuss the circumflex tone in the monosyllables as a phonological process, treating the shortened monosyllabic forms as some kind of exception, or setting up a new condition for the operation of MC. On the other hand, there have been a few suggestions that regard the phenomenon as the results of analogical processes. In this section, those objections against the existence of MC will be examined.

The objections against MC seem to be raised mostly based on two facts. One is that some potential analogical models can account for the possible restitution of long vowels in many monosyllabic forms, which could be subsequent to Leskien's Law (Pedersen 1933). Indeed, as shown by *sakaũ* 'I said,' *sakaĩ* 'you (sg.) said,' *sukaũ* 'I turned,' *vedeĩ* 'you led,' corresponding to northwestern Žemaitish *sȯkâu*, *sȯkâ*, *vedê*, the acute diphthongs that were not shortened by Leskien's Law have obtained circumflex intonation even if they occur in polysyllabic forms (Stang 1966: 167; Zinkevičius 1996: 95). This leads some researchers to suppose that since the acute final syllables that failed to be shortened by Leskien's Law were turned to circumflex intonation anyway, the circumflexion does not seem to be limited to monosyllables, hence no *Monosyllabic* Circumflexion took place.

The other is the distribution of the vowels of the monosyllabic 3rd person future forms shortened by Leskien's Law and those that exhibit monosyllabic circumflexion as observed in Senn (1966) and Petit (2002). This will be devoted a section in CHAPTER 4.

3.1.2.1 Holger Pedersen

Pedersen (1933: 14–15) suggested that MC can be interpreted as a result of an analogical process, taking into consideration the future verbal paradigms, as follows:

sg. 1.	*dúosiu* 'I will give'	du. 1.	*dúosiva*	pl. 1.	*dúosime*
2.	*dúosi*	2.	*dúosita*	2.	*dúosite*
3.	(**dúos* >) ***dùs***		—		—

sg. 1.	*dúosiu*	du. 1.	*dúosiva*	pl. 1.	*dúosime*
2.	*dúosi*	2.	*dúosita*	2.	*dúosite*
3.	***duõs***		—		—

As the chart above shows, the members of the future paradigm of *dúoti* 'to give' are disyllabic except in the 3rd person. Therefore Pedersen suggests a possibility that the once shortened 3rd person form could have restored the long vowel under the influence of the other members of the paradigm. Likewise, the long vowels in ***tiẽ*** and ***tuõs*** could be considered to have been restored from long adjectives in the same case/number forms (*ger**íe**ji*, *ger**úo**sius*).

Certainly, analogical force should not be underestimated. However, pairs such as *ger**ì***/***tiẽ***, and *ger**ùs***/***tuõs*** may raise some questions as to why the long vowels were not restored to the (polysyllabic) adjectival forms (e.g., *ger**ì***, *ger**ùs***), although they could be semantically closer to their corresponding long adjectives (e.g., *ger**íe**ji*, *ger**úo**sius*) than pronouns, and also as to what caused the tone of the long vowels restored to monosyllables to change to circumflex, whereas their models have an acute accent (e.g., *geríeji*, *gerúosius*). Indeed, if the monosyllables had their long roots restored by some models after the operation of Leskien's Law, they would be expected to surface with acute accent. For example, if the monosyllabic **dúos* was once shortened to **dùs* by Leskien's Law but the long vowel was restored from other personal forms in the same paradigm, e.g., 1sg. *dúosiu*, the expected form would be ***✗****dúos* rather than *duõs*. In order to explain the circumflex tone of this form, we still need to presume a *métatonie douce* in monosyllabic forms, i.e., MC.

Another issue is that there are some monosyllabic forms showing *métatonie douce* without any legit analogical models, e.g. *tẽ̃* (permissive particle), *nũ̃* 'now,' *võs* 'hardly,' *vẽ̃l* 'again.' Those are conjunctions or adverbs which do not belong to a paradigm and subsequently do not have any variants with long vowels preserved in polysyllabic environments.[2] Therefore, in my opinion, the *métatonie douce* in monosyllables can be defined as a phenomenon independent of the forms with the unexpected circumflex tone mentioned above.

[2] Adverbial forms and prepositions will be discussed in depth in CHAPTER 4.

3.1.2.2 Daniel Petit

Petit (2002) treated MC mainly in the 3rd person future forms. Pedersen's (1933) discussion does not include what kind of verbal roots are affected by Monosyllabic Circumflexion in detail. But there is certainly a characteristic distribution of the vowels in the monosyllabic root in 3rd person future that are more often affected by the Leskien's Law shortening, as mentioned in Senn (1966: 85). We observe that the monosyllabic roots with *-ý-* and *-ű́-* are much more often shortened in 3rd person future forms than those with *-úo-*, *-íe-*, *-ó-*, *and -é-*. While Senn (1966) proposed a formulation that limits the MC to the roots with *-úo-*, *-íe-*, *-ó-*, *-é-*, Petit (2002) proposes limiting the operation of Leskien's Law to account for this fact. Although Petit (2002) is right in focusing on the clear distribution of *métatonie douce* with *-úo-*, *-íe-*, *-ó-*, and *-é-*, and shortening with *-ý-* and *-ű́-* in the 3rd person future monosyllabic forms, his proposal encounters some problems.

Observations Through his survey of the 3rd person future forms, including the dialectal forms, Petit observed some interesting distributions. First, he found the following tendency:

(19) the shortening is observed mostly with the monosyllabic verbal roots which have a structure [Cí] or [Cű]; e.g., *bùs* ∼ *bű́ti* 'to be,' *gìs* ∼ *gýti* 'to get better;' *trũ̃ks* ∼ *trű́kti* 'to lack,' *dỹgs* ∼ *dýgti* 'to spring, sprout.'

For this matter, alternatively, different distributions are found in some dialects, as we will see on p. 104.

Second, Petit observes that the non-homogeneous monophthongs, *uo* and *ie*, behave just as diphthongs in the 3rd person future forms of monosyllabic roots. They are not shortened by Leskien's Law but turned into circumflex: e.g., *dúoti* ∼ *duõs*, *liẽs* ∼ *líesti* 'to touch', just as in *dìrbti* ∼ *dir̃bs* 'to work,' *sémti* ∼ *sem̃s* 'to draw.' He considers the metatony process in those words (including monosyllabic forms like *dir̃bs*, etc.) to be a part of Leskien's Law.

Proposals Based on the observations above, Petit proposed several things. First, he claims that Leskien's Law did not affect the so-called non-homogeneous monophthongs, *úo* and *íe*, but it only affected *ý* and

ű́. The vowels *ó* and *é́* were exempted from shortening because of the asymmetry between them and their corresponding short vowels *a* and *e*.

Second, as related to the first proposal, the shortening of *uo* and *ie* [in cases such as (2e) in CHAPTER 2 and (16a)] can be observed in E. Aukštaitian dialects, e.g., *dȍt'* (2sg. impr.), *dȍs* (3rd p. fut.) $\sim$ std. Lith. *dúok, duõs* ($<$ **dúoki, *dúost*), which is a dialectal innovation, but the unusual alternation in the root was eliminated by replacing the short root with a metatonical root with *uo* and *ie* in the 3rd person future forms. However, the short vowel was preserved in the personal endings of verbs because they did not suffer from the unusual alternation in the root within the same paradigms.

Third, Leskien's Law also shortened the acute long diphthongs in word-final position, and eventually changed their tone to circumflex (*métatonie douce*). Petit assumes that Osthoff's Law (shortening of the long diphthongs **$\bar{V}R$*) took place in word-internal syllables after Leskien's Law. Therefore, monosyllabic forms with acute long diphthongs were shortened by Leskien's Law and were turned to circumflex afterwards, just as in the case of all other word-final diphthongs: compare **-ā́u* (1sg.pret. ending) $>$ **-áu* $>$ *-aũ*, and **gā́us* $>$ **gáus* $>$ *gaũs* 'will get' ($\sim$ *gáuti*). Furthermore, he regarded this last step, i.e., *métatonie douce* in word-final position and in the monosyllables as a part of the process belonging to Leskien's Law. Thus, he maintains that Monosyllabic Circumflexion does not exist, but the phenomenon can be attributed to the last step of Leskien's Law. Although Petit makes some good points, there are a few problems with his analysis, which will be briefly mentioned in the next paragraph and discussed in depth in §4.1.

Problems For the first and second proposals in which Leskien's Law did not affect *uo* and *ie*, I find difficulties in following Petit's logic, especially in the explanation as to why those diphthongs were shortened in the personal and adjectival endings while they were not in the future forms. On the one hand, he states that those diphthongs were not shortened by Leskien's Law because they were phonologically treated as diphthongs (just like *-ìr* $\rightarrow$ *-ir̃*). On the other hand, he states that in the categories (other than the 3rd person future forms; i.e., personal endings and adjectival endings) affected by Leskien's Law, the short vowels from *-úo* and *-íe* remained short (p. 269ff.), which implies that Leskien's Law affected those diphthongs after all.

If Leskien's Law did operate on *-úo* and *-íe* after all, and their shortened vowels were replaced with the long vowels in the 3rd person future forms for the sake of the coherency of the root shape in the paradigm, Petit's basic idea boils down to Pedersen's idea. For this sort of proposal, I have already presented my opinion above (§3.1.2.1).

For the third proposal about Osthoff's Law, the law is usually considered to have taken place in the Proto-Balto-Slavic stage, since long diphthongs were shortened both in Slavic and Baltic, and therefore that can be a common innovation of those two branches, e.g., PIE **u̯l̥Hneh*$_2$ 'wool' > PBS **u̯ī́lnā* > **u̯íl̠nā̠* > PS **vь̋lna* (a) > SCr. *vȕna*; PB **u̯íl̠nā̠* > Lith. *vìlna*, Latv. *vil̃na*; cf. Jasanoff (2004a: 251). Therefore, it is difficult to assume that Osthoff's Law could have occurred after Leskien's Law, a Lithuanian sound law. Thus, Petit's formulation of Leskien's Law and his relative chronology needs to be reconsidered.

More discussions on his proposals particularly for the category of the Lithuanian 3rd person future forms will be found below in §4.1.

3.1.2.3 Leskien's Law and Monosyllabic Circumflexion

Although Petit's formulation of Leskien's Law cannot be maintained in my opinion, it is true that the word-final acute diphthongs turned into circumflex, except in Žemaitian dialects, when Leskien's Law was operating. This fact actually provokes a thought on the motivation or a factor behind this sound law. That is, both Leskien's Law and the word-final *métatonie douce* of acute diphthongs stem from one and the same factor; at some point in time in Lithuanian (after Saussure's Law), an acute bimoraic vowel/diphthong was not allowed to stand in word-final position. This could be regarded as a constraint banning an acute final syllable nucleus. With this constraint being highly ranked, the acute word-final monophthongs were shortened, maintaining their quality, and the acute diphthongs underwent *métatonie douce*, since they do not have their corresponding "short" vowels.

That indeed allows a possibility that MC might be a side product of Leskien's Law, especially in the case of diphthongs (e.g., *laĩ* [optative particle] ∼ *láisti* 'let,' Latv. *laî* [optative particle]). The monosyllabic environment can be interpreted as the initial syllable or the final syllable as well. When it is interpreted as the final syllable, the ban on the acute syllable in the final position could apply to a monosyllable. Consequently, the acute tone could have been turned into the circumflex

tone.

The relative chronology of Leskien's Law and MC must be clarified in order to discuss it. If MC can be traced back to Proto-Balto-Slavic, the *métatonie douce* of diphthongs in word-final position should be considered a separate tonal change. On the other hand, if MC is considered to have taken place as a side product of Leskien's Law, we would need to reconsider the possibility of MC having taken place twice, for some possible data from root nouns show MC at an old stage. If the latter is correct, it will allow a possibility to regard MC as a phenomenon of drift.

Another note is that this certainly makes it difficult to see whether the circumflex intonation of monosyllables with diphthongs (e.g., *dir̃bs* 'will work' ∼ *dìrbti* 'to work') is due to this general metatony or a possible MC. Therefore, the monosyllables with diphthongs should be handled as supplementary information, while the establishment of the the phenomenon and its relative chronology should be always supported by the monosyllables with plain long vowels.

3.1.2.4 Summary

Above, two authors' works were introduced that are representative with the view that MC is not a phonological rule, but can be attributed to something else — Pedersen (1933) attributes it to analogy, whereas Petit (2002) to Leskien's Law.

Reexamining their arguments, their claims are found unsupportable. The claim common to Pedersen's and Petit's explanations is that the examples of so-called MC can be attributed to paradigm leveling; However, Petit considers it for fewer cases, i.e., where the root vowels are *-ó-* and *-íe-*. However, this hypothesis does not explain why the acute root restored to the 3rd person future forms have turned into circumflex. It requires one more step to derive *duõs* (or *jõs*) from the possible ✗*dúos* (or ✗*jós*) with the long root restored from other members of the paradigm. As we will see in the next section, some data show that MC was not an active process around the 16th c. (about 200 to 300 years after Leskien's Law, which took place around 1300AD, cf. Girdenis 1992 [2001: 42ff.]), when *ā* became *o* and *ē* became *ė*. If the narrowing of these vowels motivated the restoration of the acute root to the 3rd person future forms because of the resulting asymmetric pairs of long and short vowels, as Petit maintains, there would have been no chance for the new

analogical forms (✗*jós*, ✗*dés*, etc.) to gain the circumflex tone. In addition, Petit's classification of the non-homogeneous monophthongs *ie* and *uo* as diphthongs that were not shortened by Leskien's Law is problematic, since that does not provide a better solution to the shortening of those vowels in the personal endings and adjectival case endings than the traditional one.

Therefore, I would conclude that MC cannot be attributed to the process of analogy, such as paradigmatic leveling, but must be regarded as an independent phenomenon.

3.1.3 Discussion on the Relative Chronology of Monosyllabic Circumflexion

It is easily inferred that MC was no longer active by the time of the Old Lithuanian period.

(20) a. *tóms* 'to them' (f. pl. dat.) < OLith. *tómus*

b. *tíems* 'to those (m.pl.dat.)' < OLith. *tíemus*

c. *jíems* 'to them' (m.pl.dat.) < OLith. *jíemus*

d. *dvíem* 'to the two' (m./f. du.dat.) < pre-Lith. **dvíem(ā)* < PBS **dváimā*

(20a), (20b) and (20c) are the result of an apocope that took place in the relatively recent history of Lithuanian in the 16th and 17th centuries or later (Bjarnadóttir 2003: 16).[3]

There is also the case of 2nd person singular imperative forms. They regularly have the acute tone even when they are affixed to monosyllabic acute stems, e.g., *bū́k* (∼ *bū́ti* 'to be'), *dúok* (∼ *dúoti* 'give'), etc. They are known to have been disyllabic in Old Lithuanian, being followed by a personal ending **-i*, which was still present in old texts, but has now mostly been lost, as in (21).

[3] (20d) requires a discussion as to when the final vowel dropped. On the other hand, we could also argue that the syncope in this form must have been fairly recent based on the presence of acute tone.

(21) a. *ußmuschki* ‘kill’ (Mod. Lith. *užmušk*)

[*Mažvydas Catechism* p. 19, l. 8][4]

b. *Buki* ‘may thy be....’ (Mod. Lith, *bū́k*)

[*Mažvydas Catechism* p. 23, l. 9][5]

These forms in (20) and (21) exhibit the acute tone despite being monosyllabic. This can be explained only by assuming that MC was no longer an active phonological process when the apocope took place. Therefore, the more difficult question is how far back Monosyllabic Circumflexion can be traced.

While Petit assumes that the *métatonie douce* in the 3rd person future forms of monosyllabic acute roots took place relatively recently, Rasmussen (1999) and Villanueva Svensson (2011c) investigate the possibility of MC being traced as far back as the Proto-Baltic-Slavic stage, based on additional categories where MC can be observed. Kortlandt (1985) also assumes that the origin of the circumflex tone of the Lithuanian 3rd person future forms and Baltic reflexes of PIE root nouns can be traced back to a Proto-Balto-Slavic stage, yet from a different point of view. In what follows, their views will be introduced.

3.1.3.1 Jens Rasmussen

Rasmussen (1999: 481f.) gives the following examples from both the Baltic and Slavic branches:

(22) a. Lith. *nuõ* ‘froms’ cf. *núo-jauta* ‘presentiment’ (from the stem *jaũt-* of the verb *jaũsti* ‘forebode’)

b. Lith. *tiẽ* ‘those (m. nom. pl.)’ cf. *ger**íe**ji* ‘the good (def. m. nom. pl.),’ *ger**ì*** ‘good (indef. m. nom. pl.)’ [= (16a)]

c. Lith. *jũs* ‘you (2pl.nom.)’ cf. *j**ū́**sų* ‘your (2pl.gen.),’ Latv. *jũs*, PIE **i̯uH-*

d. SCr. *dâ* ‘gave’ < 2sg. **deh*$_3$*-s*, 3sg. **deh*$_3$*-t*

e. SCr. *pî* ‘drank’ < 2sg. **pih*$_3$*-s*, 3sg. **pih*$_3$*-t*

[4] Ford (1971: 30).
[5] Ford (1971: 36).

f. SCr. *bî* ‘was’ < 2sg. **b^{h}uH-s*, 3sg. **b^{h}uH-t*, cf. OCS *by*

g. Sln. *tî* ‘you (2sg.nom.)’ < PS **ty* < PBS **tū* < PIE **tuH*

h. Sln. *mî* ‘we (1pl.nom.)’ < PS **my*,[6] cf. OCS *my*

i. Sln. *vî* ‘you (2pl.nom.)’ < PS **vy* ← PBS **jū(s)*[7] < PIE **i̯uH-*

j. Sln. *tâ* ‘that (f.sg.nom.) or those (n.nom.pl./acc.pl.)’ < PBS **tā* ← PIE **seh$_2$*

k. Sln. *krî* ‘blood’ < PS **krū*, cf. YAv. *xrū*, OIr. *crú*

The case of (22a) is interpreted in the same way that Zinkevičius explained them. The other items under (22) are identified as examples of MC based on comparative evidence pointing to the long vowel in the Proto-Balto-Slavic stage. As discussed in CHAPTER 2, the long vowels in the Proto-Balto-Slavic stage received an acute nucleus, which are typically realized with the acute tone in Balto-Slavic. Therefore, we have the unexpected circumflex accent in them, and that must be the result of some kind of secondary metatonical process that could change an acute tone to circumflex, i.e., MC. Since unexpected circumflex tones are thus observed also in Slavic languages, he supposes that MC can be traced back to the common stage of Baltic and Slavic.

However, when we look closely at the data, they rarely show the correspondence of MC in both Baltic and Slavic. Certainly, Rasmussen explains the tonal disagreements in Lithuanian and Latvian shown in (22b, c) by means of an analogical process through which Latvian pronouns may have adopted the acute from the adjective and nominal endings, or from the corresponding plural form (Lith. *jū́sų*, Latv. *jũsu*). Yet, the examples under (22d, e, f) do not have any comparanda on the Baltic side, since unfortunately Baltic does not attest any explicit root-aorist

[6] For the initial **m-*, see footnote 81 on p. 189. For the vocalism, it is explained either as the influence of PS 2pl. nom. **vy* (Meillet 1924: 396–397) or as an analogy from the accusative plural ending (Vaillant 1958: 452).

[7] The initial **v-* is assumed to be taken from oblique cases (cf. Kapović 2009: 75).

category as such. The case in (22h) does not have comparanda either.[8] In the case of (22g, j), they do have cognates in Baltic, i.e., *tù*[9] and *tà*, but they do not provide evidence of MC. Thus, the data point to different possibilities, i.e., MC in Proto-Balto-Slavic, and in the individual languages on both the Baltic and Slavic sides.

For these data, Villanueva Svensson (2011c: 17ff.) makes several valid points. First, the Slavic personal pronouns are reconstructed with mobile paradigms (cf. Kapović2006: 86), and therefore they could have circumflex tones through Meillet's Law. Consequently, they are ambiguous in regard to MC. Second, he also considers the possibility of aorist forms as in (22d, e) to reflect Meillet's Law. He concludes that overall Rasmussen's evidence turns out to be "labile."

Rasmussen (1999) also adduces the nouns that allegedly originated from Proto-Indo-European root nouns, which will be revisited in (39) and (40) on p. 112 below. As will be discussed later, many of the alleged descendants of PIE root nouns are found to fall short of being secure evidence for the age of MC in Larsson (2001, 2002, 2004), followed by Villanueva Svensson (2011c: 11ff., 16ff.). This will be mentioned briefly in the next section and in more detail in CHAPTER 4.

3.1.3.2 Miguel Villanueva Svensson

In his article "Indo-European Long Vowels in Balto-Slavic" (2011), Villanueva Svensson points out some problems with assuming a certain type of forms [e.g., (39) and (40) on p. 112ff.] as root nouns. Actually, some of the forms in (39) and (40) had been discussed in Kortlandt (1985: 117ff.) for a different purpose. Kortlandt adduces them as evidence for the circumflex tone as the reflex of Proto-Indo-European long vowels (or lengthened grades). He assumes that monosyllabic root nouns are one of the loci where original lengthened-grade vowels are found, and therefore the circumflex tone often found in them should prove that the Proto-Indo-European lengthened-grade vowels received circumflex tone in Balto-Slavic. In works by both Kortland (1985) and

[8] Lith. *mẽs*, OPru. *mes*, and Latv. *mẽs* are from PB **mes* (Stang 1966: 254), and they do not phonologically correspond to Slavic *my*, due to the analogical influence of the 2nd person PBS **jū̲-* (cf. footnote 6).

[9] This form may continue a short variant of the 2nd person singular nominative pronoun **tū/*tu* (Stang 1966: 247; Kapović 2006: 147).

Rasmussen (1999), PSl **rěčъ* (= 39c), Lith. *žėlà*, PSl **žalь* (= 39d), PSl **mělъ*, **mělь*, Lith. *smė̃lis* (= 39b), Lith. *volė̃* (= 40i), Lith. *võras* (= 40k), SCr. *čâr* (= 39a), etc. are all etymologically regarded as root nouns. However, Villanueva Svensson (2011c: 11ff.) gives three reasons to doubt that these type of nouns are derived from original root nouns:

- Root nouns are normally continued as *i*-stems in Balto-Slavic, cf. Larsson (2001, 2002a). Unless supported by firm evidence, the derivation of *o*- or *ā*- stems from earlier root nouns must be regarded as problematic.

- Root nouns based on *TEUH*- and *TERH*- roots were probably generalized as zero grade already in PIE, cf. Nussbaum (1986: 66[53]). Accordingly, the reconstruction of lengthened-grade root nouns to the roots of these structures is also problematic.

- Derivatives like Lith. *žolė̃*, *gėlà* are productive in Baltic and thus of little probative value.

Certainly, it is well known that the root nouns are usually merged to *i*-stems in Balto-Slavic through an analogical process motivated by the formal resemblance with *i*-stems in the accusative singular/plural forms as the result of the sound change PIE **R̥* > PBS **iR*. Thus, many canonical root nouns are attested as *i*-stems in Balto-Slavic, e.g., **nok^{w}t-s* 'night,' **ĝ^{h}u̯ēr* 'wild animal' > Lith. *naktìs*, Latv. *nakts*, OPru. *nactin/naktin/nacktin* (acc. sg.), OCS *nošt*ь; Lith. *žvė́rį* (acc.sg.), ELatv. *zviers/zvę̄rs* (< **zvērис*), *źwieri* (acc. sg.), SCr. *zvȉjer*, Sln. *zvȇr*.

And the third reason can be confirmed by the descriptions in Stang (1966b: 148–149) and Larsson (2004, 2010b). Rasmussen's data include many *ā*- and *i̯ā*- stems, which have proven to be quite productive in word formation. In this formation, as discussed in Stang (id.), *ā*-stem feminine nouns in AP4 are often based on verbs with acute accent, involving *métatonie douce* and the lengthening of the root vowel.[10]

For those reasons, Villanueva Svensson does not agree with the nouns that Rasmussen (1999) assumed to be descendants of PIE root nouns. Thus, many of his data, including some pronominal forms (22g, h, i, j), are dismissed by Villanueva Svensson (2011).

[10] This will be discussed in more detail in §4.2.

On the other hand, Villanueva Svensson offers an interesting argument on the accentual contrast among Latv. *sàls* 'salt,' *zùoss* 'goose,' *gùovs* 'cow,' Lith. *nósis*, Latv. *nãss* 'nose,' Lith. *žvér̨į* (acc.sg.), and Latv. *zvę̂rs* 'wild animal,' so that Rasmussen's view on a monosyllabic circumflexion rule being applied to Proto-Balto-Slavic could be accommodated with the acute roots in the words for 'nose' and 'wild animal.' His argument on those root nouns seems to support the possibility of MC being traced back to the Proto-Balto-Slavic stage, whereas he states that MC does not need to be either so old as Rasmussen assumes or so recent as Petit does in their discussions of verbal forms in aorist and future (Villanueva Svensson 2011: 18–19). We will return to this topic and examine his discussion in more detail in CHAPTER 4, in which the chronology of MC is discussed.

Villanueva Svensson also mentions 3rd person future forms with monosyllabic roots. Some of them exhibit MC (*duõs* ∼ *dúoti* 'to give,' *dẽs* ∼ *dė́ti* 'to put'), whereas others do not (*lìs* ∼ *lýti* 'to rain,' *bùs* ∼ *bū́ti* 'to be,' etc.). Therefore, Petit (2002) offers an alternative way for explaining the distribution of metatony and shortening without MC. However, since certainly Petit's (2002) formula "accounts for the facts only at the cost of extensive analogy," Villanueva Svensson instead accepts Rasmussen's view according to which the circumflex tone on certain 3rd future verbal forms are derived through MC. Yet this view still leaves some 3rd person future verbal forms with shortened roots unexplained. I will present my own view on this in §4.1 (p. 82ff.).

3.1.3.3 Frederik Kortlandt

Frederik Kortlandt argues that there are two chronological layers of the circumflex tone in monosyllables (Kortlandt 1985: 115, 2014). He maintains that the oldest distribution of metatony and Leskien's shortening among the Lithuanian 3rd person future forms is preserved in the dialects where the 3rd person future forms of the verbs in *-ýti* are shortened (*rašìs* 'will write,' *darìs* 'will do'), while those of the verbs in *-ė́ti*, *-óti* and *-úoti* are affected by metatony (*stovẽs* 'will be standing,' *žinõs* 'will know,' *dainuõs* 'will sing'). In his opinion, shortetning is regular among verbs with monosyllabic root vowel *ý* or *ū́*, while metatony is regular with monosyllabic roots elsewhere (e.g., *dẽs* 'will put,' *jõs* 'will ride,' *duõs* 'will give'), which served as the model of metatony in the final syllables of the 3rd person future forms of the verbs in *-ė́ti*,

-óti, -úoti, referred to as metatonical above. In fact, he maintains that Leskien's Law affected only the high long vowels *ý* and *ű́* in monosyllabic forms. Therefore, he assumes that the metatony (MC) in the 3rd person future forms of monosyllabic roots (e.g., *dẽ̂s* 'will put,' *jõs* 'will ride,' *duõs* 'will give') must have been older than Leskien's Law, affecting the 3rd person future forms of the verbs in *-ė́ti, -óti* before they could have been shortened. He (1985: 115, 2002: 16) dates this back to Proto-Balto-Slavic, equating the Baltic future category with the PIE *s*-present and *s*-aorist with the lengthening in the root, where the circumflex tone is generated through a sound change $*\bar{V}H > *\bar{V}$, e.g., **dēh$_3$-s-t* > **dōs-t* > *duõs*. Since Kortlandt assumes that the lengthened-grade vowels gain the circumflex tone with the rejection of Eichner's Law, the cirucmflex tone in monosyllabic forms of the reflexes of root nouns and Lithuanian 3rd person future forms are the regular outcome for him. Therefore his framework does not require the assumption of MC to explain the circumflex tone of those forms.

Nonetheless, the pronominal forms that have either acute forms (*tíe* 'that (m. nom. pl.),' *túos* 'id. (m. acc. pl.),' *túo* 'id. (m. instr. pl.)' in Žem. and W. Aukšt. dialects in the vicinity of Žem. area) or metatony forms (Aukšt. *tiẽ, tuõs, tuõ*), depending on dialects, are considered by him to result from MC as a local and more recent phenomenon in the Aukštaitian dialects. Yet, any possible factors of the distribution of the acute forms (e.g., f. nom./instr. sg. *tà*) and metatony forms (m. instr. sg. *tuõ*, nom. pl. *tiẽ*,) within Aukštaitian dialects are not explained. This problem will be taken up below in §4.4.

There are a couple of counterarguments against his view that there are two chronological layers of the circumflex tone of monosyllabic forms, e.g., the Baltic future could be descended from the PIE desiderative, and also there are a few cases where Leskien's Law failed to shorten *ý* and *ű́* (see §4.1 below). In addition, a different ablaut pattern can be reconstructed for the word for 'cow,' etc. (see §4.2 below). However, by discussing the same data with additional data from a different theoretical standpoint, Kortalndt's proposal of the two chronological layers of MC will find agreement in §4.3.

3.1.3.4 Summary

The discussions reviewed above (Rasmussen 1999; Villanueva Svensson 2011c) support the existence of MC. Kortlandt (1985, 2014) also

recognizes the problematic circumflex tone of some monosyllabic words, although circumflex tone is the regular outcome without the assumption of MC in many monosyllabic forms, e.g., 3rd person future forms, according to his framework.

Rasmussen assumes that MC took place in the Proto-Balto-Slavic stage based on the data from root nouns, pronouns, and aorist forms. While disapproving of many of those data, Villanueva Svensson (2011c) suggests a more refined way to analyze some root nouns with monosyllabic roots, which might support the view of MC taking place in the Proto-Balto-Slavic stage. Alternatively, Kortlandt supposes that circumflexion in monosyllables occurred twice, in PBS and in Lithuanian, based on 3rd person future forms and pronominal forms.

On the one hand, some researchers seem to agree that MC may have taken place in Proto-Balto-Slavic. On the other hand, it is also true that the relative chronology of Monosyllabic Circumflexion and other Balto-Slavic sound/morphological changes (e.g., Osthoff's Law, transfer of the stem formation of root nouns to *i*-stem, acute assignment, etc.) has not been examined in detail. I will examine the East Baltic reflexes of PIE root nouns, which will provide evidence for MC in Proto-Balto-Slavic.

Additionally, Kortlandt's proposal for the two chronological layers of circumflexion in monosyllables should be examined. In fact, we will see that the East Baltic particles/prepositions show a peculiar distribution of tones in §4.3: old particles with the circumflex tone, while recently formed particles showing different tones in Latvian and Lithuanian. This may be better explained by presuming two chronological layers of MC.

As I mentioned above, the 3rd person future forms are not regarded as informative data for the establishment of the relative chronology of MC. However, a close examination and an interpretation of the distribution based on recent research on the Northern Indo-European verbal categories make it possible to draw some information about the relative chronology of the process. This will be shown in §4.1, and the following section §4.2 will provide a more accurate relative chronology of MC.

3.2 Data

In what follows, we will examine examples of MC. The data come from previous works and etymological dictionaries, e.g., Būga (1923/24: 95ff.), Fraenkel (1962–65), Zinkevičius (1984–1995: II, 161), Larsson (2010), and Dunkel (2014).

Below is the list of data to be discussed as potential examples of MC sorted in accordance to historical grammatical categories:

I. 3rd person future forms in Lithuanian:

- *d**uõ**s* 'will give' < **dúos* cf. 1sg. *d**úo**siu*
- *d**ẽ̃**s* 'will put' < **dés* cf. *d**ẽ́**siu*, etc.

II. reflexes of PIE root nouns:

- Latv. *g**ùo**vs* 'cow' (< **g^{w}ṓus* ←-- acc.sg. **g^{w}ṓm*)
- Latv. *s**à̃**ls* 'salt' (< **sā́ls* ← **sál-s*)
- *š**uõ*** 'dog' (< **ḱu̯ṓ*)

III. propositions/adverbs:

- Lith. *n**uõ***, Latv. *n**ùo*** 'from' ∼ Lith. *n**úo**bara*, Latv. *n**uõ**-bara* 'lamb's wool (gathered in spring)'
- Lith. *p**eř*** 'through' ∼ Latv. *p**ãr***, Lith. *p**ér**-nešti* 'to carry across'
- Lith. *pr**iẽ*** 'by, near' ∼ Lith. *pr**íe**-puolis* 'coincidence'
- Lith. *pr**õ*** 'through' ∼ Latv. *pr**uô**jãm* 'away'
- Lith. *d**aũ**g* 'a lot (of...)' ∼ Latv. *d**aũ**dz*, Lith. *d**áu**ginti* 'to multiply'
- Lith. *d**ẽ̃**l* 'for, because of' ∼ Latv. *d**ẽ̦**l* 'id.'
- Lith. *l**aĩ*** 'let *somebody* do.... ' ∼ Lith. *l**éi**sti* 'let,' Latv. *l**aî***, inf. *laîst*
- Lith. *n**ẽ̃*** 'not even' ∼ Latv. *n**ê*** '(emphatic) no,' PIE **né eh$_1$*
- Lith. *n**ū̃*** 'now' ∼ Lith. *nūnaĩ* 'now, today,' OCS *nynĕ* 'now,' PBS **nūnoi*, Skt. *nú, nū́* 'now,' Gk. νῦν, νυν 'now,' PIE **nŭ̆-*

– Lith. ***tẽ̃*** (permissive particle) < **teh*$_1$; cf. Gk. τῆ̃ ‘there’ (Trautmann 1910: 449; Endzelīns 1923: 478; Būga 1958–61: I, 454[2]; Dunkel 2014: II, 789)

– Lith. ***vaĩ*** ∼ Latv. ***vaî*** ‘woe,’ Goth. *wai*, Lat. *vae*, OAve. *voya-* m. ‘woe,’ Skt. *uvé* ‘I look (at myself),’ OAve. *avōi, vayōi* ‘auch!’ Gk. ὀά, οὐά, οὐᾶ ‘auch.’ Gk. οὐαί ‘woe’

– Lith. ***vẽ̃l*** ‘again’ (< **vė̃li*/**vė̃lia*?) ∼ Latv. ***vêl***, PB **vḗli*

– Lith. ***võs*** ‘hardly’ ∼ OCS *jedъva*, Čak. *jedvä*, PBS **(ed-)vās* ‘hardly’; Dunkel (2009: 49); Dunkel (2014: 764ff.) reconstructs PIE **u̯a* + **és*.

IV. pronominal forms:

– 2pl. nom. ***jūs*** < **jū́s* ‘you’ cf. 2pl. gen. ***jū́sų***, Latv. ***jũs***

– m. nom. pl. ***tiẽ*** < **tíe* ‘those’ cf. *ger**íe**ji* ‘the good ...’ (def.), Latv. ***tiẽ***

– acc. pl. m. ***tuõs*** < **túos* ‘those’ cf. *ger**úo**sius* ‘the good ...’ (def.)

– m. sg. instr. ***tuõ*** ‘those’ cf. *ger**úo**ju* ‘the good...’ (def.)

4. A Categorical Study of Monosyllabic Circumflexion

In this chapter, the four categories where the examples of Monosyllabic Circumflexion are found are analyzed. As listed in the previous chapter, the examples are found in the following four categories.

I. 3rd person future forms of monosyllabic stems:
šõ̀ks – šókti 'to jump;' *vỹ̀s – výti* 'to drive,' etc.

II. reflexes of PIE root nouns:
Latv. *gùovs* 'cow' (< $*g^{w}\acute{o}\underset{\frown}{u}s$ ←-- acc.sg. $*g^{w}\acute{o}m$); *šuõ̀* 'dog' (< $*\hat{k}\underset{\frown}{u}\acute{o}$), etc.

III. prepositions/adverbs:
nuõ 'from' ∼ *núotaka* 'bride;' *vẽ̀l* 'again' ∼ Latv. *vêl* 'still, yet' < PB $*v\bar{e}li$; *tẽ̀* (permissive particle) < $*teh_1$; cf. Gk. τῆ 'there,' etc.

IV. pronominal forms:
tuõ̀ (< $*toh_1$ m. sg. instr. ∼ *geráoju* 'the good (m. sg. instr.)'), *tiẽ̀* (< **toi* pl.nom. ∼ *geríeji* 'id. (pl.nom)'), *tuõ̀s* (< $*t\breve{o}ns$ pl. acc. ∼ *geráosius* 'id. (pl.acc.)'), etc.

First we will look into the Lithuanian 3rd person future forms to venture a guess venture a guess as to approximately when MC must have taken place. The reflexes of the PIE root nouns are more diagnostic than the 3rd person future forms for identifying the relative chronology of MC and some phonological and morphological changes, but there are only a few of them; thus we will establish a more accurate relative chronology of MC by examining them next. Based on the results of those two categories, the examples and problematic forms of the remaining categories will be examined.

4.1 The 3rd Person Future Forms

The 3rd person future forms are known as a category where Monosyllabic Circumflexion is observed. However, the phenomenon is not coherently observed in this category, i.e., there are both forms that are examples of the phenomenon and forms whose root vowels are shortened. There is no commonly accepted explanation to account for this distribution. In this section, I will examine the distribution of Monosyllabic Circumflexion and shortening among the 3rd person future forms with long monosyllabic stems.[1] Through this examination, the possibility of MC in Proto-Balto-Slavic will also be discussed. The data were collected from Senn (1966) and Petit (2002).

4.1.1 Irregularity among the 3rd p. Future Forms of Monosyllabic Stems

The formation of the Lithuanian future forms is synchronically quite transparent. It consists of the infinitive stem, the future formant *-s-*, and a personal ending. The ending is *-∅* in the 3rd person. Therefore, the 3rd person future form of monosyllabic stems results in a monosyllable. Many such monosyllabic acute stems show the Monosyllabic Circumflexion in the 3rd person future, as a matter of fact:

(23) a. *šõ̀ks – šókti* 'to jump'

b. *vỹ̀s – výti* 'to drive'

c. *duõ̀s – dúoti* 'to give'

d. *dė̃̀s – dė́ti* 'to put'

e. *stõ̀s – stóti* 'to stand,' etc.

Whereas the majority of the 3rd p. future forms of monosyllabic acute stems follows the metatony rule (*vỹs* 'will drive,' *lỹs* 'will become meager;' *šõks* 'will jump,' *vė̃s* 'will get cool'), many exhibit shortening by Leskien's Law (*bùs* 'will be,' *lìs* 'will rain,' *rìs* 'will swallow,' *pùs* 'will rot,' etc.).

[1]The argument presented in this section is an elaborated version of my earlier published paper (Yamazaki 2014).

For such exceptions a few proposals have been made. Zinkevičius (1984–95: II, 218) assumes that the shortened forms can be the result of the analogy from their polysyllabic variants, e.g. *bùs* from ***nebùs*** 'won't be' (< ****nebū́s***). However, since every monosyllabic verb has polysyllabic variants at least in their negative forms, this does not satisfactorily explain the distribution of shortening and metatony in the 3rd person future forms.

Kazlauskas (1968: 104[1]) suggests that the shortening is regular for monosyllabic 3rd person future forms. According to him, some of them remain long due to the expected homonymic clash (*vỹs – výsti* 'to droop,' *siū̃s – siū́ti* 'to sew' vs. *vìs – vìsti* 'to fall apart,' *siùs – siùsti* 'to rage'). However, his explanation still raises some questions as to why *gnỹbs – gnýbti* 'to pinch,' *žnỹbs – žnýbti* 'to tweak,' etc. remain long when there are no ✗*gnibti* or ✗*žnibti*; why *lìs – lýti* is alone shortened, while *lỹs* (– *lýsti* 'to become thin') is not.

Senn (1966: 231) observes that Leskien's shortening is regular with *ý* and *ū́* in the final syllable (including monosyllables) of the 3rd person future forms, but otherwise metatony is regular. Therefore, he regards the metatony of *ý* and *ū́* in the final syllable of some 3rd person future forms as "counterexamples." However, Senn left unexplained why shortening is regular for those verbal roots with *ý* and *ū́* as well as why the verbs in (27, 28) exhibit metatony.

Villanueva Svensson (2011: 19) assumes that the acute tone was restored in the future forms of the acute stems in -*ū́*- and -*ī́*-, which resulted in the shortened forms in the 3rd person future tense. Although this idea is phonologically preferable, it does not clarify the condition of the alleged restoration of the acute tone. As we will see below in the data collected by Senn (1966) and Petit (2002), not all the monosyllabic stems in -*ū́*- and -*ī́*- are shortened.

Petit (2002: 245ff.) has conducted an exhaustive survey on the unexpected distribution of metatony and shortening in the 3rd person future forms with monosyllabic acute roots. In addition to a couple of proposals on the more limited condition of Leskien's Law and its relative chronology, Petit (2002) observes some important tendencies of the roots shortened in the 3rd person future and those showing Monosyllabic Circumflexion.

The first tendency is found in the syllable structure of the roots. He observes that the roots consisting of closed syllables (C$\acute{\text{V}}$C) have a

stronger tendency toward *métatonie douce*, whereas those consisting of open syllables (C$\acute{\text{V}}$) have a stronger tendency toward shortening. Some examples are:

(24) a. C$\acute{\text{V}}$C $\rightarrow$ C$\tilde{\text{V}}$C [V = *i* or *u*]
e.g., *dýgti – dỹgs*; *trū́kti – trū̃ks*

b. C$\acute{\text{V}}$ $\rightarrow$ C$\grave{\text{V}}$
e.g., *gýti – gìs*, *bū́ti – bùs*, *pū́ti – pùs*

However, there are a few counterexamples, such as *lū́žti – lùš* 'to break,' *rū́gti – rùgs* 'to turn sour,' *slū́gti – slùgs* 'to subside;' *výti – vỹs* 'to drive,' *siū́ti – siū̃s* 'to sew.' Moreover, its phonetic motivation is somewhat unclear.

Petit's (2002: 272) second point concerns the correlation between the short vowels in the 3rd person future forms and preterit forms. When the preterit forms have a short root, the vocalism of their future forms in the 3rd person tend to have short root vocalism as well, e.g., *bū́ti – bùvo – bùs, gýti – gìjo – gìs,* etc. There are again a few forms that do not show this tendency, e.g., *džiū́ti – džiū́vo – džiùs, rū́gti – rū́go – rùgs, slū́gti – slū́go – slùgs, siū́ti – siùvo – siū̃s.* Yet, since the motivation of copying the short vocalism in the preterit form to the 3rd person future form is somewhat unclear, the reason for the failure of copying the length in *džiùs, rùgs*, etc. also remains unclear.

For the third point, he explains why the shortening in the 3rd person future forms is limited to the roots with -*ī́*- and -*ū́*- by assuming that the result of the shortening was not eliminated when the roots were in -*ī́*- and -*ū́*-. Since the long vowels *ė* and *o* and the diphthongs *ie* and *uo* correspond to phonetically asymmetric short vowels (*e* [ɛ], *a* [a], *i*, and *u*, respectively), Leskien's Law gave rise to unusual alternations within the future paradigms involving those vowels, e.g., ✗*dès* $\sim$ 1sg. *dė́siu* (*dė́ti* 'to put'), ✗*jàs* $\sim$ 1sg. *jósiu* (*jóti* 'to go by horseback'), ✗*lìs* $\sim$ 1sg. *líesiu* (*líeti* 'to pour'); ✗*dùs* $\sim$ 1sg. *dúosiu* (*dúoti* 'to give'). Those shortened roots have been restored with the long vowels kept in other personal forms, adopting *métatonie douce*. Therefore, we find *dė́ti – dė̃s*, *dúoti – duõs*, and so forth. On the other hand, this restoration did not happen in the future paradigms with the root vocalism in *ī́* and *ū́*, which have phonetically symmetrical corresponding short vowels (*i, u*).

However, a detailed survey of the relevant paradigms of the verbs in question shows a morphological distribution of shortening and metatony, which will provide a better understanding of the distribution even among the roots in -*ī́*- and -*ū́*-. In one of the following sections, I will provide an alternative explanation as to why the shortening in the 3rd person future forms is limited to the roots in -*ī́*- and -*ū́*-, based on the results of my survey. The relative chronology of MC will be also examined. In the next section, we will start by examining the data.

4.1.2 Data

The data to be examined in the survey were compiled based mainly on the list in Petit (2002: 247ff.), and supplemented by forms in Senn (1966: 231). Petit collected the data from *Lietuvių kalbos gramatika* (*LKG*, Ulvydas (ed.) 1965–76), *Dabartinės lietuvių kalbos gramatika* (*DLKG*, Ambrazas (ed.) 1994), *Lietuvių kalbos rašyba ir skyryba* (*LKRS*, Mokslas 1989); for more archaic data, he referred to Otrębski (1956) and Morkūnas (1980: 109–222), and for dialectal data he referred to Zinkevičius (1966) as well as to Otrębski's grammar.

I. shortening instead of MC (violation of the rule)

(25) *ū́* → *ù*

a. *bū́ti – bùs* 'to be'
b. *pū́ti – pùs* 'to rot'
c. *srū́ti – srùs* 'to stream'
d. *žū́ti – žùs* 'to perish, die'
e. *džiū́ti – džiùs* 'to dry, wither'
f. *bliū́ti – bliùs* 'to bleat'
g. *kliū́ti – kliùs* 'to touch'
h. *griū́ti – griùs* 'to fall down'

(26) *ý* → *ì*

a. *gýti – gìs* 'to get better'
b. *rýti – rìs* 'to swallow'
c. *sýti – sìs* 'to link to'
d. *šlýti – šlìs* 'to lean, tilt'

e. *lýti – lìs* ‘to rain’

II. MC

(27) $\acute{u} \rightarrow \tilde{u}$

a. *siűti – siũs* ‘to sew’
b. *trúkti – trũks* ‘to lack’
c. *grűsti – grũs* ‘to crush’
d. *lűžti – lũš* (note: Senn 1966 gives *lùš*)

(28) $\acute{y} \rightarrow \tilde{y}$

a. *gnýbti – gnỹbs* ‘to pinch, bite’
b. *žnýbti – žnỹbs* ‘to pinch, to tweak’
c. *dýgti – dỹgs* ‘to spring, shoot’ (note: Senn 1966 gives *dìgs*)
d. *klýsti – klỹs* ‘to be mistaken’
e. *výti – vỹs* ‘to drive, wind’
f. *lýsti – lỹs* ‘to get/become thin’
g. *su-lýsti – su-lỹs* ‘to loose weight’
h. *(at)lýžti – lỹš* ‘to slacken’
i. *slýsti – slỹs* ‘to slide’
j. *výsti – vỹs* ‘to fade, droop’
k. *plýšti – plỹš* ‘to tear, rip’ (note: Senn 1966 gives *plìš*)

4.1.3 Reexamination of the Data

A close examination of the data listed in §4.1.2 reveals a fairly clear tendency that their present paradigms are involved in the nasal-infix formation. Below are the verbs that have nasal-infix presents in the lists. The forms are listed in the order of *infinitive, 3p.pres., 3p.pret., – 3p.fut.* It is also indicated in which dialect the nasal-infix presents are attested and which form is in Standard Lithuanian (in bold face). Sources are Kurschat (1883), and LKŽ, Fraenkel (1962–65).

(29) a. *bűti,* ***yra/bũna****/bũva/ẽsti, bùvo – bùs* ‘to be’
bũva: Ramygala (Panevėžio; E. Aukšt.), Šiaulėnai (W. Aukšt.)

b. *pū́ti, pų̃va/**pū̃va**/pū̃na/pū̃sta/pū́sta, pùvo – pùs* ‘to rot’

c. *srū́ti, **srū̃va**/srū̃na/srū́sta, srùvo – srùs* ‘to stream’

d. *žū́ti, **žū̃va**/žų̃va/žū̃na/žū́sta, žùvo – žùs* ‘to perish, die’

e. *džiū́ti, džių̃va/džiū̃va/džiū̃na/**džiū́sta**, džiū́vo – džiùs* ‘to dry, wither’
džiū̃va: Šilutė (W. Žem.), Šiauliai (W. Aukšt.)[2]

f. *bliū́ti, **bliū̃va**/bliū̃na, briùvo – bliùs* ‘to bleat’

g. *kliū́ti, kliū̃na/**kliū̃va**/kliū́sta, kliùvo – kliùs* ‘to touch’

h. *griū́ti, **griū̃va**/griū̃na, griùvo – griùs* ‘to fall down’

i. *slū́gti, **slū́gsta**/slunga, slū́go – slùgs* ‘to subside’
sluñga is found in the southern dialects of East Aukštaitia, i.e., Pabaiskas, Pašilė (Ukmergė), Čiobiškis, Gelvonai, and Musninkai (Širvintos) dialects (Morkūnas 1969: 134).

j. *gýti, gį̃ja/**gỹja**/gỹna, gìjo – gìs* ‘to get better’

k. *lýti, **lỹja**/lỹna, lìjo – lìs* ‘to rain’

l. *rýti, **rỹja**/rỹna, rìjo – rìs* ‘to swallow’

m. *rū́gti, **rū́gsta**/ruñga, rū́go – rùgs* ‘to turn sour’
ruñga: Gelvonai (Širvintos; E. Aukšt.)

n. *sýti, **sỹja**, sìjo – sìs* ‘to link to’

o. *šlýti, šlìja/**šlỹja**/šlẽja/šlỹna/šliñta/ šlỹsta/šlỹva, šlìjo – šlìs* ‘to lean, tilt’

Except (29a, e, i, m), all the verbs in (29) have nasal present forms in the standard language. (29a) and (29e) have nasal-infix presents in West Aukštaitian dialects, which was influential to the formation of the standard language.

[2] A form *džiū̃na* is also found.

However, the future forms in the 3rd person of the following three items are metatonical, despite their nasal-infix presents, but not all of them have a nasal-infix present in the standard Lithuanian. As illustrated in §4.1.4.6, they all have a somewhat peculiar situation within the paradigms.

(30) a. *výsti, **výsta**/viñsa/viñta, výto – vỹs* 'to fade, droop'

Baisogala (W. Aukšt.), Krakės (W. Aukšt.), Ėriškiai (E. Aukšt.): *viñta*

Also *vỹsti, vỹsta, vỹto*, found in a few dictionaries and in the writings of Simonas Daukantas (Žem.).

b. *trū́kti, **trū́ksta**/truñka, trū́ko – trū̃ks* 'to lack'

Musninkai (Širvintos; E. Aukšt.): *truñka*

c. *siū́ti, **siùva**/siū̃na/siùna/siū̃va, siùvo – siū̃s* 'to sew'

F. Kurschat's dictionary: *siū̃va* (based on Western Aukštaitian dialect)

On the other hand, the majority of the verbs whose 3rd person future forms are not shortened do not have nasal-infix presents.

(31) a. *výti, vẽja/vìja/vỹna, vìjo – vỹs* 'to drive, wind'

b. *grū́sti, grū́da, grū́do – grū̃s* 'to crush'

c. *gnýbti, gnýba, gnýbo – gnỹbs* 'to pinch, bite'

d. *žnýbti, žnýbia, žnýbė – žnỹbs* 'to pinch, to tweak'

e. *dýgti, dýgsta, dýgo – dỹgs* 'to spring, shoot'

f. *klýsti, klýsta, klýdo – klỹs* 'to be mistaken'

g. *slýsti, slýsta, slýdo/slìdo – slỹs* 'to slide'

h. *lýsti, lýsta, lýso – lỹs* 'to become thin'

i. *lýžti, lýžta, lýžo – lỹš* 'to slacken'

Although there are three verbs that do not follow the tendency, they still show Monosyllabic Circumflexion, which the majority of the 3rd person future forms exhibit.

4.1.4 Interpretation of the Distribution

The co-occurrence of nasal-infix presents and the shortened future forms in the 3rd person shown in (29) is noteworthy. In this section, any historical correlations between the short 3rd person future forms and the nasal-infix presents listed in (29) will be sought, taking into account the shift of the verbal system from PIE to Baltic.

4.1.4.1 Historical Background of Nasal-infix Presents in the Baltic Verbal System

In this section, an overview on the historical background of the Baltic nasal-infix presents will be provided. Its prehistorical connection with the intransitive inchoative thematic verbs reconstructible for Northern Indo-European will be addressed too.

The category of nasal-infix present is a well-attested verbal formation in Indo-European: Skt. *pr̥ṇā́ti/pr̥ṇánti* 'to fill' ∼ $\sqrt{p\bar{r}}$- (< **pl̥-né-h₁-ti/*pl̥-n-h₁-énti*), *yunákti / yuñjánti* 'to join' ∼ $\sqrt{yuj}$- (< **i̯u-né-g-ti / *i̯u-n-g-énti*); Hitt. *ḫarni(n)k-^{mi}* 'to destroy'; Lat. *iungis / iungunt* 'you join / they join'; Goth. *(ga-)full-nō-*, 3sg. *-full-ni-þ* 'to get filled'; etc. In Baltic, it also has rich attestations, including secondary formations, e.g., *bū̃va* 'is/are' (< Proto-Lith. **bu-n-va* beside OLith. *esti* descending from PIE **h₁és-ti*), and derived inchoatives, keeping the apophonic grade of their base word, e.g., *glemb̃a* 'become(s) flabby' ← *glebùs* 'flabby.' This indicates the productivity of this category.

As Stang (1942: 132ff.) has noted, nasal-infix presents are built to the zero-grade of the root as a rule, and are usually paired to thematic aorists as their preterit paradigm.[3] The zero-grade vocalism is morphologically regular also with the thematic aorist (Stang 1942: 138ff).[4]

[3] In Slavic, there are only limited nasal infixed forms kept intact, which indicates that nasal-infixation became unproductive in the Proto-Slavic time. Instead, nasal-suffixation became more common, e.g., *dvignǫti* 'move' (Leskien's class II, 1), *rinǫti* 'impel' (Leskien's class II, 2). Yet, the most archaic type of verbs still show the zero-grade in this formation, e.g. *linǫti* 'cling' (cf. Gorbachov 2007: 18ff.). Although the Slavic nasal presents (Leskien's class II) are paired to thematic aorists only when the roots end with a consonant (e.g., *dvigъ* to *dvignǫti*, Leskien 1922: 131–132), it is clear that thematic aorists are usually formed to inchoatives (Stang 1942: 63ff.).

[4] This morphological feature can be seen as old traits, i.e., the nasal-infix

Therefore, it is naturally understood that the data listed in (29) all have the reflexes of zero-grade vocalism, i.e., *y* and *ū*. This matter will be discussed in one of the following sections.

It is well known that nasal-infix present forms underwent a couple of phonological and morphological processes at the prehistorical stage of Lithuanian. The first process to mention is morphological: the introduction of a glide to the present stem. The expected original nasal formations of *pū̃va*, *gỹja*, *lỹja* are: **pu-n-H-e/o-* 'to rot, decay,' **g^{w}i-n-h$_3$-e/o* 'to become alive,' **li-n-H-e/o-* 'to start raining,' which would have given rise to Proto-Baltic **puna(t), *gina(t), *lina(t).* Those forms are considered to have acquired a root final glide in the present stem through an analogy to some verbs such as *mìgti* (inf.), *miñga* (3p. pres.), *mìgo* (< *mìgā*; 3p. pret.) 'sleep' (Gorbachov 2007: 167ff.), cf. (32):

(32) Proportion of Analogy:
miñga : **mìgā* = X : **lìjā*
X = **liñja* (> *lỹja*).

This explains why the present forms in (29) have the circumflex tone, while they are expected to have the acute root as indicated by their infinitive forms and etymological backgrounds. Afterwards, some nasal-infix present stems further underwent a regular loss of the nasal segment in the following environment:

(33) $\mathrm{Vn} > \tilde{\mathrm{V}} > \bar{\mathrm{V}} \,/\, \_\_\_ \left\{ \begin{array}{llll} \text{r}, & \text{l}, & \text{m}, & \text{n}, \\ \text{j}, & \text{v}, & & \\ \text{s}, & \text{š}, & \text{ž} & \end{array} \right\}$.

According to this sound change, **liñja* in (32) changed to **lı̨̃ja* > *lỹja*. Likewise, *gỹja* [3p.pres.] < *gı̨̃ja* (*gýti* 'to heal, get better'), *pū̃va* < **punva* (*pū́ti* 'to get rotten'), etc. The function of the lost inchoative marker *-n-* often "gets reinforced by attaching the other productive inchoative intransitive suffix *-sta-* in present stems" (Gorbachov 2007: 152).[5] Thus, some of the verbs in (29) have a *sta*-present side by side:

present formation is reconstructed with the zero-grade root for PIE (LIV (17)), and the same could be said for thematic aorist, although only two verbal roots (**u̯id-e/o-* [∼ **u̯eid-* 'to notice'], **h$_1$lud^{h}-e/o-* [∼ **h$_1$leu̯d^{h}-* 'to go out']) allow us to reconstruct the category in the parent language (Cardona 1960: 125).

[5] In Žemaitian and their neighboring Aukštaitian dialects, the same function was reinforced by another productive suffix *-na-*, giving rise to dialectal forms such as *lỹna, pū̃na, džiū̃na*, etc.

(34) a. *žűti* 'to perish:' *žų̃v-a* > *žū̃va* → *žū̃sta* → *žűsta* [3p.pres.]

b. *pűti* 'to rot:' *pų̃v-a* > *pū̃va* → *pū̃sta* → *pűsta* [3p.pres.]

It follows that the *sta*-presents of the verbs (29b, c, d, e, g, i, m, o) are likely to be newer forms built after the loss of the nasal. The *sta*- and nasal-infix presents, sharing the same aspectual meaning, are in near-complementary distribution in Lithuanian: the roots in ^{0}ET, ^{0}EL, ^{0}EU, ^{0}EUT form nasal-infix presents, while the roots in ^{0}ERT, ^{0}EN form *sta*-presents (Stang:1942: 132). As Gorbachov (2014: 22ff.) argues (with references), *sta*-presents became particularly productive in each East Baltic languages, indicated by the fact that only around 70 out of over 300 *sta*-verbs respectively in Lithuanian and Latvian overlap. The old nasal-infix presents are replaced with *sta*-presents, particularly in Latvian where nasal has been lost in the wider environment (Stang 1942: 133). This makes it possible to assume that once nasal-infix presents had been productive in the parent language, but *sta*-presents became more productive in the individual East Baltic languages.

The morphological norm of the zero-grade in the nasal presents and thematic aorist of the verbs listed in (29) is also applied to their infinitive stem. The infinitive stem in general originated from the verbal abstract noun in the *ti*-stem in the dat.-loc. sg. Therefore, their root vocalism is expected to be originally in zero-grade, although it has become identical to that of the preterit stem in most cases in Balto-Slavic (Stang 1942: 85, 122ff.). The long acute root in the infinitive stem, which can be considered to inherit the old zero-grade, is well preserved by the verbs in (29). Indeed, many of their acute roots can be directly explained with the root-final laryngeal reconstructible for PIE or with Winter's Law:

(35) a. *bűti, yra/bū̃na/bū̃va/ẽsti, bùvo – bùs* 'to be'
cf. PIE **b^{h}u̯eh$_2$-/*b^{h}eu̯h$_2$-* 'to become' (Skt. *bhávati*) (LIV 98ff.)

b. *pűti, pų̃va/pū̃na/pū̃sta/pűsta, pùvo – pùs* 'to rot'
cf. PIE **peu̯H-* 'to be rotten,' ON *fúnar* (< PGmc. **fŭ̄ni/a-* 'rots') (LIV 480)

c. *džiűti, džių̃va/džiū̃va/džiū̃na/džiűsta, džiűvo – džiùs* 'to dry, wither'
cf. PIE **deh$_2$u̯-* 'to catch fire' (LIV 104)
Lith. *džiáuti* 'to dry' IEW (179–181)

d. *bliū́ti, bliū̃va/bliū̃na, briùvo – bliùs* ‘to bleat’
cf. PIE **b^{h}leu̯H-* ‘to overflow’ (LIV 90)

e. *kliū́ti, kliū̃na/kliū̃va/kliū́sta, kliùvo – kliùs* ‘to touch, brush’
cf. PIE **kleHu̯-* (∼ **kleuH-*?? ‘to end up somewhere’; LIV 365)

f. *gýti, gį̃ja/gỹja/gỹna, gìjo – gìs* ‘to get better’
cf. PIE **g^{w}i̯eh$_3$-* ‘to live’ → **g^{w}inh$_3$-e/o-* ‘to become alive’ (LIV 215)

g. *griū́ti, griū̃va/griū̃na, griùvo – griùs* ‘to fall down’
cf. PIE **g^{h}reh$_1$u̯-* ‘to (start to) drop, fall’ (LIV 202)

h. *lýti, lỹja/lỹna, lìjo – lìs* ‘to rain’
cf. PIE **lei̯H-* ‘to pour’ (LIV 405)

i. *rýti, rỹna/rỹja, rìjo, – rìs* ‘to swallow’
cf. PIE **h$_3$rei̯H-* ‘to float,’ OE *rinnan* ‘run,’ OCS *rinǫti sę* ‘rush, dash,’ Skt. *riṇā́ti* ‘lets flow’
(LIV 305; Mayrhofer 1986–96: II, 437)

j. *rū́gti, rū́gsta/ruñga, rū́go – rùgs* ‘to turn sour’
cf. PIE **(h$_1$)reu̯g-* (IEW 871, LIV 509)

k. *sýti, sỹja, sìjo – sìs* ‘to link to’
cf. PIE **sih$_2$-* (← **seh$_2$(i̯)-* ‘to bind’),[6] *sinā́ti* ‘(s)he binds’ < **si-né-h$_2$-* (Mayrhofer 1986–96: II, 720ff.)

Thus, these verbs preserve the inherited infinitive stem with the long acute root despite their preterit stem with the short vowel.

Of course, there are also secondarily formed verbs which show the same pattern as those in (35). The following items in (36) are traditionally not traced back to *seṭ*-roots, and the long vowels in their infinitive roots (lengthened zero-grade) seem to be a Baltic innovation. Nonetheless, their pattern in the verbal paradigms are the same as those in (35), i.e., *-ī́-* or *-ū́-* in the infinitive, *-ī̃-* (< *-in-*) or *-ū̃-* (< *-un-*) in the nasal infix present, and *-ĭ̄-* or *-ŭ̄-* in the *ā*-preterit.

(36) a. *srū́ti, srū̃va/srū̃na/srū́sta, srùvo – srùs* ‘to stream’
cf. PIE **sreu̯-* ‘to flow’
(LIV 535; Mayrhofer 1986–96: II, 784)

[6] The evidence for the laryngeal is provided by Skt. *ví-ṣita-* ‘unbound’ (< **u̯i-sh$_2$-tó-*) and Hitt. *iš-ḫi-an-zi* ‘they bind’ (< **sh$_2$-i̯-énti*).

b. *žűti, žų̃va/žū̃na/žűsta, žùvo – žùs* ‘to perish, die’
cf. PIE **ĝʰe̯u-* ‘to disappear, vanish’ (IEW 448)

c. *slűgti, slűgsta/slunga, slűgo – slùgs* ‘to subside’
cf. PIE **(s)leu̯-* ‘to be limp’ → PBS **(s)leu̯-g-* (?)
(IEW 962)

d. *šlýti, šlìja/šlỹja/šlẽja/šlỹna/šliñta/ šlỹsta/šlỹva, šlìjo – šlìs* ‘to lean, tilt’
cf. PIE **k̂lei̯-* ‘to lay oneself back,’ OE *hlinian*, OSax. *hlinōn*, OHG *hlinēn* (< **hlini/a-* ‘to lean’ Gorbachov 2007: 78)
(LIV 332)

These verbs (listed in (29), including the items in (35) and (36)) clearly form a morpho-semantic group, characterized by inchoative meaning and the specific pattern discussed above. As a matter of fact, (35b) and (36d) overlap the partial list of the intransitive inchoative thematic verbs established in Gorbachov (2007: 159ff., 203) for Northern Indo-European languages, i.e., Germanic, Baltic, and Slavic (also, Villanueva Svensson 2011a: 44). Since the verbs in (29) include some transitive inchoatives, the inchoative thematic verbal group in Proto-Baltic can be assumed to have developed from the Northern IE intransitive inchoative thematic verbs before *sta*-presents became productive. Let us call them Group 1 verbs here. However, it is still unclear why the Group 1 verbs have the shortened future forms. In the next section, we will review the morphological history of the Baltic future formation to look for any linkage between the nasal-infix presents and their shortened 3rd person future forms.

4.1.4.2 Historical Background of the Baltic Future and the 3rd Person Future Forms of Inchoative Thematic Verbs

The Baltic languages, including Lithuanian, have the future tense forms characterized by *-s-*, which is generally called *s*-future. Below is the Lithuanian future paradigm of the verb *dúoti* ‘to give.’

sg. 1.	*dúosiu*	du. 1.	*dúosiva*	pl. 1.	*dúosime*
2.	*dúosi*	2.	*dúosita*	2.	*dúosite*
3.	*duõs*		—		—

The Latvian future paradigm shows a perfect match with Lithuanian:

sg. 1.	*duôšu*	pl. 1.	*duôsim*
2.	*duôsi*	2.	*duôsit*
3.	*duôs*		—

This *s*-future, or *s*-desiderative in Indo-European terms, is also found in some classic Indo-European languages. Compare the Sanskrit and Greek future paradigms below with the Lithuanian and Latvian above:

Skt. $\sqrt{}$*dā* 'to give'

sg. 1.	*dāsyā́mi*	du. 1.	*dāsyā́vas*	pl. 1.	*dāsyā́mas*
2.	*dāsyási*	2.	*dāsyáthas*	2.	*dāsyátha*
3.	*dāsyáti*	3.	*dāsyátas*	3.	*dāsyánti*

Gk. δίδωμι 'to give'

sg. 1.	δώσω	du. 1.	—	pl. 1.	δώσομεν
2.	δώσεις	2.	δώσετον	2.	δώσετε
3.	δώσει	3.	δώσετον	3.	δώσουσι

While Sanskrit future forms are marked with the suffix *-sya-* and Greek with a fully thematic formant *-se/o-* throughout the paradigm, the Lithuanian future paradigm comprises three variants: *-si̯e/o-*, *-si-*, *-s-*. The athematic suffix *-s-* with zero ending in the 3rd person makes it appear especially isolated in the paradigm. This inflectional pattern of the future paradigm can be traced back to an athematic pattern according to Endzelīns.[7]

[7] Stang (1942: 213ff.; also 1966: 320–2) associated this pattern with a hypothetical "semithematic inflection,' according to which the stative *-i̯e/o-* presents originally had a thematic ending only in the 1sg., 1du., 1pl., and 3pl., and **-i-* or **-ī-* in the remaining forms in PIE (cf. Meillet 1924: 239; Stang: id.). However, the semithematic theory has a few problems that have been pointed out already. One of the most important problems is that the inflection does not have a solid foundation outside of Balto-Slavic, as discussed in Jasanoff (1978: 20ff, 96). This theory is not regarded as tenable anymore.

Endzelīns (1928: 107, 1948: 204)[8] has proposed that the origin of the *-i-* element in the Baltic future suffix is the now disappeared athematic 3rd plural ending **-n̥t(i)*, which developed into **-int(i)*. This *-i-* element spread over the future paradigm but only in dual and plural forms due to the general paradigmatic pattern of the Baltic verbal paradigm, where the same vocalism is found in all the dual and plural forms, as in *vedù* (1sg.), *vedì* (2sg.) as opposed to *vẽd**a***- in the remaining present forms. The palatalized *-si-(u)* was substituted to the 1sg. form when the originally athematic 1sg. **dōsmi* was thematized.[9]

This assumption of athematic endings in the future paradigm can be supported by the Old Prussian athematic attestations *postāsei* 'you will be' (< **stā-s-sei*; Schmalstieg 1958: 122, 125; Jasanoff 1978: 104), *does* 'he will give' (< **dō-s-t*) (Hill 2004: 78ff.). The often mentioned Lithuanian dialectal athematic forms in the dual and plural, e.g., 1pl. *dúosme*, 2pl. *dúoste*, etc. (Žem. and E. Aukšt.), can either support the original athematic nature of the *s*-future (Jasanoff 1978) or can be explained as a back-formation based on the 3rd p. *duõs* (Stang 1942: 204). Some more comparative evidence for *s*-future also speaks for the existence of athematic inflection: OIr. *téis* 'will go' < **steig^{h}sti*; *reiss* 'will run' < **retsti*; *seiss* 'will sit' < **setsti* (Thurneysen 1975: 410–411); Osc. *didest* 'dabit,' Osc./Umbr. *fust* 'erit,' Umb. *ferest* 'feret' (3sg.); Osc. *censazet* 'censebunt,' Umb. *furent* 'erunt' (3pl.).

The reconstruction of the athematic 3pl. ending for *s*-future **-n̥t(i)* has another important indication for the ablaut type of the paradigm. Obviously, **-n̥t(i)* is a zero-grade variant of the 3pl. ending in the weak form, and that means the ablaut pattern of the paradigm was probably acrostatic, i.e., Narten type (Jasanoff 1988: 233, 2003: 133; Villanueva Svensson 2010: 220), although there are not many supporting forms (one probable example is **ĝnḗh$_3$-s-*/**ĝnéh$_3$-s-* continued by

[8] See also Schmalstieg (1958: 120ff.); Jasanoff (1978: 103ff.), Endzelīns (1971: 234).

[9] OLith. *eismi* 'I will go' (Matusevičiūtė 1938: 101) is once attested. This form may fit well in the scenario of the thematization here, although it is unclear whether it is an archaism, an analogy to athematic present *eimì*, or a mistake (cf. Villanueva Svensson 2010: 220[33]).

Jasanoff (1978: 106) points out another factor for this process, i.e., the general correlation of dual and plural forms in **-i-* with 1sg. forms in **-i̯ō* among the Baltic verbs.

Hitt. *ganēšš-mi* 'to recognize'). Nonetheless, the root-vocalism of some Baltic future forms with secure Indo-European etymology[10] seems to reflect rather the full-grade root than the lengthened-grade root,[11] assuming Eichner's Law. This may indicate that the full-grade root was generalized to the future paradigm, when the ablaut pattern of the Narten-type desiderative paradigms was normalized in Proto-Balto-Slavic.

Thus, the 3sg. future formation (now representing both sg. and pl.) can be considered to be a remnant of the Narten-type desiderative formation. Their inherited ending is kept unaffected by the spread of *-i-* into the future paradigm and the thematization process, which makes them appear isolated with remarkable archaism in the paradigm. The circumflex tone of the 3rd person future stems of monosyllabic acute stems particularly contributes to that. The factor of their circumflex tone cannot be analogy, as their analogical models (e.g., *dúosiu, dúsi* for *duõs*) usually have the acute tone. Therefore, an independent process which could have changed the acute tone to circumflex tone, i.e., MC needs to be assumed. That means that the circumflex tone of the 3rd person future forms must have resulted from MC (see §3.1.2). It follows that their preform (e.g., **dṓsti* 'will give') must have become monosyllabic through the loss of the final **-i* (*i*-apocope) before MC.

The operation of Leskien's shortening (*lìs* type) indicates that the loss of *-i* in the 3rd person future forms of monosyllabic stems must have taken place already by the pre-Lithuanian stage, as supported by further evidence from Kupiškis dialect (cf. Hill 2004: 74 with references). In fact, the *i*-apocope process is known to have taken place in many early Indo-European languages (cf. Hock 2007: 65ff.). For Balto-Slavic, its effect is observed also in the instr. sg. ending of *ā*-stems and the primary verbal endings (Meillet 1913: 235ff., Hock op. cit., Olander 2015: 165, 308, 328ff.). The more regular loss of *-i* among the finite

[10] Future forms with secure etymology here mean those based on the verbal root with rich attestations not only in Balto-Slavic but also in other Indo-European languages, preferably with parallels in the *s*-future/desiderative, such as *duõs* (*dúoti* 'to give;' Skt. *dā́syati*, Gk. δώσω), *dẽs* (*dė́ti* 'to put;' Skt. *dhā́syati*, Gk. θήσω), *stõs* (*stóti* 'to stand;' Skt. *sthāsyáti*, στήσω), etc.

[11] They exhibit reduplication in the present stem, cf. OLith. *dúodmi*, Gk. δίδωμι, Skt. *dadāmi*. It appears that the reduplicated syllable was not present in the future stem.

verbs than among the nominal domain[12] is explained by Hock (2007: 70ff.) with the correlation of the prosodic effects of Finality and unmarked SOV word order in early Indo-European languages including Baltic and Slavic. Stang (1942: 219) has noted that *i*-apocope does not affect verbs with monosyllabic stems (e.g., OLith. *esmi*, *esti*, OCS *jesmь*, ORu. *estь*), and the final *-i* seems to have dropped early elsewhere (e.g., Lith. *veda* 'lead(s) (3p.)' < **-et(i)*; OCS *vedetъ* 'leads,' *vedǫ* 'I lead' < **-ōm(i)*[13]). The *i*-less forms in the 3rd singular finite forms both in Baltic and Slavic may indicate a possibility of *i*-apocope already in Proto-Balto-Slavic at least among the finite verbs. Then, the same process is expected for the *s*-future/desiderative ending 3sg. **-s-ti*. The absence of *-i* in the 3rd person future forms of monosyllabic stems in spite of Stang's (1942: 219) note can be explained in that the apocopated ending spread from the forms of di- or polysyllabic stems to those of monosyllabic stems analogically (cf. Jasanoff 2003: 60[64]). As the circumflex tone of many 3rd person future forms of monosyllabic acute stems show, *i*-apocope and the spread of the apocopated ending needs to be projected to a stage before MC.

Nevertheless, as we have seen above, there are pieces of evidence for *s*-future/desiderative formations in **-si̯e/o-* (Skt., as well as Balto-Slavic future participles *dúosiant-*, OCS *byšǫšt-* 'about to be'), and in **-se/o-* (Gk.). Thus, it is commonly considered that PIE had a few desiderative formations with athematic (**-(h$_1$)s-*), thematic (**-(h$_1$)se/o-*), and **-(h$_1$)sie/o-*suffixes (Jasanoff 2003: 132ff.).[14] The distribution

[12] It seems to have taken place only in *ā*-stems (OCS *-ojǫ*, Lith. *-ą*) but not in *i*- and *u*-stems (OCS *-ьmь, ъmь*, Lith. *-imi, -umi*).

[13] It can be derived from PIE thematic ending **-oh$_2$* with an added primary **-mi*, cf. Skt. 1sg. *-āmi*. Olander (2015: 308) points out that the *i*-apocope of the 1sg. ending **-ōm(i)* is probably a Slavic innovation due to the lack of the identical formation in Baltic, and therefore cannot be regarded as being identical to the same phenomenon in the nominal ending and therefore cannot be projected back to the Proto-Slavic stage.

[14] There can be more desiderative formations reconstructible for PIE, cf. McCone (1991: 137). There is evidence for a variant of the suffix with a laryngeal after a resonant, while it was a simple **-s-* after stops, as shown by the following contrastive examples: Skt. *kariṣyánt-* 'about to do' vs. *vakṣyánt-* 'about to say,' Gk. τενέω 'I will stretch' vs. γράψω 'I will write,' etc. (Jasanoff 2003: 134ff). In this thesis, the suffix is usually annotated simply as **-s-* for simplicity.

of these different stem formations is yet unclear. Jasanoff (2003: 135) remarks that it is possible that the desiderative formations may correlate to their present formations; thus, roots that made Narten-presents may have favoured Narten *s*-desideratives, while the roots that made reduplicated presents may have chosen reduplicated desideratives.

Indeed, there are some indications that the desiderative formation of the root **b^{h}e̯uh$_2$-* 'to become' may not have been a Narten type at an early Proto-Balto-Slavic stage. Its future participles are attested in the **-si̯e/o-*stem, e.g., OCS *byšǫšt-*, YAv. *būšiiaṇt-*, Lith. *bū́siant-* 'about to be' < **b^{h}uh$_2$-si̯ont-*. Villanueva Svensson (2012: 19ff.) argues that the attested future participles in **si̯e/o*-stem suggest instead a preexistence of a desiderative formation (**b^{h}uh$_2$-si̯e/o-* >) **būsje/o-* for pre-Proto-Balto-Slavic. The consistent attestation of the future participle in *-si̯e/o-* in Balto-Slavic, where otherwise athematic *s*-formation has been employed, implies that the frequent use of the future participle of a few particular verbal roots including **b^{h}e̯uh$_2$-* led to the fossilization of their formation in *-si̯e/o-*. Consequently, these fossilized participles retain the *-si̯e/o-* suffix, even after the finite forms (e.g., 3sg. **būsjet(i)*) were replaced with the athematic conjugation (e.g., 3sg. **būst(i)*). He further suggests that, considering Jasanoff's observation that the desiderative formation of a verbal root may be parallel to its present stem formation, the abundant attestations of *i̯e/o*-presents to the root **b^{h}e̯uh$_2$-*, e.g., Gk. φύω, Lat. *fīō*, OIr. *bíu*, OE *bēo* may support it too. Although the inflectional pattern of the Baltic future strongly indicates that at least the endings were generalized from a Narten-type paradigm in PBS, the possibility cannot be eliminated that other desiderative formations may have played some role in the early PBS time. If this assumption is applied to the preform of the future formation of the inchoative thematic verbs (Group 1 verbs), their future formation was most likely not Narten type.

4.1.4.3 Reconstructing the Morphological History of the Future Formation of Inchoative Thematic Verbs

Regarding the Group 1 verbs, it is important that the morphology of synchronic Baltic reflexes of their future formation (infinitive stem + *-s-*) cannot be straightforwardly descended from any *s*-future/desiderative formations in PIE. No *s*-future/desiderative formations in PIE allowed a structure like R(∅)-S(∅)-E(∅), with the zero-grade root and the Narten-

type inflectional endings, which exactly the Group 1 future forms exhibit. Therefore, it must be assumed that their stem was secondarily renewed when the Baltic (or earlier)[15] future formation grammar was introduced. Their original formation before the replacement with the new R(∅)-S(∅)-E(∅) pattern remains unclear, though. The fact that some of their present stem formation is reconstructed as the nasal infix *thematic* type in Northern Indo-European may provide a hint. As we have seen in §4.1.4.2, the *s*-future/desiderative formation was possibly based on the present formation. Taking this into account, a possibility that cannot be eliminated is that the *s*-future/desiderative formation of Group 1 verbs may have been a thematic type in **se/o-*. In addition, a future/desiderative formation in **-si̯e/o-* can be considered for **bʰeu̯hᵢ-* (see above). Accordingly, the future forms of Goup 1 verbs must be morphologically innovative forms.

Yet there is another group of verbs that have inherited the future forms in full grade, e.g. *duõs* 'will give,' *dė̃s* 'will place,' *stõs* 'will stand,' *bė̃gs* 'will run,' etc. Let us name them Group 2. Some of these verbs have good correspondents in other IE languages (as discussed in §4.1.4.2). In addition, their infinitive stems which descend PIE **CeH-* or **CeT-* shape roots (e.g., *dúoti*, *dė́ti*, *stóti*) most likely continue the vocalism of the PIE stage,[16] without further morphological reformations in Proto-Baltic or earlier. Therefore, both their inherited future and infinitive stems exhibit the full grade, hence there was no need for a major stem replacement (which is likely to have taken place to the Group 1 future forms). Accordingly, the 3rd person future forms of the Group 2 verbs can be regarded more archaic than those of Group 1 verbs. It is indicated that the circumflex tone should be the phonologically regular outcome in the monosyllabic future forms in the 3rd person by the fact that the Group 2 future forms with the inherited morphological traits show circumflex tone, while the Group 1 future forms with secondarily introduced zero-grade root have acute tone.

[15] Since the finite forms of the *s*-future are not attested in Slavic, the *s*-future formation rule can be only established for Proto-Baltic with certainty. But some common morphological developments of the Baltic and Slavic verbs make it probable that such an *s*-future formation was established already in Proto-Balto-Slavic, but later lost in Slavic.

[16] See Vine (2004) for how the full-grade vocalism in the primary *ti*-stems could have been established among the PIE **CeH-* roots.

Therefore, at a certain stage prior to the replacement of the root vocalism in some categories in Proto-Baltic or before (possibly in Proto-Balto-Slavic), the following patterns could be found (all the finite forms are in the 3rd person):

Gp 1.	**present**	**preterit**	**future**	**infinitive**
	nasal infix	*ā*-aorist	(unclear	(zero-grade)
	(zero-grade)	(zero-grade)	→ zero-grade)	
	lin**at*	**lìjāt*	**lī́sat(i)??* → **lī́st*	**lī́tĕi* (35h)
	pun**at*	**pùvāt*	**pū́sat(i)??* → **pū́st*	**pū́tĕi* (35c)
	(**bujat(i)?*→) **bu**n**at*	**bīt*[17]	**bū́sjat(i)* → **bū́st*	**bū́tĕi* (35a)
Gp 2.	(unspecified)	(full-grade)	(full-grade)	(full-grade)
	**dōsti*	**dovēt*	**dõst*	**dṓtĕi*
	**dēsti*	**dējāt*	**dẽst*	**dētĕi*
	**lejat*	**lējāt/*leijāt*	**leĩst*	(**lítĕi*??) →**léitĕi*[18]

Table 4.1: Inchoative thematic verbs (= Gp. 1) and verbs with inherited future stems (= Gp. 2)

The table above describes the renewal of the future stem of Group 1 verbs based on the infinitive stem when the future formation rule (infinitive stem + *-s-*) was introduced. Since this reformation can be assumed

[17] According to Stang (1942: 198, 1966: 380), this may have originated from an imperfect form to *i̯e/o*-present, **b^{h}u̯iet* (3sg.), which eventually gave rise to OLith. *biti* and Latv. *bija*.

[18] These are the speculated ancestral forms of *líeti, lẽja/líeja/liẽna, lḗjo/líejo, liẽs* 'to pour' for the Proto-Baltic stage. This is a cognate of *lýti* 'to rain' in the full-grade root vocalism. Their cognates are well attested in Balto-Slavic, e.g., Latv. *liêt* (*leju, lêju*) 'to pour,' OCS *lijati* (*lějǫ*) 'id.;' Latv. *lît* (*liju/lîstu, liju*), Cur. *līt^e* (*līst, līst^e*) 'to rain.' There is also a Greek form λείβω 'to pour out' (with -β- from a homonym εἴβω; LIV 406[3]). The root vocalism of the Lithuanian present form *líeja* is probably taken from the infinitive stem, and *lẽja* would continue the thematized formation of the Narten-type paradigm **lēi̯H-/*lei̯H-* (LIV 406[4]).

for Group 1 verbs but not for Group 2 verbs in the prehistory of the future/desiderative formation, the factor that caused the difference in their 3rd person future forms is expected to lie in this renewal process. That is, the acute monosyllabic stems were introduced from the infinitive stems to the 3rd person future stems of Group 1 verbs in the process of the renewal, while the future stems of Group 2 verbs remained intact. The new acute future stems of Group 1 verbs were later shortened by Leskien's Law. It follows that MC must have taken place before the morphological reformation of the future stems of Group 1 verbs, but afterwards, it was not an active phonological process until Leskien's Law. Otherwise, ✗*lỹs* or ✗*bũs* would be expected.

In this way, I propose that the future stems of Group 1 verbs (some of which originally could have been formed in different ways) have the acute tone in the 3rd person because they were renewed based on the infinitive stems with the inherited acute tone after MC had taken place. This assumption accounts for their acute stem in the 3rd person future forms and their consequent shortening by Leskien's Law.[19] This could further indicate that the replacement of the root vocalism of the future forms of Group 1 took place when MC pattern of the 3rd person future forms of Group 2 had not yet been an established analogical model. It had to wait until the Group 2 pattern became a more influential group.

In addition, we could assign to a "Group 3" all the remaining verbs including the items in (31) which basically follow the metatony pattern of Group 2 with respect to the tone of the 3rd person future forms, adopting the circumflex tone. In fact, the etymology of some of the verbs in (31) commonly shows another interesting characteristic: their formation is often as old as East Baltic, even without established Indo-European root etymology. For example, the present form *klýsta* of the verb *klýsti* 'to be mistaken' is an inchoative-intransitive formation in zero-grade based on a group of verbs, *kliedéti* and *kléisti* (ALEW I 507ff.), and the cognates are attested only in the Baltic and Slavic languages. The present form *lýsta* (inf. *lýsti* 'to become thin') is another inchoative formation in zero-grade to an adjective *líesas* (AP3; Latv. *liẽss*) 'thin.' For an Indo-European root etymology, ALEW names

[19] This indicates that Leskien's Law did operate on monosyllabic words pace Blevins (1993: 243). This speaks against the existence of minimal word syndrome in Lithuanian.

*leiH$_2$- ‘to fade’ or *leid- ‘to let (→ ‘to cease’).’ However, it can hardly be claimed that the verbal paradigm of *lýsti* would be inherited from the proto language. The forms *gnýbti* and *žnybti* are attested only in East Baltic, lacking Indo-European root etymologies. No cognates of *lýžti* ‘to slacken’ are found either in Fraenkel (1962–65) or in ALEW.[20]

The root of *slýsti* ‘to slide’ can be traced back to PIE *$h_3$sleid- ‘to glide’ with a few cognates (Gk. ὀλισθάνω ‘to glide,’ Goth. *slindan*, OE *slīdan* ‘to slide’). The phonologically expected zero-grade should be *slid- (> *slīd-), and the long vowel in *slýsti* with acute tone is due to Winter’s Law. This verbal root is also attested with another paradigm: *slìsti, sliñda, slìdo* ‘to make (wax) slippery.’ In fact, there are a group of verbs that show an extremely similar profile, e.g., *skýsti, skýsta, skýdo* ‘to liquefy’ beside *skìsti, skiñda, skìdo* ‘to become flimsy’ (*skíesti, skíedžia, skíedė*); *trū́kti, trū́ksta, trū́ko* ‘to be lacking’ beside *trùkti, truñka, trùko* ‘to last, continue’ (*tráukti, tráukia, tráukė* ‘to pull’). Villanueva Svensson (2010: 207ff.) describes, quoting Kazlauskas (1968: 326f.) and Young (2008: 207ff.), that those paradigms have been leveled from an earlier paradigm, e.g., **skýsti, skiñda, skýdo, *trū́kti, truñka, trū́ko.*

Since the paradigms of *slýsti* and *slìsti* perfectly fit this profile, it is reasonable to reconstruct an original paradigm *slýsti, sliñda, slýdo* for them. What can be observed for their future forms is that *skýsti, trū́kti, slýsti* accept the metatony pattern of Group 2 in the 3rd person (*skỹs, trū̃ks, slỹs*), while *skìsti, trùkti, slìsti* naturally generalized the short vowel (*skìs, trùks, slìs*).

This indicates that these newly formed verbs exhibit the same pattern of Group 2 for the 3rd person future forms. It can be considered that at some point in the prehistory of Lithuanian, the pattern of Group 2 with metatony in the 3rd person future forms started to be taken as the canonical model for the future paradigm, and the majority of the verbs copied it, including new formations, except the Group 1 verbs. They alone remained unaffected by this model, with the 3rd person future forms maintaining the acute tone. However, in Latvian, the Group 2 pattern was completely eliminated, with all the 3rd person future forms

[20] There are a group of words which have similar phonological forms (i.e., *liẽžti* ‘to lick,’ *lýžčioti* ‘to lick (repeatedly),’ *lyžnóti* ‘to lick a little occasionally,’ etc.), but it seems to me semantically difficult to connect them etymologically to *lýžti*.

of the monosyllabic acute stem with the acute tone.

4.1.4.4 Zero-Grade Vocalism

As Petit (2002: 247ff.) points out, the shortened 3rd person future forms listed in (29) show a specific pattern: -*ī́*- or -*ū́*- in the infinitive, and -*ī̆*- or -*ū̆*- in the *ā*-preterit. In addition, we discovered above that they have -*ĩ*- (< -*in*-) or -*ũ*- (< -*un*-) in the nasal-infix present, and the circumflex tone of the nasal-infix present has been explained above as originating from the sequence **-in-/*-un-* preceding the inserted glide.

Accepting the scenario introduced above, it can be easily understood why the shortening is limited to roots with -*ī́*- or -*ū́*-, and even why some of them are not shortened.

There are many verbs in (29) that can be traced back to PIE *seṭ* roots, as listed in (35) above. The pattern of the vocalism in infinitive (*ý/ú*) – present (*ỹ/ũ*) – preterit (*ì/ù*) may be more phonologically transparent with those verbs than the others in (36). The infinitive vocalism is readily derived from the zero-grade **-iH-tei/*-uH-tei*. The nasal-infix present vocalism is repeated here — **-in-(i̯/u̯)/*-un-(i̯/u̯)* (as in **linjat* 'rain(s),' *punvat* 'get(s) rotten') developed into *ỹ/ũ* through the nasal loss before the glide. The preterit vocalism of short *ì/ù* can be understood as the outcome of the sequence **CVH-e/o-* > PBS **CV̆j/v-e/o-* (→ Baltic *CV̆j/v-ā*; as in *lìjo, pùvo*, etc.), where the laryngeal is lost without compensatory lengthening.

Therefore, it is not a coincidence that the verbs of shortened 3rd person future forms tend to have the preterit forms with short vowels as well, when the whole system of the Group 1 verbs is considered.

4.1.4.5 Analysis of the Dialectal Data

The irregularity of the 3rd person forms in the standard language can look like a mixture of different dialectal patterns. However, in reality, it should be understood as the winning-out or elimination of the Group 1 or 2 pattern.

According to Petit (2002), the following patterns are found in different dialects.

(37) 3rd future forms in dialects (p. 253ff.):

a. Žemaitian dialects have eliminated all the variations, restoring systematically the acute tone to the 3rd person future forms (cf. *bū́s* ∼ *bū́ti*; *gýs* ∼ *gýti*)

b. West Aukštaitian dialects show the shortening in the monosyllabic roots of the structure [Cū́(C)-] or [Cī́(C)-], MC elsewhere (*bùs* ∼ *bū́ti* 'to be,' *pùs* ∼ *pū́ti* 'to rot,' *lìs* ∼ *lýti* 'to rain')

c. Std. Lithuanian (based on S.-W. Aukšt. dialect) shows the shortening in the monosyllabic roots of the structure [Cū́-] or [Cī́-], MC elsewhere

d. East Aukštaitian and, to a lesser extent, South Aukštaitian dialects generally show the shortening with the lack of MC (*bùs* ∼ *bū́ti*; some analogical cases: *pùs* ∼ *pū̃sti* 'to blow,' *pìks* ∼ *pỹkti* 'to be in a bad temper')

e. North-West Aukštaitian dialects generally show MC with a lack of shortening (*pū̃s* ∼ *pū́ti* 'to rot,' *lỹs* ∼ *lýti* 'to rain'), but *bùs*, which is highly frequent.

As the standard language was formed in the 19th century based on the dialect in central Suvalkija, the southern branch of West Aukštaitian, and Prussian Lithuanian (Senn 1944: 103ff.), the South-West Aukštaitian dialect exhibits the same pattern as the standard Lithuanian with regard to the 3rd person future forms. Kortlandt (2002: 15ff., 2014: 217 ff.) also observes these dialectal differences in the distribution of metatony and shortening among the 3rd person future forms. He describes it as "the spread of metatony" in W. Aukštaitian dialects and its absence in other dialects. He suggests that the starting place of metatony is the simple root verbs, such as *dė̃s* ∼ *dė́ti*, *jõs* ∼ *jóti*, *duõs* ∼ *dúoti*, which resulted from the "early Proto-Balto-Slavic loss of a laryngeal after a Proto-Indo-European lengthened grade." However, apart from whether to accept the rule that an early PBS loss of a laryngeal after a lengthened grade vowel yielded the circumflex tone, the circumflex tone in the 3rd person future forms did not necessarily result from such a phonological condition. For example, *sė̃s* to *sė́sti*, *sė́da* 'to sit down,' and *bė̃gs* to *bė́gti*, *bė́ga* 'to run' are not descended from a *seṭ* root, but the long acute roots are the results of Winter's Law (**sed-* > **sēd-*; **bʰegʷ-* > **bēg-*).

Their 3rd person future forms *sẽ̇s* and *bẽ̇gs* are reasonably based on pre-forms **sed-s-* (> **sēds-*), **b^{h}eg^w-s-* (> **bēgs-*) in the full grade, which can be explained as the result of the operation of MC on long vowels resulting from Winter's Law, while it could be attributed to an analogy from the pattern of the core Group 2 verbs. The proposed background for the providers of the metatony model provided in table 4.1 enables us to understand that what he calls "the spread of metatony" started from Group 2 verbs, and Southern W. Aukštaitian dialects exhibit a curious situation where the Group 1 verbs still remain as such, without either affecting other groups or losing their morphological/phonological profiles.

In what follows, it will be shown how the spread or elimination of the Group 2 pattern resulted in the difference in the distribution of metatony and shortening in each dialect.

It is obvious that the acute vowel was restored after Leskien's Law in the Žemaitian dialects, where all the future forms of acute monosyllabic stems have a long acute vowel. The metatony pattern has been completely eliminated. If the acute restoration occurred before Leskien's Law, the vowels would have been shortened to give rise to the E. Aukštaitian pattern. The acute tone in the Žemaitian future forms also implies that MC could not affect long monophthongs after Leskien's Law.

Likewise, the metatony pattern seems to have been completely eliminated in Latvian. Now only the acute forms are found in the 3rd person future forms of monosyllabic acute stems.

E. Aukštaitian dialects exhibit shortening in general, which means that the pattern of Group 1 turned out to be more prosperous than in other dialects, e.g., W. Aukštaitian dialects.

The W. Aukštaitian dialects and Std. Lithuanian, showing the shortening in the verbs characterized by nasal-infix present, *ā*-preterits, and zero-grade *ý/ū́* in the infinitive, but metatony elsewhere, have generalized the Group 2 pattern to this limited group of verbs. The N-W. Aukštaitian dialects generalized the Group 2 pattern further to almost all the verbs, even including the Group 1 verbs. Only *bùs* remains unaffected, which has been preserved due to its frequency. The dialectal variants are summarized in table 4.2.

Žem.	N-W Aukšt.	Std. / W. Aukšt.		E. Aukšt.
		two patterns		
Leskien's Law ↓ acute restoration to all the 3p. future to acute root (e.g., *pū́s*) 'will rot'	generalization of Gp. 2 pattern (MC) e.g., *pū̃s*	Gp. 2 and Gp. 3 (MC) e.g. *slỹs* 'will slide'	Gp. 1 (acute) ↓ Leskien's Law (shortening) e.g., *pùs*	(generalization of Gp. 1 pattern) ↓ Leskien's Law (e.g., *pùs*, *slìs*)

Table 4.2: The patterns of 3rd p. future forms in different dialects

4.1.4.6 Exceptions

Now we return to the three verbs whose 3rd person future forms are metatonical despite their nasal presents, i.e., (30a) *výsti*, (30b) *trū́kti*, and (30c) *siū́ti*. All of them have interesting geographic distributions of present forms, which could have manipulated the spread or elimination of the Group 2 pattern.

For (30b), it was discussed above that its original paradigm was possibly **trū́kti, truñka, trū́ko*, from which *trū́kti, trū́ksta, trū́ko* and *trùkti, truñka, trùko* were created through leveling. During the leveling process, the paradigm of *trū́kti* adopted the Group 2 pattern. The fact that *truñka* is found only in an eastern dialect spoken in Musninkai as the present form of *trū́kti* shows that the leveling process could have gone differently in this particular dialect, which did not prevent the paradigm from accepting the general pattern of metatony in the 3rd person future form in other dialects. It is noteworthy that the future forms are always shortened in the eastern dialects where the present form of *trū́kti* is *truñka*. In this particular dialect, it can be said that the nasal-infix present may have introduced the Group 1 pattern to this paradigm.

For (30a), the nasal-infix presents are attested only in the E. Aukštaitian dialects (*viñsa*: Kupiškis; *viñta*: Širvintos, Kėdainiai, Panevėžys). Actually, in these dialects, the Group 1 pattern is common. But this was not the case in other dialects, including southern W. Aukštaitian. Another point to add is that we find *vỹsti, vỹsta, vỹto* in old materials, such as Sirvydas' *Dictionarium trium lingvarum*,[21] and in the writings of Simonas Daukantas (1793–1864), who was born in Kalviai, Klaipėda. Since the birthplaces of the authors range from eastern and western areas of Lithuania (although both of them worked in Vilnius for some years), this may suggest that the circumflex accent in this word was once prevalent. A possibility that this circumflex variant had some effect on the future form cannot be excluded.

Lastly, the direct remnant of nasal-infix present form *siũva* is a hapax found only in F. Kurschat's dictionary,[22] but not in LKŽ, Stang (1942), or Senn (1966). Since Kurschat included much material from East Prussia, it is possible that *siũva* was a local form there.[23] The more

[21] In the third edition, published in 1713 (Lyberis, Ivaškevičius, & Kruopas 1979), we find the form ⟨pawistu/wistu⟩ (*pavystu/vystu*) on p. 477.

[22] Kurschat (1883: 375).

[23] Nonetheless, *siũva* remains enigmatic, especially because a few lines be-

common *siùva* was probably decisive in accepting the Group 2 pattern.

4.1.4.7 Spread of Metatony to Polysyllabic Future Forms

In the West Aukštaitian dialects where the MC forms are better preserved, the circumflex tone of the MC forms analogically spread to the polysyllabic words. The verbs ending in *-ýti, -úoti, -éti, -óti* have their future forms with the circumflex final syllable, e.g., *rašỹs* 'will write,' *važiuõs* 'will drive,' *stovẽs* 'will stand,' *žinõs* 'will know,' etc. (Zinkevičius 1984–95: 218). In Žemaitian dialects where *bū́s*, *lýs*, *dúos* are found, we encounter forms like *rašýs*, *važiuós*, *stovés*, *žinós*, etc. In E. Aukštaitian dialects where the pattern of *bùs* and *lìs* has been generalized, *darìs*, *rašìs*, *sakìs* are found, and even *žinàs* and *stovès* are found in Vilniškiai where the shortening is generalized to *šàks* (std. *šõks*) and *dès* (std. *dẽs*) (for the dialectal forms, see Zinkevičius 1966: 361). This shows that the treatment of the result of MC (Gp. 2 verbs) affected the treatment of the final syllable of polysyllabic 3rd person future forms in *-ýti, -úoti, -éti, -óti*.

4.1.5 Conclusions

In this section, I have debated the conditions of the paradigms of the verbs of acute monosyllabic stems whose 3rd person future forms have been shortened. The survey revealed a strong tendency for them to have nasal-infix presents and *ā*-preterits. The analysis showed that they are most likely a group of verbs based on the descendants of the intransitive inchoative thematic verbs reconstructible for Northern Indo-European.

Considering the Indo-European morphological background of the Baltic future formation, first of all, *i*-apocope must have taken place before MC to feed the environment of MC on the 3rd person future forms (**dṓsti* > **dṓst*). Second, the future stem could not have been composed of the zero-grade root and the Narten-type ending, which the future forms of inchoative thematic verbs (Gp. 1) show. This means

low the lemma, a reflexive form *siuvúos* with the short root is cited. Although it is clear that the nasal formation *siūva* is new, based on comparative evidence, it is difficult to know its age. One favorable interpretation is that *siūva* is a new dialectal innovation and could not have accepted the Group 1 pattern but could that of Group 2. However, the question of how old *siūva* is remains open.

that their stems are secondarily introduced according to the newly established Baltic (-Slavic, possibly) grammar of future formation at some point [see table 4.1]. Therefore, it is the secondarily 3rd person future forms that have acute tone, while those with the inherited full-grade root (Gp. 2) have circumflex tone. This clearly supports the existence of MC no later than Proto-Baltic (possibly PBS) and cannot be explained as a biproduct of Leskien's Law, which was discussed on p. 69.

After the replacement of the future stems, the future paradigms of Group 1 verbs did not follow the pattern of the Group 2 verbs characterized by inherited full-grade future stems with the circumflex tone in the 3rd person. Therefore, the acute root introduced in the 3rd person future forms of Group 1 verbs was later shortened by Leskien's Law. All other verbs either follow the Group 1 or Group 2 pattern, depending on the dialects. The core of the Group 2 verbs, *duõs, dẽ̃s, stõs, bẽ̃gs, liẽs*, etc., later spread in the West Aukštaitian dialects and eventually in standard Lithuanian. This even affected the polysyllabic future forms, i.e., *rašỹs* (*rašýti* 'to write'), *važuõs* (*važúoti* 'to go (by vehicle)'), *stovẽ̃s* (*stovéti* 'to stand'), *žinõs* (*žinóti* 'to know'), etc.

What has been argued does not necessarily contradict the observations made by Petit (2002: 272ff.). Moreover, this interpretation can even explain what lies behind his observations from a different perspective. The pattern in which all the nasal infix present paradigms, the infinitives, and the thematic aorist are based on the zero-grade of the root provides a good theoretical explanation to his observation that the shortening in the 3rd future forms is most frequently found among the roots in *C*ī́*(C)* and *C*ū́*(C)*.

For the relative chronology, the 3rd person future forms with the inherited full-grade (Group 2) exhibiting the result of MC means that MC took place no later than the establishment of the Baltic (or Balto-Slavic) future-stem formation rule, i.e., no later than Proto-Baltic. The forms like *bẽ̃gs* 'will run' do not contradict MC taking place after Winter's Law. In addition, the Leskien's shortening among the 3rd person future forms of Group 1 verbs indicates that there was no MC again after the replacement of their stem with the acute root in Proto-Baltic at least until Leskien's Law.

In the next section, we will examine exactly when MC could have taken place before Proto-Baltic by examining the reflexes of PIE root nouns.

4.2 Reflexes of PIE Root Nouns

Proto-Indo-European nominal inflection is analyzed based on a structure consisting of three morphemes, a root, a suffix, and a case ending, as represented as R-S-E. Among them the root bears the lexical meaning, the suffix a supplementary meaning, and the inflectional ending a grammatical function. In this theory, root nouns are defined as a group of nouns consisting of a root and an ending, lacking any suffixes. Because of their simple structure, they are considered as an archaic nominal category. The ablaut patterns reconstructed for root nouns are as follows (cf. Schindler 1972: 31ff.).

(38) a. acrostatic type:

nom.sg.	R(ó)-E(∅)	e.g.	*g^{w}óu̯-s (→ *g^{w}ōu̯s[24]) 'cow'
			cf. Skt. *gáus*, Gk. βοῦς (Dor. βῶς), Lat. *bōs*
acc.sg.	R(ó)-E(∅)		*g^{w}óu̯-m (> *g^{w}ōm)
	[Có-*m* / CóC-*m̥*]		cf. Skt. acc.sg. *gā́m*, Gk. acc.sg. βοῦν (Dor. βῶν)
gen.sg.	R(é)-E(∅)		*g^{w}éu̯s
			cf. Skt.gen.sg. *gós*

b. mobile type:

nom.sg.	R(é)-E(∅)	e.g.	*g^{wh}rén-s (> *g^{wh}rḗn) 'diaphragm'
			cf. Gk. φρήν 'mind'
acc.sg.	R(é)-E(∅)		*g^{wh}ren-m̥ cf. Gk. φρένα
gen.sg.	R(∅)-E(é/ó)[25]		*g^{wh}r̥n-ós
			cf. Gk. dat. pl. φρασί
			Icel. *grunr* 'suspicion'

or

nom.sg.	R(á)-E(∅)	e.g.	*sal-s (> *sā́l) 'salt'
			cf. Lat. *sāl*, Latv. *sàls*, Gk. ἅλς
acc.sg.	R(á)-E(∅)		*sal-m̥
			cf. OCS *solь*
gen.sg.	R(∅)-E(é/ó)		*sl̥-ós ? (no attestation)

However, there are unexpected zero-grade attestations for the acrostatic **o/e* ablaut pattern, such as Av. *nəmō* (< **dm-és*) and Arm. *tan* (< **dm̥-és*), as pointed out by Schindler (1972: 32ff.). He assumes that there is a tendency for acrostatic ablaut pattern to replace the *e*-grade of the weak forms with the zero-grade. This tendency has obscured the original state of affairs.

Since the nominative singular ending is just an **-s*, the root nouns are monosyllabic in the nominative singular at a Proto-Indo-European stage. In addition, the root in the nominative singular could be lengthened either by Szemerényi's Law (e.g., **ĝʰu̯er-s* > **ĝʰu̯ēr*, as in Gk. ϑήρ, -ός, Lith. *žvėrìs* 'wild animal'), or by the loss of a consonant in the final consonant cluster [**k̂érd* > **k̂ḗr*; Sihler (1995: 130)].[26] Therefore, the nominative singular of those root nouns must have been in the environment of Monosyllabic Circumflexion, i.e., a long vowel in a monosyllable.

However, in Proto-Balto-Slavic, a morphological change took place that was triggered by a phonological change. It is well known that a syllabic resonant (**R̥*) developed to a combination of *i* and *R*, as shown in Lith. *šim̃tas* (< **k̂m̥to-* '100'). This sound change affected also the accusative singular and plural endings in the post-consonantal position: PIE **-m̥* (sg.acc.)/**-m̥s* (pl.acc.) > PBS **-in* / **-ins*. This sound change, together with the nominative dual ending *-ī* (< **-iH*), caused the root nouns to join the *i*-stems (Vaillant 1958: 174ff.; Stang 1966: 219; Larsson 2010a: 34). In this process, the former monosyllabic root nouns be-

[24]The nominative form was remade analogically to the accusative stem, which underwent Stang's Law. See below.

[25] As noted in previous studies (for example, Sihler 1995: 285–6; Vijūnas 2006: 57[147]), although originally Schindler (1972: 36) reconstructed it in an *o*-grade, it is in fact difficult to reconstruct the original genitive singular ending. Greek and Celtic point to **-ós*, while Germanic and Balto-Slavic point to **-és*. In addition, Italic has both reflexes of **-ós* and **-és*, and Indo-Iranian is ambiguous because of the merger of **o* and **e* to **a*. Since this problem is beyond the scope of this thesis, it is left unspecified.

[26] The clusters **VTs#* or *VRT#* were probably not the environment of Szemerényi's Law, as Piwowarczyk (2015) argues. Therefore, the long vowel in **k̂ḗr* should reflect a lengthened grade or have resulted from the loss of the final dental in **k̂érd* but not from Szemerényi's Law (cf. Piwowarczyk 2015: 273, fn. 6).

came disyllabic in nominative singular, e.g., PIE *$\hat{g}^h\underset{\frown}{u}\bar{e}r$ → PBS *$\acute{z}\underset{\frown}{u}\bar{e}r$-*is*. Therefore, many canonical root nouns are attested as *i*-stems in Balto-Slavic, e.g., *nok^wt-*s* 'night,' *$\hat{g}^h\underset{\frown}{u}\bar{e}r$ 'wild animal' > Lith. *naktìs* (4), Latv. *nakts*, OPru. *nactin/naktin/nacktin* (acc. sg.), OCS *nošt*ь; Lith. *žvér̨į* (acc.sg.), ELatv. *zviers/zvēŗs* (< **zvēris*), *źwieri* (acc. sg.), SCr. *zv̈ijer*, Sln. *zvȇr*. This morphological change triggered by the accusative forms implies an important function of the accusative forms as a model of analogy in the paradigm.

Therefore, there is a possibility that Monosyllabic Circumflexion had an effect on monosyllabic root nouns in the nominative singular (and accusative singular forms *$\hat{k}\bar{e}r$ [< *$\hat{k}erd$] 'heart' and *$g^w\bar{o}m$ 'cow'), although the disyllabic accusative forms may have been generalized later. In fact, Rasmussen (1999: 480ff.) discusses the possibility of MC being traced back to a PBS stage, based on pronominal forms, *s*-aorist forms, and alleged root-nouns. However, in light of the discussions in Larsson (2001, 2004), Rasmussen's analysis should be applied to better-established root nouns. He adduces the root nouns, including the following examples in (39) and (40),[27] adopted from Kortlandt (1985: 117–118), for his discussion. He considers the following forms to be ultimately the descendants of PIE root nouns with the sequence **-oRH-/ *-eRH-*, where the loss of the vocalized laryngeal (**ə*) caused the compensatory lengthening of the root vowel after **o* turned to **a*, yielding **-āR-/*-ēR-*.

(39) Slavic

a. PS **čârъ* (b→c)[28] 'magic' > SCr. *čâr*, PBS **kẽr-a-*, original formation: root noun **kẽr(-i)-*, PIE **k^wér* (< **k^wér-s*)

b. PS**mẹ̊lъ/*mẹ̊lь* (c) 'fine sand' > Sln. *mẹ̑l* m./f., Cze. *měl, měl'*; Lith. *smė̃lis* (2) 'sand,' PBS **(s)mēl-i-/-a-*, original formation: root noun **(s)mẽl(s)* < PIE **(s)mélə-s* (older **[s]mélh-s* < **[s]mḗlh-s*< **[s]mélh-s*) with the regular shortening of the length originated in the nominative through the stem-final consonant cluster **-lh-*.

c. PS **rẹ̊čь* (c) 'word, speech' > SCr. *rȉječ*, PBS **rẽk-i-s*, original formation: **rḗk-s* (older **rék-s*)

[27] Rasmussen's (1999) notation is adopted.

[28] Cf. Kapović 2006: 167.

d. PS *žâlь*[29] ‘worry’ < PBS **gẽl-i-*, cf. Lith. *gėlà* (4), PIE root noun **g^{w}ẽlə$_2$* probably from old **gélh$_2$* with the regular lengthening caused by the loss of **-h$_2$*; the appearance of the words looks like neut.pl. in the class of feminine nouns, cf. OHG, OSax. *quāla* ‘torture’ (PGmc. **kwēl-ō*); the root from Lith. *gélti* ‘ache,’ Arm. *kełem* ‘I anguish’

e. PS **žârъ* (b/c) ‘fire’ > SCr. *žâr* ‘glowing coal’ from **gẽr-a-*, original formation: **gẽr*, PIE **g^{wh}ér* (older **g^{wh}ér-s* built to the root in Skt. *gharmá-* ‘warmth of the sun,’ Gk. θέρμα, -μη ‘heat’)

(40) Baltic

a. PB **ǰ̃ãl-* > Lith. *žolė̃* (4) ‘grass,’ OPru. *soalis* (nom.sg., EV), *sālin* (acc.sg., III Ench.), built on the root of Lith. *žélti*, Latv. *zeĺt* ‘green,’ PIE **ĝ^{h}ólə-s*, from which pre-PBS **ǰals* > **ǰál-s* > **ǰãl-s* with the subsequent shift to a productive nominal class.

b. PB **kãv-* > Lith. *kovà* (4) ‘blow’ to *káuti* ‘blow (v.),’ PIE **kóu̯ə-s*

c. PB **mãv-* > Lith. *movà* (4) ‘clutch,’ built on the root of *máuti* ‘pull in,’ PIE **mi̯óu̯ə$_1$-s*

d. PB **skãl-* > Lith. *skolà* (4) ‘debt’ built on the root of *skeléti* ‘be in debt,’ *skìlti* ‘get in debt,’ PIE **skólə-s*

e. PB **ćãr-* > Lith. *šorà* (4) ‘hurry,’ built on the root of *šérti* ‘feed,’ PIE **ḱórə-s*

f. PB **ćãv-* > Lith. *šovà* (4) ‘bolt,’ built on the root of *šáuti* ‘shove in, shoot,’ PIE **ḱóu̯ə-s*

g. PB **tvãr-* > Lith. *tvorà* (4) ‘fence,’ Latv. *tvàre*, OCS *tvarъ* ‘creation, creature’ SCr. *tvâr* ‘creature,’ built on the root of Lith. *tvérti* ‘grasp,’ PIE **tu̯orə-s*

[29] However, Kapović (2009b: 239) reconstructs it with an acute tone *žálь* (a), which is pointed to by SCr. *žäo*, Sln. *žàl, žâli*.

h. PB **vãl-* > Lith. *volẽ* (4) '(wooden) tap, plug,' Latv. *vàle* 'washing beetle, tap of a flail,' Lith. *võlas* (2) 'roller, shaft,' Lat. *vàls* 'hay rake,' SCr. *vâl*, Cze. *val* 'shaft' built on the root of Lith. *vélti* 'felt, full,' PIE **u̯ólə*$_1$*-s*,

etc.

Although the items (39c, e) may look like good examples, Slavic nouns belonging to APc are basically ambiguous because the AP can result from Meillet's Law. Furthermore, there are a few problems in handling the remaining nouns as the descendants of PIE root nouns. First, root nouns are normally continued as *i*-stems in Balto-Slavic, as already discussed above. Firm evidence from other Indo-European language data are needed to prove that some Baltic and Slavic *o*- or *ā*-stems are descended from root nouns.

As a matter of fact, the examples (40a) ∼ (40j) are *ā*- and *i̯ā*- stems, which are proven to be a quite productive word formation in Stang (1966b: 148–149). This is identified as a type of derivation by Stang (id.) that involves *métatonie douce* and the lengthening of the root vowel when it is applied to verbs with an acute root. If the verbal root has a structure *TV́R* or *CVT* (*V* denotes not only *a*, but any vowel), the first member of the diphthong is lengthened and the second member is re-syllabified as the onset of the following syllable. Cf. the resulting feminine nouns:

(41) a. *gėlà* (4) 'acute pain' : *gélti* 'to ache'

b. *bylà* (4) 'speech, (case, file)' : *bìlti* 'to speak'

c. *gyrà* 'a drink' : *gérti* 'to drink'[30]

d. *stūmà* (4) '(door-)bolt' : *stùmti* 'to push, bolt'

e. *dorà* (4) 'morals' : *deréti* 'to be fit, suited'

f. *plovà* (4) 'washing, rinse' : *pláuti* 'to wash'

g. *mūšà* (4) 'beating' : *mùšti* 'to beat, thrash'

[30] This case involves a change of the quality of the vowel as well. On the other hand, we also have *girà* (4) 'a kind of sour drink, kvas,' which lacks the lengthening of the root vowel.

h. *mẽ̀tis* (2) ‘a throw’ : *mèsti* ‘to throw’

This is a part of a coherent nominal derivation system described by Larsson (2010b: 37–66). This derivational rule applies to denominatives as well, e.g., *dỹdis* (2) ‘greatness, size’ : *dìdis* ‘big;’ *grõžis, grõžė* (2) ‘beauty’ : *gražùs* ‘beautiful.’ She finds a system where lengthening and metatony are in operation when the derivatives have an abstract meaning, while there is no lengthening and metatony when the derivatives have a concrete meaning, as follows:

(42) a. *gỹvis* (2) ‘liveliness’ ∼ *gývis* (1) ‘creature’ : *gývas* (3) ‘alive’

b. *sũ̃ris* (2) ‘saltiness’ ∼ *sū́ris* (1) ‘cheese’: *sū́ras* (3) ‘salty’

c. *sė̃klis* (2) ‘shallowness, a shallow’ ∼ *sẽklis* (2) ‘a shallow place’ : *seklùs* (4) ‘shallow’

d. *žỹlis* (2) ‘grayness’ ∼ *žìlis* (2) ‘gray-haired man’ : *žìlas* (4) ‘gray’

Larsson (2002a: 101, 2010b: 42[41]) supposes that this pattern probably originated from PIE **tomh$_1$-os* (fem. **tomh$_1$-ah$_2$*) type, with its root-accented substantivized nouns and end-accented action noun. Thus, the nouns listed in (40) can be supposed to be the action nouns derived from verbs, not the descendants of the root nouns.

Therefore, the current discussion should be based on the Baltic continuance of nouns securely reconstructed as root nouns with “long root" according to the preceding works, e.g., Schindler (1972); Larsson (2001); Villanueva Svensson (2011c). Thus, the data handled in this section are the following:

(43) a. *nósis* (1) ‘nose’ (∼ Latv. *nãss*)

b. *žvėrìs* (3) ‘wild animal’ (∼ Latv. *zvẽrs*)

c. *širdìs* (3) ‘heart’ (∼ Latv. *sirds*), *šerdis* (1/3/4; ∼ Latv. *serde*) ‘core of wood’

(44) Latvian forms to be considered

a. *sàls* ‘salt’ (m./f.)

b. *gùovs* ‘cow’ (f.)

Since those Latvian forms which exhibit circumflex tone are already discussed as the probable data for MC in previous studies (Larsson 2010; Villanueva Svensson 2011), they are to be included in the current discussion. The problem is that the circumflex tone of the Latvian forms in (44) seems to be the result of MC, whereas the acute tone of other forms in (43) does not. How could MC affect those forms to give rise to different tones among them?

Villanueva Svensson (2011c) provides some insight into this question. For (44b), the monosyllabic accusative singular *$*g^{w}\bar{o}m$* is likely to have been inherited in PBS as well as in other IE languages; *$*g^{w}\acute{o}m$* > *$*g^{w}\tilde{o}m$* (also, Larsson 2001: 55). Therefore, (44b) has a good ground for its circumflex tone. Nonetheless, other forms need more explanation. He points out that PBS could have inherited two different paradigms, i.e., the paradigms with the lengthened grade both in nom. sg. and acc. sg. (45), and those with lengthened grade only in nom. sg. in (46) below.

(45) a. nom.-acc.sg. ***nā́s-*** / obl. **nás-* (= 43a)

b. nom.-acc. sg. ***$\hat{g}^{h}$u̯ḗr-*** / obl. *$\hat{g}^{h}$u̯ér-* (= 43b)

(46) a. nom.sg. *$\hat{g}^{h}$ā́ns-* / acc.sg. ***$\hat{g}^{h}$án-*** ‘goose’[31]

b. nom.sg. ***sā́l-*** / acc.sg. **sál-* (= 44a)

While (45a), (45b), and (46a) are derived from the stem of accusative-origin, (46b) is derived from the nominative-originated stem. Still, it remains unsolved why the nominative was favored particularly in (46b). I will try to clarify how these nouns gained different tones by closely looking into the relative chronology of phonological and morphological changes that took place in their paradigms from Proto-Indo-European to East Baltic through Proto-Balto-Slavic. The reason why the nominative-origin stem was particularly favored in (46b) will remain unexplained, but instead, how it was selected as the generalizing stem will be explained.

[31] The noun for ‘goose’ is not handled in this thesis because the evidence for a long root inherited in the Baltic forms is rather weak.

4.2.1 The Ablauting/Leveled Paradigms Inherited in PBS and PB

As observed in Villanueva Svensson (2011c), the East Baltic accentuation of the former root nouns does not look coherent. We will consider how MC could have affected the paradigms of the nouns in (43) and (44), looking into the ablauting patterns of them in greater detail. The list of the cognates are from previous studies such as Schindler (1972), ĖSSJa, and Larsson (2010a).

4.2.1.1 A Special Case: Latv. *gùovs* [44b]

This noun may be a special case in that not only the nominative singular but also the accusative singular form were monosyllabic already at a late Proto-Indo-European stage. In spite of that, we will start this survey with this noun, since this case provides a good evidence for the relative chronology of MC, Osthoff's Law, and the generalization of the *i*-stem.

The following are the cognates of Latv. *gùovs* 'cow.'

other IE: Skt. nom.sg. *gáus*, acc.sg. *gā́m*, gen.sg. *gós* 'cow;' Gk. βοῦς (Dor. βῶς), acc.sg. βοῦν (Dor. βῶν); Lat. *bōs*;

Unfortunately, Balto-Slavic cognates are not preserved as a simplex outside of Latvian. Therefore, the data come from other Indo-European languages.

Skt. nom.sg. *gáus*, Gk. βοῦς, and Lat. *bōs* all point to a lengthened *o*-grade in the nominative singular. Skt. acc.sg. *gā́m*, Gk. acc.sg. βοῦν, suggest that the long **ō* was also present in the root in accusative singular. There is another root noun that shows a similar pattern, namely Skt. *dyáus*, acc.sg. *dyā́m* 'heaven' and Gk. Ζεύς, acc.sg. Ζῆν 'Zeus.' These forms motivated Stang (1965: 292ff.) to propose a sound law, according to which a semi-vowel is assimilated before its following **-m* in the accusative singular forms and is eventually lost with compensatory lengthening in the root vowel. This sound law is called Stang's Law. The long root vowels generated in this way are considered to be analogically generalized to the nominative singular forms. Therefore, we could reconstruct the following paradigm for the first stage, following Schindler (1972):

nom.sg. **$g^w o\underset{\frown}{u}$-s*, acc.sg. **$g^w o\underset{\frown}{u}$-m*, gen.sg. **$g^w e\underset{\frown}{u}$-s*.

It later developed to the following pattern by Stang's Law and the analogical process:

nom.sg. *$g^{w}\bar{o}u̯s$, acc.sg. *$g^{w}\bar{o}m$ [Stang's Law], gen.sg. *$g^{w}eu̯$-*s*.

Although there is no evidence for the Balto-Slavic ablauting paradigm since we have only Latvian *gùovs*, this Latvian form strongly suggests that Balto-Slavic, just like in Sanskrit and Greek, inherited a monosyllabic accusative singular form with a long root, *$g\tilde{\bar{o}}m$: $<$ *$g^{w}\bar{o}m$ $<$ *$g^{w}ou̯m$, which could be represented by the Latvian form.

However, there is another suggestion: a reconstruction with a laryngeal *$g^{w}eh_{3}$-*us*/*$g^{w}h_{3}$-*ou-s* developing to *$g^{w}\bar{e}h_{3}$-*us*/*$g^{w}h_{3}$-*ou-s* under the influence of *$di\bar{e}u̯s$ 'god' (Kortlandt 1985: 118; Lubotsky 1990: 133). Lubotsky (1990: 133ff.) also suggests to relating the word for cow to the Greek verb βόσκω 'to feed, tend.' Certainly βόσκω could be built on the verbal root *$g^{w}eh_{3}$- (*$g^{w}h_{3}$-*ske/o*-), but this verbal root does not necessarily have to be etymologically connected to the noun for 'cow.' Moreover, there are a few phonological problems, as Sihler (1995: 335) discusses. For example, it is never scanned disyllabic as opposed to *náus* 'ship,' which is from *$néh_{2}$-*us*, in Vedic. Some case forms do not correspond to the attested forms, e.g., acc. sg. *$g^{w}eh_{3}u̯m$ would give rise to Skt. ✗*gāvam*, Gk. ✗βω(ϝ)α, and loc. sg. *$g^{w}eh_{3}u̯i$ would result in Skt. ✗*gāvi*, Gk. ✗βω(ϝ)ι. Therefore, I will insist on the classic reconstruction for this item.

As briefly anticipated in the beginning of this section, this form provides some clues for the relative chronology. If Osthoff's law took place before the generalization of *i*-stems, it would have given rise to ✗*gous* (nom. sg.) or possibly ✗*gom* (acc. sg.) (→ Latv. ✗*gavs* [*gavi*-]). Also, as Larsson (2010: 73ff.) and Rasmussen (2007: 30) state, it should be before the transfer of the stem formation to *i*-stems, as well. Therefore, the following relative chronology can be established.

(47) MC → generalization of *i*-stem → Osthoff's Law (shortening of long diphthong: *$\bar{V}R > \breve{V}R$)

Thus, the series of all the phonological/morphological changes which took place to the paradigm of 'cow' can be described as in table 4.3.

	‘cow’		
	nom.sg.	acc.sg.	obl.
pre-PIE	*$g^w o\underset{\frown}{u}s$	*$g^w o\underset{\frown}{u}m$ (> *$g^w \bar{o}m$)	*$g^w e\underset{\frown}{u}$-
PIE	*$g^w \bar{o}\underset{\frown}{u}s$	*$g^w \bar{o}m$	*$g^w e\underset{\frown}{u}$-
PBS	**loss of ablaut**		
	*$g^w \bar{o}\underset{\frown}{u}s$	*$g^w \bar{o}m$	*$g\bar{o}\underset{\frown}{u}$-
	acute assignment to long vowels		
	*$g\acute{\bar{o}}\underset{\frown}{u}s$	*$g\acute{\bar{o}}\underset{\frown}{u}m$	*$g\bar{\bar{o}}\underset{\frown}{u}$-
	MC		
	*$g\tilde{\bar{o}}\underset{\frown}{u}s$	*$g\tilde{\bar{o}}\underset{\frown}{u}m$	*$g\bar{\bar{o}}\underset{\frown}{u}$-
	the ending *-im* introduced to the accusative stem		
	*$g\tilde{\bar{o}}vs$	*$g\tilde{\bar{o}}vim$	*$g\bar{\bar{o}}\underset{\frown}{u}$-
	generalization of *i*-stem		
	*$g\tilde{\bar{o}}vi$-s	*$g\tilde{\bar{o}}vi$-m	*$g\tilde{\bar{o}}vi$-
	Osthoff’s Law: vacuous operation		

Table 4.3: Phonological/morphological shifts of the paradigm of ‘cow’ from PIE to late PBS

4.2.1.2 Leveled Paradigms in PBS

In this section, the nouns with no evidence for ablaut in their Proto-Balto-Slavic paradigms will be treated. Probably, the ablaut has been lost in these paradigms before or at an early stage of Proto-Balto-Slavic.

***žvėrìs* (3) ‘wild animal’ [43b]** The cognates of this noun are the following:

Baltic:	Latv. *zvêrs* (m.) < PB **źvērис*
Slavic:	OCS *zvěrь* (m.), SCr. *zvȉjer* (f.), Sln. *zvȇr* (f.) < PS **zvə̂rъ* (c)
PBS	**źvērис* ← **źvēr* < PIE **ĝ^{h}u̯ēr*
other IE[32]:	Gk. θήρ, θηρός (m.), Lat. *fera* (f./n. pl.) ‘wild beast’

[32] Gmc. **ber-an-* (> OE *bera*, OHG *bero* ‘bear’) might be added here. Yet opinions on its etymology varies. While it is assumed to be related to the words meaning ‘brown,’ such as Lith. *bė́ras* (1/3), Latv. *bę̃rs*, Skt. *babhrú-* (< **b^{h}eb^{h}ru-*) ‘brown’ from PIE **b^{h}er-* (Fraenkel 1962–65: 39; Stang 1972: 15),

As a matter of fact, most cognates point to the lengthened *ē*-grade in PIE, with no trace of ablaut. Only the Latin material marginally points to the full-grade in PIE. Schindler (1972: 37) classifies **ĝʰu̯er-* as the full-grade type [R(é)-E(∅) ∼ R(∅)-E(é)], assuming that **ĝʰu̯er-* possibly had the same ablaut pattern as **di̯éu̯-s/*di̯u̯-ós* 'day, heaven,' etc., in PIE. However, Lat. *fera* does not exclude the possibility of an acrostatic R(ḗ)-E(∅) ∼ R(é)-E(∅) (also, Larsson 2001: 56).

On the other hand, a root with a laryngeal is reconstructed – **ĝʰu̯eHr-* in Derksen (2008: 550) and **ĝʰu̯eh₁r-* in Pronk (2012: 216ff.). Since Lithuanian and Latvian forms point to the acute root of a mobile paradigm, it is clear that this item was not affected by Hirt's Law. This speaks against the existence of a root-final laryngeal. Pronk (2012: id.) argues that although this item would have been mostly disyllabic in the environment of Hirt's Law, it must have been trisyllabic in some inflectional forms, e.g., instr. sg. **ĝʰu(e)h₁r̥-mì*, dat. pl. **ĝʰu(e)h₁r̥-mùs*, loc. pl. **ĝʰu(e)h₁r̥-sù*, instr. pl. **ĝʰu(e)h₁r̥-mìHs*, etc. These inflectional forms would not have been in the environment of Hirt's Law, and therefore he assumes that mobility was introduced to the paradigm despite the root-final laryngeal. However, this assumption can explain only the mobility of the Balto-Slavic paradigm for 'wild animal' and lacks any supports from the oblique stem **ĝʰu(e)h₁r̥-* by the attested forms (also, Carrasquer Vidal 2013: 208). He assumes that Lat. *fera* can be derived from the strong stem **ĝʰu̯eh₁r-* through a regular shortening in the pretonic position known as Dybo's Law in Italo-Celtic (Dybo 1961, cf. Schrijver 1991: 337). However, if the proposal of Matasović (2012: 129ff.) that the law was restricted to the long vowels resulting from **iH*, **uH*, and **RH* in Proto-Italo-Celtic, although based on the Celtic data, is correct, Lat. *fera* would be more likely to reflect a weak stem **ĝʰu̯er-* without a laryngeal.

For the PBS stage, all the cognates attest the lengthened *ē*-grade. This means that the ablauting pattern must have been simplified at least for the strong stems in the PBS stage, as Villanueva Svensson (2011: 19ff.) claims. The following chart reflects this scenario, in which the

it is also associated with the PIE root **ĝʰu̯er-* 'wild animal' (Bammesberger 1990: 176). Bammesberger (1990: id.) assumes that phonologically PIE **ĝʰu̯-* could give rise to Gmc. **b-*, considering the case of **bed-ja-* 'beg, ask' from PIE **gʷʰedʰ-i̯-* 'id.'

nominative singular form affected by MC is considered to have been replaced through the generalization of the accusative stem **źvḗri-*, which provides the attested forms.

	'wild animal'		
	nom.sg.	acc.sg.	obl.
PIE	**ĝʰu̯ḗr*	**ĝʰu̯ḗr-m̥*	**ĝʰu̯ér-*
PBS	**loss of ablaut** and assibilation of **ĝʰ*		
	**źvḗr*	**źvḗr-m̥*	**źvēr-*
	extension of syllabic resonant and acute assignment		
	**źvḗr*	**źvḗr-im*	*źvḗr-*
	MC		
	**źvr̃̄*	**źvḗr-im*	*źvḗr-*
	generalization of accusative stem in *i*-stem		
	**źvḗri-s*	**źvḗri-m*	**źvḗri-*
	Osthoff's Law: vacuous operation		

Table 4.4: Phonological/morphological shifts of the paradigm of 'wild animal' from PIE to late PBS

***nósis* (1) 'nose' [43a]** The cognates of this noun are the following:

Baltic:	Latv. *nãss* 'nostril' < PB **nā̀sis*; also, *nãse* 'nose' in *ē*-stem
Slavic:	OCS *nosъ*, SCr. *nôs, nȍsa*, Sln. *nọ̑s* < PS **nosъ* (c) ← **nósa* [nom.pl ← nom./acc. du. (Bräuer 1969: 130–143; Fritz 1996: 15)] < **nás-oh*$_1$
other IE:	Skt. *nās-/nas-* (f.) 'nostril' (du. *nā́sā* 'nose'), Lat. *nāris* (f.), PGmc. **nasō* (f.; < du. **nás-oh*$_1$ (← **-h*$_1$*e*) cf. Kluge 1882: 509ff; Thöny 2013: 140ff.)

Based on these cognates, a few paradigms have been reconstructed. The most classic reconstruction is Schindler's (1972: 37) normal degree type (mobile root noun) **nás-s* (> *nā́s*)/**n̥s-ós*. Schindler considered that the weak form is attested in Germanic **nus-* (as in OE *nosu*, also Bammesberger 1990: 199). But according to Griepentrog (1995: 323), the ablaut is lost in the paradigms of the root nouns already in Proto-Germanic, and such a variation in zero-grade cannot be regularly descended from one paradigm in the protolanguage. As an

alternative explanation, it is suggested that the Old English form may have been influenced by the Germanic root **neus-* 'to sniff.' If the Old English form is eliminated from the descendants of **nas-* that only underwent phonological sound changes, Schindler's reconstruction loses a datum supporting the ablaut pattern R(á)-E(∅) / R(∅)-E(é) for 'nose.' Nonetheless, the mobile accent pattern still remains in the Indic paradigm (du. gen. *nas-ós*). A possible solution to accommodate both the data in full- or lengthened-grade and the mobile ablaut pattern would be to assume that Schindler's weak stem **n̥s-ˊ* was replaced with a new full-grade form **nas-ˊ*.

Kortlandt (1985) reconstructs **neh₂-s/*nh₂s-ós* with a *seṭ* root. However, the Skt. gen.du. *nas-ós* speaks against the weak stem **nh₂s-*, since neither **n̥h₂s-* (> Skt. ✗*ās-*) nor **nh₂̥s-* (> ✗*nis-*) would give rise to the attested weak stem Skt. *nas-ˊ*, as rightly pointed out in Larsson (2010a: 83). Rasmussen (1989) reconstructs an acrostatic paradigm **nā́s/*nā́s-m̥*/dat.sg. **nás-ei̯*. However, the Indic materials suggest a mobile paradigm. Considering the mobility in the PIE paradigm, the weak forms may have had zero-grade in the root.

Mayrhofer (1992) and Griepentrog (1995: 342ff.) reconstruct **Hnas-* with a root-initiall laryngeal. Mayrhofer's reconstructed paradigm belongs to the protero-kinetic (**Hnā́s-/*Hnas-ˊ*), while Griepentrog's to the acrostatic (**Hnā́s-/*Hnás-*). The possible evidence for the root-initial laryngeal is the lengthening of the vowel preceding *nas-* in Vedic compounds with *nas-* as their second member, e.g., *urū-ṇas-á* 'platyrrhine, broad-nosed,' *ŕ̥jū-nas-* (personal name; literally 'having a straight nose'), *apī-nasa-* 'dryness of the nose, cold' (Griepentrog 1995: 341). On the other hand, it has been known since Pāniṇi's time that the lengthening in front of a morpheme boundary is somewhat regular. Wackernagel and Debrunner (1896 1964: II, 130ff.) and MacDonell (1910: 75) name the "rhythmical tendency" of this type of lengthening, many cases of which take place before a single consonant between two short syllables (besides *urū-ṇas-á*, etc. mentioned above, e.g., *ahī-śúva-* [a proper name of a Demon], *ṛ̥tā-ṣáh-* 'maintaining the sacred law,' *sanā-júr-*[33] 'long since aged' vs. *sána-śruta-* 'famous of old') as its main factor,

[33] Its second member is probably from $\sqrt{j\bar{r}̥/jar^{i}}$ 'to age,' which continues PIE **ĝerh₂-* 'to ream, to make old' according to Mayrhofer (1986–96: I, 577). The root does not have an initial-laryngeal, but still causes the lengthening to the first member of *sanā-júr-*.

while admitting that it more often happens in front of particular roots. Therefore, this lengthening phenomenon alone may be weak evidence for the root-initial laryngeal. Since this will not affect the following discussion on 'nose,' anyway, the identification of the initial laryngeal will not be pursued further.

Fritz (1996: 15) reconstructs an amphikinetic paradigm derived from a root **h₂enh₁-* 'breathe,' i.e., nom.sg. **h₂énh₁-ōs* / acc.sg. **h₂énh₁-os-m̥* / gen.sg. **h₂n̥h₁-s-és*. He assumes that this paradigm in Baltic developed to PB nom.sg. **nōs* (< PIE **h₂nōs* ← **h₂énh₁-ōs*) / acc. sg. **násim*, where the root was eventually leveled with **nāsi-*, taking the length from the nominative and the color of the vowel from the accusative sg./pl. in the *i*-stem profile. This assumption requires a significant remodeling of the nominative singular form (**h₂énh₁-ōs* → **h₂nōs*) under the influence of the weak stem and the endingless locative, but the weak stem itself is, according to him, attested as the words for 'mouth,' e.g., Skt. *ās-*, Av. *āh-* (gen. sg. PIE **h₂n̥h₁-s-és* > Skt. *āsás*, Av. *å̊ŋhō*; instr. sg. PIE **h₂n̥h₁-s-éh₁* > Skt. *āsā́*, Av. *ə̄ə̄å̊ŋhā*). This appears too speculative because the original nominative form in fact has no support among the attested forms in the IE daughter languages. On the other hand, Fritz considers the Slavic forms to be derived from a dual stem **h₂n-ós-oh₁* (> PS **nósa*) with a secondary dual ending. This derivation is plausible, considering that a similar reinterpretation is assumed to have taken place also in Germanic (Kluge 1882: 509ff.; Griepentrog 1995: 329ff.), and a similar semantic shift can be observed in Skt. nom. sg. *nā́s* 'nostril' and du. nom. *nā́sā* 'nose,' although the assumption of the paradigm in the protolanguage appears questionable.

Certainly, the dual ending for the consonantal stems is reconstructed as **-h₁e* (cf. Eichner 1982: I, 35), therefore the shift of the thematic dual ending **-oh₁* to the dual form of the root noun for 'nose' calls for a particular explanation. In fact, the shift of the thematic dual ending **-oh₁* to the dual of athematic nouns is well attested in Sanskrit (cf. Wackernagel 1896–1964: III, 48; Sihler 1995: 287; among others), and at a lesser extent in Avestan (Hoffmann and Forssman 2004: 115, 136ff.) and Greek (Fritz 2011: 49–51; Sihler 1995: 265). Lühr (2000: 269ff.) discusses a case of such a shift of thematic dual ending to feminine nouns in Mycenaean and Attic Greek. She points out that the thematic dual ending **-oh₁* in fact appears also in genderless personal pronouns and the numeral for 'two' (**du̯oh₁*) in Greek, and proposes that the ending **-oh₁*

may have been adopted first from such pronouns to the numeral for two, and further to some nouns. Therefore, it is not totally impossible that the thematic dual ending could spread to the root noun **nas-* in dual with its potential productivity. There is an alternative solution to handling this problem, namely, the collective ending **-eh₂* (cf. Neri 2003: 146[422]). This also works out phonologically both in Germanic and in Slavic; however, the semantics does not seem more plausible than the dual hypothesis.[34]

Consequently, the possible ablaut pattern could be originally *á* ∼ ∅ (suggested by Schindler 1972). However, the nominative singular form (**nás-s*) could have developed to **nás* by the loss of the final **-s*,[35] and that facilitated the weak stem (**n̥s-´*) to have a more typical vowel, as in **nas-´*. The ablaut pattern suggested by Rasmussen (1989) and Larsson (2010a: 81ff.) may have developed through such a secondary process, but probably still retained accentual mobility, as in R(á)-E(∅) / R(a)-E(é) in late PIE.

In the following table 4.5, Schindler's paradigm is taken as the starting point, which presumably developed into the pattern **nás-* ∼ **nas-´*. The fact that the root in the lengthened grade has not been generalized to the dual forms and that the dual forms gained a meaning 'nose (a pair of nostrils),' reinterpreted in a different stem-formation in both Slavic (*o*-stem) and Germanic languages (*ō*-stem), makes it plausible to consider a split of the paradigm into one for 'nostril' and another for 'nose' at a late stage of PIE before the split of Proto-Germanic and Proto-Balto-Slavic from Northern Indo-European. The generalization of the lengthened grade over the paradigm (loss of the ablaut) presumably took place after the split of the paradigm, and the consequent generalization of the *i*-stem from the accusative forms after MC. This relative chronology can give the right outputs, i.e., the attested forms with the acute root originated in the accusative stem, which replaced the original nominative singular form presumably affected by MC.

[34] A thorough discussion of the matter is found in Thöny (2013: 145ff.).

[35] The simplification of the geminate *ss* could cause compensatory lengthening, as in the amphikinetic suffix of *s*-stems: e.g., **h₂éus-ōs* → *uṣ́ās* 'dawn.'

	‘nostril’			
	nom.sg.	acc.sg.	obl.	nom.du.
PIE	(*nás-s? >)	*nás-m̥	(*n̥s-? →)	*nas-h_1e
	*nā́s		*nas-	(→ *nas-oh$_1$)
late PIE	semantic split of paradigm			
		↙	↘	
		‘nostril’		↓
	nom.sg.	acc.sg.	obl.	‘nose’
	*nā́s	*nás-m̥	*nas-´	*nas-oh$_1$
				(→ PS / PGmc.)
PBS	**loss of ablaut**			
	extension of syllabic resonant			loss of laryngeal
	*nā́s	*nā́s-im	*nā́s-	*nas-ō
	acute assignment to long vowels			
	*nā̲́s	*nā̲́s-im	*nā̲́s-	*nas-ō̲
	MC			
	*nā̃s	*nā̲́s-im	*nā̲́s-	*nas-ō̲
	generalization of accusative stem in *i*-stem for ‘nostril’			
	*nā̲́si-s	*nā̲́si-m	*nā̲́si-	*nas-ō̲

Table 4.5: Historical shifts of the paradigm of ‘nostril’ from PIE to late PBS

4.2.1.3 Ablauting Paradigms in Proto-Balto-Slavic

In this section, the focus will be on reflexes of root nouns that probably retained ablauting paradigms still in Proto-Balto-Slavic, as indicated by their cognates.

Latv. *sàls* ‘salt’ [44a] cognates:

Baltic:	OPru. *sal* (GrA 60, GrF 83; unknown length/accentuation of the root), *sali* (GrG 39), *salli* (GrH)[36]
Slavic:	OCS *solь* (f.), SCr. *sôl, sȍli*, Sln. *sọ̑ł, solî* < PS **solь* (c)
other IE:	Gk. ἅλς, ἁλός m. ‘salt,’ f. ‘sea,’ Lat. *sāl, salis* m./n. ‘salt’
PIE:	nom.sg. **sā́l* (< **sal-s*), acc.sg. **sal-m̥*

The Latvian and Latin forms point to a lengthened grade in the nominative singular. Other materials point to a full grade.[37] This has the same sort of problem regarding ablaut pattern that the paradigm for 'nose' had: i.e., there are some pieces of evidence in favor of a mobile ablauting pattern (Slavic paradigm in (c) and the Greek paradigm, and the fact that both lengthened grade and full grade are attested), whereas there is no evidence for zero grade, which would be expected for a mobile paradigm. In a way similar to the case of 'nose,' I would assume that the original pattern **sál-s* / **sl̥-́* developed to nom.sg. **sā́l* / acc.sg. **sál-m̥* / obl. **sal-́* due to the change **sál-s* > **sā́l*.

Kortlandt (1985: 119) reconstructs a root with a laryngeal: **seh₂-ls* / **sh₂-el-m*/**sh₂-l-os*. This reconstruction successfully explains the Latin paradigm nom.sg. *sāl* / gen.sg. *sălis* / acc.sg. *sălem*, but there is actually no evidence for the root-final laryngeal. Furthermore, there is no semantic ground for dividing the stem into the root (**seh₂*) and the suffix (**-(e)l-*), since we find no cases where the assumed root **seh₂-* behaves as an independent morpheme. Therefore, the reconstruction as a root noun for 'salt' is employed in this discussion.

The Proto-Slavic form **sölъ* has a short root in the same *i*-stem as in Baltic, while the Baltic form indicates a lengthened grade. This suggests an ablauting paradigm for Proto Balto-Slavic (Larsson 2010a: 75).

[36] "Gr" here stands for the "Grunau vocabulary" included in the Prussian Chronicle written in the 16th C. by a monk, Simon Grunau. Although the original copy is lost, several copies from different epochs are left (Dini 2014: 331):

GrA: 17th–18th C, University of Königsberg
GrC: ca. 1750, Königsberg city archive
GrH: Hartknoch's publication *Alt und Neues Preuẹn*, Francfurt (1679) and Leipzig (1684)
GrG: Göttingen
GrF: Helsinki library

[37] Lith. *sólymas* 'brine' is often mentioned as a cognate here, but according to Būga (1958–1961: II, 418, 584), this word does not contribute much to the reconstruction, as it is attested only in a few Žemaitian dialects and eastern Aukštaitian dialects, and is probably a loanword from Latv. *sālīms*.

	‘salt’		
	nom.sg.	acc.sg.	obl.
PIE	(*sál-s >) *sā́l*	*sál-m̥*	(*sl̥-? →) *sal-´*
PBS	extension of syllabic resonants		
PBS	and acute assignment to long vowels		
	sā́l	*sál-im*	*sal-´*
	MC		
	sã̄l	*sálim*	*sal-´*
generalization of *i*-stem, keeping the ablaut pattern			
	sã̄lis	*sálim*	*sali-*
Osthoff’s law: vacuous operation			
	sã̄li-s	*sáli-m*	*sali-*

Table 4.6: Historical shifts of the paradigm of ‘salt’ from PIE to late PBS

The generalization of a particular stem to the entire paradigm should be presumed to have taken place independently in Proto-Baltic and Proto-Slavic, with the nom.sg. stem **sã̄li-* being generalized in Baltic, and with the acc.sg. stem **sáli-* in Slavic.

***širdìs* (3) ‘heart’ [43c]** The cognates of Lith. *širdìs* (3) and Latv. *sirds* are as follows:

Baltic: Latv. *sirds*, OPru. *seyr* (/sēr/ n. nom. sg. only in the *Elbing Vocabulary*; with *a*-stem masc. declension in Catechisms) ‘heart;’ Lith. *šerdis* (1/3/4), Latv. *sirde* ‘the core of wood’ < PB **śerd-*/**śird-*

Slavic: OCS *srьdьce*, Cz *srdce* ‘heart’ < **śird-iko-*; OCS *srěda* ‘middle,’ SCr *srijèda* ‘Wednesday’

other IE: Gk. κῆρ, κῆρος n., Lat. *cor, cordis* n., Skt. *hā́rdi* (< **ḱēr-d-h₂*; n.), *hṛ́d* n., Hitt. *ker/kardiyaš* n., Gk. καρδίᾱ, OIr. *cride* n. ‘heart’ (< **ḱr̥dio̯m*)

This may be also a special case in that it involves a split of the paradigm in accordance to the meanings, namely the zero grade for the meaning ‘heart’ and the *ĕ*-grade for the meaning ‘the core or the center (of a tree),’ probably already in PBS, for both Baltic and Slavic preserve cognates in zero grade and *e*-grade with similar semantic variations. This means that the weak- or oblique-originated stem **ḱr̥d-* (> Lith. *šìrd-*) was generalized to the whole paradigm of the word for

'heart,' while the stem of accusative origin is usually generalized in the paradigm as seen in the generalization of *i*-stems to the root nouns from the accusative stem in *i*. A possible factor of the unusual generalization of weak stem to the paradigm for 'heart' is assumed to be the PIE loc. sg. **k̂érd-i* or **k̂erd-í* 'in the heart (of)' > 'in the middle (of),' which caused the semantic shift from 'heart' to 'middle' (cf. Petit 2004: 47). Villanueva Svensson (2011b: 166ff.) further investigates the PIE origin of the paradigm for 'core' in the delocatival derivation, which is a case of "decasuative derivation" illustrated in Nussbaum (1986: 187ff., 235ff.). He suggests that the ending-less loc. sg. **k̂érd* 'in the heart (of)' served as the base of the derivation with the suffix **-o-* to form **k̂erd-ó-* 'what is in the heart (of)' in late PIE or in pre-PBS.[38] This derivative **k̂erd-ó-* later acquired the *i*-stem inflection under the influence of that of *širdìs* in Baltic, whereas it acquired the *ā*-stem inflection through the collective **k̂ērdeh₂* (> PS **śerdȧ́*) in Slavic. This explanation provides theoretical and semantic grounds for the emergence of the paradigm for 'core' with the stem in *ĕ*-grade (**k̂ĕrd-*). The establishment of the paradigm for 'core' in *ĕ*-grade must have forced the paradigm for 'heart' to generalize the zero-grade stem. The fact that the stem **śr̥̄d-* is attested without any possible result of MC indicates that the stem was generalized to the paradigm of 'heart' probably after the operation of MC to give rise to the new nom.-acc. sg. **śŕ̥d(d).*

Another important point to note is its neuter gender as shown by other Indo-European cognates, e.g., Lat. *cor, cordis* (n.), Skt. *hā́rdi* (n.), and Gk. κῆρ, κῆρος (n.). Therefore, this item used to be monosyllabic both in the nominative and accusative singular, for the inflectional endings lacked in those cases among neuter nouns. Consequently, it is expected that they gained the circumflex tone through the process of MC. The lack of attested forms with the circumflex tone may speak against the existence of MC itself. However, it must be assumed that the paradigm for 'heart' in PIE is inherited by two paradigms for 'heart' and 'core' in PBS, and that the gender of both of them turned from neuter to animate at later stages. These background processes allow a possibil-

[38] Two pieces of evidence for the locative in the full-grade beside that of the zero grade for 'heart' is given in Villanueva Svensson (2011b: 165): Hitt. loc. sg. *kerti=tta* 'in your heart' < **k̂erd-i* and (**k̂erd dʰeh₁-* >) **k̂red dʰeh₁-* 'to believe' (> Av. *zrazdāiti-*, Skt. *śrád dhā́*, Lat. *crēdō, -ere*, OIr. *cretim* 'to believe').

ity that the forms affected by MC could be eliminated through all those morphological/analogical processes.

The following table reflects the possibility that the morphological processes eliminated the forms affected by MC in nominative and accusative singular after the split of the paradigm.

	'heart'				
	nom.sg.	acc.sg.	obl.	loc.	nom.-acc.pl. (= coll.)
PIE	*$\hat{k}$érd (> *$\hat{k}$ḗr)	*$\hat{k}$érd (> *$\hat{k}$ḗr)	*$\hat{k}_{\circ}$rd-´	$\hat{k}$érd(-i) (→ *$\hat{k}$erdó- 'core')	*$\hat{k}$érd-(e)h_2
PBS	assibilation of *$\hat{k}$, Winter's Law, and extension of syllabic resonant				
	*śḗr	*śḗr	*śīrd-´	*śērd-i	*śḗrdā
	acute assignment to long vowels				
	*śe̋r	*śe̋r	*śīrd-´	*śērd-i	*śe̋rdā
	MC				
	*śe͠r	*śe͠r	*śīrd-´	*śērd-i	*śe̋rdā
	loss of ablaut by generalizing zero-grade for 'heart'				

'heart'		'core'	
nom.-acc. sg.	nom.-acc. pl. (= coll.)	nom.-acc. sg.	nom.-acc. pl. (= coll.)
*śírd	*śírdā	*śērdóm	*śe̋rdā
Osthoff's Law			
*śírd	*śírdā	*śerdóm	*śérdā

Table 4.7: Historical shift of the paradigm for 'heart' from PIE to PBS

For the East Baltic forms (Lith. *šìrdis*, Latv. *sirds* 'heart'), one possibility is that **śírd-ā* in the nom.-acc. pl. (collective) of the split-out paradigm for 'heart' served as the paradigmatic pivot. Its ending **-eh$_2$* coincides with the feminine *ā*-stem in the nominative singular, and therefore it might have triggered a paradigmatic shift from the root noun to a feminine *ā*-stem of the word for 'heart.' The generalization of the *i*-stem took place at a later stage, motivated by other *i*-stem feminine

body part terms, e.g., *akìs* (4) 'eye,' *ausìs* (4) 'ear,' *nósis* (1) 'nose,' as Szemerényi (1970: 531[48]) suggests. Another possibility is that **śi̯rd-* in the oblique cases adopted the inflection of the feminine *i*-stem due to a few consonantal oblique endings, i.e., gen.sg. **śi̯rd-és* (Larsson 2010: 275). The second possibility seems more plausible, considering that the masculine gender attested in Old Lithuanian[39] may imply that the gender choice of the original neuter noun for 'heart' was not straightforward. Probably, the paradigm of *śi̯rd-* started to adopt the *i*-stem inflection due to the formal coincidence, but the gender choice was not so clear — masculine in some dialects, feminine in other dialects. Over time, the feminine gender won out for exactly the reason that Szemerényi suggests: the other body part terms in the feminine *i*-stem. On the other hand, for Lith. *širdai* (3 (→ 4)) 'quarrel', a possible thematization is suggested (Szemerényi: id.). From a semantic point of view, it was probably a functional thematization that led the derived form to mean '(something) belonging to the heart/anger,' descended as the word for 'quarrel' in Lithuanian. Another reflex meaning 'core' in a different vocalism, Lith. *šerdis* (1/3 (→ 4)), seems to exhibit a regular tonal reflex of **śe̯rd-ā* (inherited to PS **śerdȁ*). The form *šerdis* (4) may be a case of *métatonie douce* among *i*-stems, which is discussed in Derksen (1996: 147). He points out that *i*-stems of AP1 and AP3 tend to shift to AP4, and in many such cases, AP1 and AP3 are often still attested dialectally.

The Old Prussian form presents more enigmas, for the exact phonetic value of ⟨seyr⟩ is unclear. At face value, it seems to descend PIE **k̂ḗr* in the nom.-acc. singular, but considering that the strong stem with the lengthened grade is usually reflected as the words for 'core,' this is not compatible. Larsson (2010: 271ff.) assumes that the absence of the dental consonant **d* in the paradigm can be attributed to an Old Prussian sound rule *CTs* > *Cs* proposed by Smoczyński (2000: 100ff.), since the word belongs to the masculine *a*-stem declension (gen.sg. *sīras*, dat.sg. *sīru*, acc.sg. *sijran*/*sīran*, acc.pl. *sirans*),

[39] For example, *širdi (...) gailinti* 'a heart repenting' (Mažvydas 67_{11}; see Specht 1933: 256ff.). These attestation may not be solid evidence for the established masculine gender in Old Lithuanian, because the word is attested in feminine gender for many times even within *Mažvydas Catechism*. But it may imply that there was some ambiguity concerning the gender choice for this word.

not showing any particular archaism except for the nominative singular form attested in the Elbing Vocabulary. She puts forward an assumption that the archaic-looking nominative singular form can be explained by some Old Prussian innovations, i.e., the above-mentioned sound change, and the spelling ⟨ey⟩ possibly reflecting the lowering or diphthongization of the original **i* (Smoczyński 2000: 101[124]), with parallels to the lack of the nom.sg. ending *-s*, such as in *semen* 'seed.' This suggestion may enable us to suppose that the Old Prussian forms can also be derived from the remodeled paradigm for 'heart.' Consequently, when the paradigm of the neuter root noun for 'heart,' which had become irregular due to the lack of the ending in the nom.-acc. singular, needed to be normalized in Proto-Baltic, a masculine *a*-stem inflection beside *i*-stem inflection was adopted. The problem is that the motive of the adoption of masculine *a*-stem remains an enigma.

Despite the enigma, it can be assumed that the nom-acc. *śẽr* resulting from MC was lost from the paradigm through the developments discussed so far. The paradigm for 'heart' was restructured in Proto-Balto-Slavic based on the oblique stem **śi̯rd-*, while the forms for 'core' would be from the de-locatival **śerd-ó-*.

4.2.2 Relative Chronology of MC

The relative chronology should be discussed as well. First of all, it was shown in §4.1.5 that MC is older than Proto-Baltic, and the data can be explained by a relative chronology with Winter's Law preceding MC. In addition, this section has shown that MC should be prior to the generalization of *i*-stems to root nouns followed by Osthoff's Law. This gave a partial relative chronology as in (47). Yet, this section could not find a decisive clue for establishing the relative chronology of MC and Winter's Law.

It is generally difficult to establish their relative chronology. The environment of Winter's Law is hardly provided in a monosyllabic word, because of the final devoicing of stops. For instance, n. nom.-acc. sg. **tod* > PS *to* without the operation of Winter's Law shows that the final **-d* was devoiced to **-t* already in PBS before Winter's Law was at work. The examples of 3rd person future forms like **sed-s-* and **$b^h eg^w$-s-* (cf. §4.1.4.5) have their root-final stops protected by **-s-*; therefore the stops may have not been affected by the final devoicing rule. Addition-

ally, the possibility remains that the final stops were devoiced through the assimilation to *-*s*-, and the long root was analogically provided by the other personal forms and the circumflex tone from the Group 2 verbs. At this point, it could be a matter of taste whether to operate with sound laws or with two analogical processes.

Consequently, another possible way is to speculate their relative chronology from the theoretical assumptions. As mentioned in §2.3.8, the fact that the long vowels resulting from Winter's Law receive the acute tone can imply that the acute assignment operated on them as well, which may allow for assuming that Winter's Law preceded the acute assignment. If this is integrated in the relative chronology in (15) based on the preceding works, the relative chronology in (47) can be updated as follows:

(48) relative chronology II:

$$\left.\begin{array}{r} *D > *T/\_\_\# \rightarrow \text{Winter's Law} \\ \text{Hirt's Law, } *\mathring{R} > iR \rightarrow *VH]_\sigma > *\bar{V}]_\sigma \end{array}\right\} \rightarrow$$

$\rightarrow$ acute assignment, *i*-apocope[40] $\rightarrow$ **MC** $\rightarrow$ generalization of *i*-stem to root nouns $\rightarrow$ Osthoff's Law $\rightarrow$ **o* $>$ **a*.

The relative chronology of Osthoff's Law and **o* $>$ **a* can be established based on the reflexes as follows:[41]

[40] See §4.1.5.

[41] It has been proposed that the PBS acute diphthongs may not reflect the length of the nucleus vowels but directly reflect glottalization in the cases of PIE **smordós* reflected as PBS **smardos*, PIE **molH-tĕi* as PBS **maltĕi*, in Olander (2015: 41–42) and in the talk *An acute problem: the Balto-Slavic diphthongs* given by Tobias M. Sjøberg in Vilnius 2015. Olander and Sjøberg assume that PIE **smordós* and **molH-tĕi* would directly develop to PBS **smordós* and **mol-tĕi*, so that they would give **smardós* and **mal-tĕi* with the root vowel *a*. However, the relative chronology proposed here can also give rise to the expected outcomes. The often quoted examples which raises questions to the fate of long diphthongs, e.g., *pùlti* 'to fall' (< **púolti* < **pólti*), *aštuñtas* 'eighth' (< **aštuontas* < *aštōntas*), can be explained with secondary factors. The long vowel in **púolti* can be taken from the preterit stem **pōl-* (Lith. *púolė*), as Balto-Slavic infinitive stems are often identical to their preterit stems (Stang 1942: 85, 122ff.), and that of **aštuontas* can be from its cardinal

PIE	*nog^{w}ós	*smordós	*molH-tĕ̄i	*u̯ōrna
	‘naked’	‘stench’	‘to grind’	‘raven’
Winter’s Law	*nōg^{w}ós	*smōrdós	—	—
*VH]$_{\sigma}$ > *V̄]$_{\sigma}$	—	—	*mōltĕ̄i	—
Acute Assignment	*nō̲gos	*smō̲rdos	*mō̲ltĕ̄i	*u̯ō̲rna
Osthoff’s Law	—	*smo̲rdos	*mo̲ltĕ̄i	*u̯o̲rna
*o > *a	—	*sma̲rdos	*ma̲ltĕ̄i	*u̯a̲rna
Lith.	*núogas* (3)		*málti*	*várna* (1)
Latv.	*nuôgs*	*smaî̃ds*	*maĨt*	*vãrna*

Table 4.8: Relative chronology of Osthoff’s Law

The circumflex tone of the reflexes of PIE root nouns can be just subtle remnants that barely imply the existence of Proto-Balto-Slavic MC. Nonetheless, there can be another piece of evidence for Proto-Balto-Slavic MC, which is provided by the Slavic root aorist forms in the 2nd and 3rd person singular (e.g., 22d, e, f).

Their preforms are reconstructed as root aorist forms such as *deh$_3$-s/*deh$_3$-t, *b^{h}uH-s/*b^{h}uH-t, *pih$_3$-s/*pih$_3$-t in Rasmussen (1999: 483ff). On the contrary, Kortlandt (1988: 300–301) reconstructs PIE *s*-aorists that have the lengthened grade only in the 2/3sg. forms to explain their circumflex tone in contrast to SCr. 1sg. *däh* (< *dā-s-(o)m), 1pl. *däsmo*, 2pl. *däste*, 3pl. *däše*. According to him, the laryngeal disappeared after a lengthened-grade vowel (*dēh$_3$-s-s > *dōh$_3$-s-s > *dōs-s), and the lengthened-grade vowel regularly gave rise to the circumflex tone in the 2/3 sg. However, as Jasanoff (2004b: 173ff.) rightly points out, such a paradigmatic pattern is quite unacceptable, and the predecessor of those Slavic aorist forms should be the root-aorist sigmatized under the considerable productivity of the sigmatic aorist in Slavic. Therefore, we must start from the following PIE paradigm with a reformation of the stem to that of *s*-aorist in Proto-Slavic:

1sg.	*doh$_3$-m → *dās-om	1pl.	*dh$_3$-me → *dās-omo(s)
2	*doh$_3$-s → *dās-s	2	*dh$_3$-te → *dās-te
3	*doh$_3$-t → *dās-t	3	*dh$_3$-ént → *dās-int

*aštōni (Lith. *aštuonì*); see also Villanueva Svensson (2011c: 30[33]). In addition, the m. pl. acc. ending of *o*-stem Lith. *-us*, Latv. *-us* (< PBS *-ōns) can be explained differently (see §4.4.1.1, p. 174ff.).

This historical speculation reasonably gives the environment for MC only to the 2/3sg. forms. As Rasmussen and Jasanoff agree on, the assumption of MC can provide a phonological ground for the circumflex tone of those forms. However, there are some counterexamples against this. The Slavic aorist forms in 2/3sg., e.g., **bï̃* (∼ **bïti* 'beat'), **šï̃* (∼ *šïti* 'to sew'), **gnjï̃* (∼ **gnjïti* 'rot'), **čü̃* (∼ **čüti* 'sense, hear'), **krï̃* (∼ **krïti* 'hide'), contrast with the aorist forms with the circumflex tone. Kortlandt (1997: 29–30) points out that they belong to Slavic accentual paradigm a, while the verbs of 2./3.sg. aorist forms with the circumflex tone belong to APc, and Villanueva Svensson (2011: 18) further noted that the latter may simply reflect the result of Meillet's Law. Rasmussen (2007: 32) replies to this presentation that Meillet's Law is not the factor of the different accentuations of those aorist forms in 2/3sg., since both types of verbs originally had the root-aorist paradigm with the acute root. He continues that the acute forms would be analogical to other personal forms, while the circumflex forms lack any such analogical support, therefore they must be the phonological outcome. Indeed, Meillet's Law would probably explain the circumflex tone in the 2/3sg., but does not provide any solution to the tonal contrast of the circumflex tone in 2/3sg. and the acute tone of the remaining personal forms in the same paradigm.

Thus, the accentuation of Slavic aorist still needs further discussions, but it may present some remnants of the old MC. If so, this could be a good support for the MC in Proto-Balto-Slavic, as the corresponding data in both Slavic and Baltic sides are hard to obtain. The reason is that some categories can be lost as in the case of root-aorist in Baltic, or morphologically completely reformed as in the case of BS reflexes of PIE root nouns.

4.2.3 Conclusion

The items handled in this section could be said to be good examples of cases in which each word has its own history. It can be observed that morphological and phonological changes have usually eliminated the results of MC, while the circumflex forms resulting from MC had a chance to survive in a few cases within specific conditions (monosyllabic in accusative singular as well as nominative singular in the case of 'cow,' and an ablauting paradigm in PBS in the case of 'salt'). The

charts in which the detailed relative chronology was demonstrated show how the result of MC could have survived in such cases.

On the other hand, if MC cannot be presumed, it would be quite difficult to explain how different tones are descended among the East Baltic reflexes of root nouns. They all had a long root in the PIE forms, and therefore they are expected to receive the same tone, either the acute or circumflex tone on the phonological level, depending on the theory. If Kortlandt's hypothesis is employed, it is difficult to explain why Lith. *žvėrìs* has the acute root. To avoid this problem, he reconstructs laryngeals for this root (and also for 'nose'), but robust evidence for the laryngeal is hardly found among IE languages, as argued above. The fact that some root nouns have East Baltic reflexes with acute tone supports the hypothesis first advocated by de Saussure, and Latv. *gùovs* and *sàls* suggest the operation of MC.

4.2.4 Excursus: The Final Syllable of *n*-stems in Nominative Singular

The final syllable of the nominative singular of *n*-stems in Lithuanian has a long vowel with a circumflex intonation, i.e., *-uõ* (e.g., *akmuõ* 'stone'). Lithuanian *n*-stems have corresponding categories in Indo-European languages. They generally point to two ablauting patterns: an amphikinetic pattern as exemplified by Lith. *akmuõ* ∼ Gk. ἄκμων (nom.sg.)/ἄκμονος (gen.sg.), Skt. *áśmā*/*áśmanas*, and OCS *kamy*/*kamene* (< *$h_2$ék-mōn/*h_2k̂-mn-´); and a hysterokinetic pattern as Lith. *piemuõ* (3^a) 'shepherd' ∼ Gk. ποιμήν/ποιμένος 'id.' (< *poh_2i-mḗn/*poh_2i-mn-´). Lithuanian generalized the ending from the amphikinetic type *-*mon*-*s* as all *n*-stems have *-uõ* in the nominative singular ending.

The nominative singular ending of the amphikinetic ablaut pattern as the preform of this ending *-uõ* is explained by the following sound changes: *-*on*-*s* > *-*ōn* > *-*ō* / # (Szemerényi 1996: 115ff; Jasanoff 1989: 138). Since inherited long vowels were assigned an acute nucleus that gave rise to the acute intonation in Lithuanian (e.g. *$ĝ^h$u̯ēr- > Lith. *žvérį* (acc.sg.) 'beast'), the circumflex intonation in the nominative ending of *n*-stems and its exemption from Leskien's Law presents a problem.

Following the discussions presented in Jasanoff (2004a) and Yoshida (2012), I would like to reexamine the view presented in Hanssen (1885:

616), which focuses on two monosyllabic *n*-stem nouns in Lithuanian (*šuõ* 'dog' [< **k̂uó(n)*], *žmuõ* 'man' [< **dʰĝʰmó́(n)*]) that could have phonologically given the circumflex intonation of the ending through Monosyllabic Circumflexion.

4.2.4.1 Suggested Explanations

In general, there have been two main suggestions for solving the problem of the circumflex tone of the *n*-stem ending (including *šuõ* and *žmuõ*). One is to formulate a rule that a trimoraic vowel arose in absolute word-final position through contraction and compensatory lengthening, among other factors. For the *n*-stem ending, Hirt discovered that the *n*-stem ending in Gk. -ών has the acute tone, while Lith. *-uõ* corresponding to Gmc. *ō* has the circumflex tone, and therefore the Lithuanian and Germanic long vowels in word-final position must reflect a common feature. Hirt (1892: 22) assumes that the loss of the final *-n* in sandhi caused a compensatory lengthening, which gave rise to a trimoraic final **-ô*. This is eventually reflected as a long *-ō* in Gothic and OHG, and **-ō* in Balto-Slavic as well. The theory is summarized and critically examined by Lane (1963) and Boutkan (1995: 109ff.) among others. The second way is to attribute the problematic correspondence to phonological and analogical processes, without an additional factor like overlength, initiated by Lane (1963). He has suggested that Germanic vowel contraction can be the source of the overlength for the gen. pl. ending, but attributed the length in the *n*-stem ending to a secondary development in which the long vowel was secondarily introduced from the acc. pl. ending **-ōnum* to nom. sg. Boutkan (1995), generally disagreeing with the reconstruction of trimoraic vowels, accepts this view. On the other hand, Jasanoff (2004a) maintains that the contrast of bimoraic and trimoraic vowels was reinterpreted in Balto-Slavic as that of marked vs. unmarked, further as that of acute vs. circumflex tone. This certainly has two advantages. First, this theory also explains the *r*-stem (e.g., *duktẽ* 'daughter') and *s*-stem (e.g., *sesuõ* 'sister') endings. In addition, Estonian, a Balto-Finnic language neighboring the Balto-Slavic family, also has trimoraic long vowels as phonemes, which is a good parallel of three-fold distinction in vowel length (Jasanoff 2004a: 249[5]) and can be taken as a clue of such a distinction as an areal feature. However, Yoshida (2012) presents two counterarguments, as we have seen in §2.3.8 (pp. 52). He (p.240–241)

additionally argues that it can be questionable to assume that the three-fold distinction of vocalic length could have existed in the word-final syllable in Germanic and in Balto-Slavic, which did not always carry the accent. For, even in the case of Estonian, which presents the three-fold distinction of vocalic length, it is only found in the word-initial syllable, which carries the accent, and the three-fold vocalic length is an Estonian development (Raun 1954: 62ff.). Furthermore, I would like to mention Kallio (2012), who argues that Proto-Finnic originally had only monomoraic syllables, and the trimoraic syllables (*(C)VVC-, *(C)VCC-) were introduced by the Germanic loanword. On the other hand, in Finnic, stops were originally in morpho-phonemic alternation between weak and strong degrees. In Estonian, the alternation was extended to vowels as well, and ternary length contrast developed (Raun 1954: 65ff.). Since this morphophonological backround is quite different from Germanic and Balto-Slavic, I do not think Estonian ternary length contrast can be simply compared to our case of the *n*-stem ending in nom. sg. in Indo-European.

On the other hand, Olander (2009: 114ff.) argues in favor of the view that the circumflex tone, as in the *n*-stem ending Lith. *-uõ* is the regular outcome of a Proto-Indo-European plain long vowel *$*\bar{V}$*, while the acute tone (e.g., *$*\text{-}\acute{o} >$* 1sg. pres. Lith. *-ù*) is regular in the Proto-Indo-European sequence with a laryngeal *$*VH$* in the word-final position. In other words, the distinction between the plain long vowel *$*\bar{V}$* and the laryngeal sequence *$*VH$* was somehow preserved in the absolute word-final position. Although this description faithfully reflects the distribution of the tones of the data, no coherent phonological account has been provided. In fact, taking into account Yoshida's (2012) proposal (cf. (14)), the loss of laryngeal in the coda position of the final syllables (*$*\text{VH}]_{\omega} > *\bar{\text{V}}$*) had to take place before the acute assignment in order for them to be marked as acute. Therefore, it is difficult to assume that the older plain long vowels of PIE origin could have selectively escaped from the acute assignment.

There is another problem: the rarity of the data of the plain long vowels in the absolute final position. They are virtually limited to the nominative singular endings of the consonantal stems, and only accusative plural ending of *o*-stem *$*\text{-}\bar{o}\text{(m)s}$* could have the closest phonotactic structure (with coda consonant(s), though). The accusative plural ending indeed has the acute reflex in Baltic. Therefore the problem of

the circumflex reflexes of consonantal endings in the nominative singular could be seen as being specific to this category.

In what follows, I will search for a possible factor as to how the ending avoided acute assignment.

4.2.4.2 *šuõ* 'dog' (4)

Since it is ambiguous whether PIE **k̂u̯ōn/*k̂u̯on-m̥/*k̂un-ós* is a root noun or an *n*-stem, I hesitate to include it into the main part of this section for the discussion on the Baltic reflexes of root nouns. Morphologically, a hypothetical root **k̂(e)u-*, a well-established *n*-stem suffix **-(o/e)n-*, and the ending could be recognized. The only problem is that the hypothetical root **k̂(e)u-* is never found elsewhere. Therefore, it seems more plausible to segment it into the root **k̂u̯on-* and the ending.

Despite this morphological ambiguity, this item is relevant to the current discussion in that the PIE protoform is reconstructed as a monosyllable in the nominative singular, which is preserved as such in Lithuanian, while other case forms merged with the *i*-stems as others did. Therefore, I suppose that this word is worth discussing in this excursion section. Following the manner of the previous sections, I will start the discussion by listing the cognates below.

Baltic:	Latv. *suns*,[42] OPru. *sunis* 'dog;' PB **śō*
other IE:	Gk. κύων, gen.sg. κυνός, OIr. *cú*^{L}, gen.sg. *con*, Skt. *śuā́*, gen.sg. *śunás* < PIE nom.sg. **k̂u̯(-)ón-s*, gen.sg. **k̂u(-)n-ós*

The Latvian and Old Prussian forms are considered to have generalized the accusative stem as most other root nouns did. The remaining cognates (Greek, Old Irish, Sanskrit) all point to the long vowel **ō*. Especially, the fact that the Old Irish ending *-ú*^{L} does not cause nasalization, but rather lenition of the initial consonant of the following word, is suggestive of a loss of **-n-* following **-ō-* at an early stage. Therefore, the suffix and ending in nominative singular is considered to have

[42] A form *suo-* is found in *suo˙vã*, which is only used to call a dog, in Latvian (ME 1135). Therefore, this cannot be taken as a solid piece of evidence for Latv. *suo* 'dog,' since the form is not found as a simplex with its paradigm, and this belongs to a special group of words for calling animals (vocative interjection), e.g., Lith. *žiùr žiùr* (for geese), *sà* (for dogs), etc.

undergone the following sound change in PIE, and it was already a long vowel at a late PIE stage:

*-on-s > *-ōn > ō / __ #

(Szemerényi 1996: 115ff.; Jasanoff 1989: 138)

Consequently, *$\hat{k}$uō with a long vowel can be reconstructed for late PIE. Certainly Greek and Sanskrit attest Lindeman's disyllabic variant *$\hat{k}$u̯uō (> Gk. κύων, Skt. *śuvā́*), but a Lithuanian form can be derived from the monosyllabic variant, since otherwise the disyllabic variant would have given rise to ✗*šuvù* or ✗*šuvuõ* (with *n*-stem ending).

The long vowel in the monosyllabic variant could receive the acute quality in PBS, which contradicts the fact that it is actually attested by the circumflex tone in Lithuanian. A possibility that the circumflex tone is due to MC can be justifiably assumed. The following chart describes the chronological changes that happened to the paradigm of 'dog.'

	'dog'		
	nom.sg.	acc.sg.	gen.sg.
PIE	*$\hat{k}$u̯(-)ón-s *$\hat{k}$u̯ṓ	$\hat{k}$u̯ón-m̥	*$\hat{k}$u(-)n-ós
PBS	assibilation of *$\hat{k}$, extension of syllabic resonant		
	*śu̯ṓ	śu̯ónim	*śu(-)n-ós
	acute assignment		
	*śṓ[43]	śónim	*śun-ós
	MC		
	*śõ̃	śónim	*śun-ós
	generalization of *i*-stem?		

Table 4.9: Historical shift of the paradigm of 'dog'

Compared to the cases where the accusative stem took over all the forms throughout the paradigm as 'wild animal' and 'nose,' this may provide an interesting case where a trace of MC can be persistently preserved when the generalization of the accusative stem according to the *i*-stems has failed.

[43] *u̯ disappeared between a sibilant and a vowel: cf. Lith. *sesuõ* 'sister' ∼ Skt. *svásar-*, Goth. *swistar.*

4.2.4.3 *žmuõ* ‘man’

The word *žmuõ* is an archaic Old Lithuanian form attested in the writings of Daukša, Sirvydas, and Bretkūnas. It is still found in the Lazūnai dialect (*žmuɔ·i*), but has been replaced with *žmogùs* (3) elsewhere. The attested inflectional forms include: nom.sg. *zmuo*, acc.sg. *žmúnį / žmûnį*, nom.pl. *žmónes*, gen.pl. *žmónių / žmonių / žmônių / zméniu / žmuonių / žmoúnių*, dat.pl. *žmónêmus / žmonémus / žmónemus*, acc.pl. *žmónes*, instr.pl. *žmónémis / žmonémis / žmónemis* (Kudzinowski 1977: II, 473ff.). Also in Old Prussian, *smoy* ‘man’ (Elbing Vocabulary) and *smūni* ‘person’ (IIIrd Catechism) are found. Stang (1966: 226) assumes that *ū* in OPru. *smūni* corresponds to **ā* in *žmonės* (nom. pl.), but not to *û* in *žmûnį* (acc.sg., Daukša). He supposes that *û* in *žmûnį* probably represents short *u*, after the analogical model of *šuõ* (nom.sg.) : *šùnį* (acc.sg.) = *žmuõ* : X. For the root vocalism **ā* in the plural paradigm, he considers the plural formation of a feminine abstract noun (**žmānė-*) meaning ‘personal figure.’ Thus, the root vocalisms of the inflectional forms, except in the nominative singular, are secondary.

This noun is obviously not a reflex of a PIE root noun. Nussbaum (1986: 187ff.) analyzes it as a de-locatival *n*-stem derivation from an amphikinetic noun nom. sg. **dʰégʰ-ōm* / gen. sg. **dʰĝʰ-(m̥)m-és* ‘earth’ reconstructed by Schindler (1967). The presumed derivational process is as follows: loc.sg. **dʰĝʰ-m-én* ‘on earth’ → **dʰĝʰ-mŏn-* ‘human.’ Nonetheless, its nominative singular form **dʰĝʰ-mon-s* underwent the regular sound changes except for the tone: nom.sg. **dʰĝʰ-món-s* > **dʰĝʰ-m-ố* > pre-Lith. **źmố* > ⋯ > *žmuõ*. Lindeman’s variant of PIE **dʰĝʰ-m-ō*, **dʰĝʰ-m̥m-ō*, is supposed to have produced Goth. *guma* ‘man.’ Since the nominative singular ending is considered to have been a long vowel already in PIE, it is supposed to gain the acute tone, whereas it is attested with the long circumflex vowel, exactly in the same way as *šuõ*. The following table (4.10) can be drawn in parallel with the case of *šuõ*.

As in the case of *šuõ*, the accusative stem did not affect the nominative singular form in Lithuanian.

	‘man’		
	nom.sg.	acc.sg.	gen.sg.
PIE	*$d^h\hat{g}^h$-món-s *$d^h\hat{g}^h$-mṓ	*$d^h\hat{g}^h$-món-m̥	*$d^h\hat{g}^h$-m̥n-és
PBS	assibilation of *$\hat{g}$, extension of syllabic resonant		
	*źmṓ	*źmón-im	*źimn-és
	acute assignment		
	*źmṓ	*źmón-im	*źimn-és
	MC		
	*źmõ̃	*źmónim	*źimn-és
	generalization of *i*-stem only to obliques?		
	*źmõ̃	*źmónim	*źmoni-és

Table 4.10: Historical shift of the paradigm of ‘man’

4.2.4.4 Summary

The circumflexed long vowels as the phonological outcome of the PIE long vowels in monosyllabic forms including those two *n*-stem nouns motivated Hanssen (1885) to assume that they provided the model for the long circumflex ending *-uõ* of consonantal stems in the nominative singular. Although the possibility that only two *n*-stem forms could have had an analogical influence over all the remaining *n*-stems and *s*-stems, there are a couple of favorable arguments.

First, the word-initial syllable is known to have a remarkable phonological privilege (Beckman 1998: 52ff.). This fact is explained by psycholinguistic studies indicating that it “plays a key role in lexical access, word recognition and speech production” (Beckman: id.). One of these initial syllable privileges is to preferentially fail to undergo an otherwise regular phonological process. Many cases of this kind are found cross- linguistically,[44] which allows us to posit a positional faithfulness

[44] Becker, Clemens, Levine, and Nevins (2011) conducted a survey on this constraint in Tamil, Turkish, Portuguese, and French. Among their examples are: Tamil *miːn* ‘fish (sg.)’ ∼ *miːn-gə* (pl.), *maːn* ‘deer (sg.)’ ∼ *maːn-gə* (pl.), as opposed to *makən* ‘son (sg.)’ ∼ *makə***ŋ**-*gə* (pl). Also, Barr (1994: 527ff.) points out that while animate *s*-stems in Latin usually underwent an analogical change in the nominative singular (e.g., *honōs* → *honō***r** ‘honor’) due to their genitive forms affected by rhotasism (**honōsis* > *honōris*), monosyllabic *s*-

constraint, IDENT-σ_1(F). This means that the segments in the first syllable in the input should remain identical to those in the output (Beckman 1998: 56). I propose that this played a role in preserving the ending *-$\tilde{o}$, which was phonological in the monosyllabic forms (where the ending is a part of the first syllable). In other words, the faithfulness constraint prevented the long vowels in these monosyllables from being glottalized (if that was the phonetic feature of acute nuclei), which may have provided a cue with the absolute final plain long vowels to merge with the non-acute long vowels rather than to glottalized vowels.

Also, there is an interesting case from Sogdian where the nom.-acc. plural ending observed in animal names has been generalized from the word for 'dog,' Sogd. *(')kwt-*, which must have been one of the most frequently used animal names (Sims-Williams 1979: 343–344). Sogdian had a few types of plural endings, among which were *-yy* and *-yh/y'*: *qwt-yy* 'dogs,' *'spy-y* 'horses;' *'kwtyh* 'dogs,' *'spyh/'spy'* 'horses.' The latter three forms appear exclusively in Buddhist texts. These endings are characteristic of animal terms of light syllables and derived from *-yĭ* and *-yă*, respectively. Sims-Williams (1979) mentions a view that these endings must have been generalized to animal names in general from the word for *(')kwt-* 'dog.' However, the spread of the nom.-acc. plural endings, *-yĭ* and *-yă*, may not be solely attributed to *(')kwt-* 'dog,' since there were some other animal names that could have originally had those endings, e.g., **uštrī-* 'she-camel,' or **xarī-* 'jennet.' A similar phenomenon may be seen in Lithuanian in the fact that both *šuõ* and *žmuõ* were basic words and could have facilitated the spread of the ending derived from them.

Therefore, despite its disadvantage in the number, the potential influence of the monosyllabic words on the category to which they belong may be worth considering.

stems were resistant to this change, and forms like *flōs* 'flower,' *rōs* 'dew,' *ōs* 'mouth,' etc. are retained as such or are affected by the rhotasized genitives later than other categories.

4.3 Particles/Prepositions

As mentioned in the introductory part of this chapter, particles are often listed as examples of Monosyllabic Circumflexion. In this chapter, those particles/prepositions that have been mentioned in previous studies, in addition to the ones found in Dunkel (2014), will be taken up and discussed. The list of items to be discussed is found on p. 79.

In the following sections, the cognates and etymologies of the particles are discussed in accordance to how far back they can be traced. Those that have a good Indo-European etymology are discussed under §4.3.1, whereas those that can be traced back only to Proto-Baltic are discussed under §4.3.2.

4.3.1 Old Particles

Some particles, especially prepositions, exhibit variations in length and/or tone in Baltic (also in Slavic), e.g., Lith. *ne / nẽ* (negation), Latv. *ne / nê*, OCS *ne / ně-*, Skt. *ná*, Lat. *ne-que / nē*; Lith. *nuõ / núo- / nu-*, Latv. *nùo / nuõ / nu-* 'from.'

The origin of such variations have been variously discussed so far — Monosyllabic lengthening in PIE, compounding with another particle including an adverbial particle **-h_1*, and a Balto-Slavic morphological process involving metatony (to be discussed in §4.3.1.1).

Monosyllabic lengthening in PIE was observed previously by Hirt (1921–1937: II, 227). Recently, Kapović (2006: 151ff.) discussed this same phenomenon, giving substantial examples that allow us to reconstruct the phenomenon in PIE. Byrd (2015: 113ff.) further shows that the phenomenon can be phonologically motivated by "minimal word requirement," which means a word bearing a stress must consist of at least two moras, combined with the possible extrasyllabicity of the consonant in coda. However, Dunkel (2014: I, 86) argues against the existence of this phenomenon, as there are some particles that do have short and long variants, while there are others that never show such variants, e.g., **-de* 'in addition; on the other hand,' **-(s)k^{w}e* 'and,' **i̯o* 'in addition, and,' etc. He assumes that the long variants of the particles that have short / long variants can be explained as combinations with other particles; for example, for **nō* 'onto' beside **no*, a combination of **no* and a directional particle **-o*, and for **nū* 'now' beside **nu*, a combination of **nu* and a modality particle **-h_1* are suggested. Yet, the particles that

he names as the ones that never show lengthening seem to include many clitics (**-de* and **-(s)k^{w}e*), which rarely bear an accent.

There is no substantial clue for deciding which of the two processes (monosyllabic lengthening or compounding with another particle) caused the long variants to those particles. Since this thesis does not aim at identifying the origin of the variants in different lengths, the following discussion will instead focus on whether there is evidence of PIE or PBS forms with a long vowel. It is more important for the current discussion on MC whether the ancestral forms of the possible examples of MC were in the environment of MC or not at a Proto-Balto-Slavic stage.

4.3.1.1 Prepositions

As briefly mentioned above, Baltic (and Slavic) prepositions exhibit an alternation when they are used as a verbal prefix or nominal prefix, e.g., verbal prefix *nu-rašýti* 'copy' : nominal prefix *núo-bara* 'lamb's wool (collected in spring)' : preposition *nuõ* 'from;' *pri-tarti* 'to approve' (*prì-taria* [3pres.]) : *príe-taras* (1) 'prejudice' : *priẽ* 'about;' *pra-skìnti* 'clear away' : *pró-skyna* (1) : *prõ* 'through;' *pa-sùkti* 'to turn' (*pà-suka* [3pres.]) : *pó-sūkis* (1) 'turn' : *põ* 'after, under,' etc.

Traditionally, the short variants of the verbal prefixes are explained as proclitic shortening (Endzelīns 1971–1982: I, 504–509; Zinkevičius 1980–81: II, 186). The shortening must have taken place after the diphthongization of the old long vowel **ō* to give rise to *nu-* from *nuo-*. While Endzelins assumes that the acute tone in the nominal prefixes is original and the circumflex tone in prepositions is the result of a secondary treatment in the word-final position, Zinkevičius maintains that the acute tone of the morphemes turned to the circumflex tone in monosyllabic forms, such as prepositions.

Petit (2011: 261ff.) disagrees with this idea, pointing out two problems. First, most of the prepositions that Zinkevičius reconstructs with a long acute vowel **pā́, *prā́, *príe, *pér, *núo* are not paralleled by their cognates in other Indo-European languages in terms of the long vowels. For example, **prā́* (Lith. *prõ*) has cognates with a short vowel, e.g., Gk. πρό, Skt. *prá*, OIr. *ro*. Only **núo* has cognates with a long vowel, e.g., Gk. ἄνω, Sl. *na*. Second, proclitic shortening for the verbal prefixes is only valid in Lithuanian and not compatible with the Latvian and Slavic data.

Alternatively, Petit proposes that the ancestral forms with short vowels for the prefixes/prepositions was lengthened only when it was used as the nominal prefix. This starting point of the system can be supported by the Slavic facts as well (cf. Le Feuvre 2011: 202ff.).

	verbal prefix (short)	nominal prefix (lengthening)	preposition (short)
Sl. OCS	**pŏ-* > *po-* *po-mьrěti* 'remember' SCr. *pä-met*	**pō-* > *pa-* *pa-mętь* 'memory'	**pŏ* > *po* 'after, by'
Sl.	**prŏ-* > *pro-*	**prō-* > *pra-* OCS *pra-dědъ* SCr. *prä-ded* 'great-grandfather'	**prŏ* > *pro* 'through'
	Ru. *pro-solít* 'to salt'	*prá-sol* 'merchant of salted products'	

Petit assumes that the circumflex tone in the verbal prefixes and prepositions with a diphthong, e.g., *priẽ* and *peñ*, reflects a short diphthong, while the acute tone in their variants as nominal prefix *príe-* and *pér-* reflects long diphthongs. This provided a metatony model with the system of nominal prefix and preposition, where *métatonie rude* takes place on the nominal prefix. On the other hand, the nominal prefixes with a long monophthong directly reflect the lengthening that took place to them, while their verbal prefix remains short. This gave rise to a quantitative model of the system of verbal prefix and nominal prefix, where verbal prefixes remain short as opposed to the long acute nominal prefix. It further caused a secondary shortening to some verbal prefixes, such as **priẽ-* to *pri-* above. The metatony model and quantitative system can be drawn as follows, after Petit (2011: 268):

verbal prefix (short)	nominal prefix (lengthening)	preposition (short)
secondary short vowel	acute tone	circumflex tone
prěi- > *priẽ-* (→ *pri-*)	*prḗi-* > *príe-*	*prěi* > *priẽ*

Table 4.11: Metatony model for nominal prefix : preposition

verbal prefix	nominal prefix	preposition
(short)	(lengthening)	(short)
grave accent	acute tone	secondary circumflex tone
		after the metatony model
*pŏ- > pa-	*pō- > *pó-	*pŏ → *põ̃

Table 4.12: Quantitative model for verbal prefix : nominal prefix

Petit considers the possible factors of such a lengthening in nominal prefix to be a root-initial laryngeal of the nominal stem, or a voiced unaspirated stop in the root initial position via Winter's Law. In fact, such a lengthening of a prefix is shown by Petit (2004b: 259ff.) in the case of Lith. *sū́drus* (3, 1) / *sūdrùs* (3) 'robust, solid' < *$h_1$su-drú- 'made of wood,' also Skt. *sudrú-* 'made of wood.' Le Feuvre (2011) also suggests that the acute tone of the Slavic nominal prefix **sǫ́-* (cf. SCr. *sȕsed*, Slov. *sósẹ́d*, OCS *sǫ́sědъ* 'neighbor') contrastive to its variant in verbal prefix **sъ(n)-* (cf. OCS *sъ-staviti* 'to establish') is likely to have been lengthened by a root-initial laryngeal or a voiced unaspirated stop of the nominal root via Winter's Law. She adduces OCS *pažitъ* 'pasture' (< **po-g^{w}ih$_3$-ti*), where Winter's Law is expected to operate to lengthen the nominal prefix for support.

This hypothesis provides interesting consequences as well. Petit (2011) claims that the vowel lengthening present only in the nominal prefix implies that the univerbation of a prefix and a noun can be traced back to the earliest stage of PBS, while verbal prefixes were not univerbated but autonomous, escaping the effect of the lengthening. He finds the confirmation of the correctness of his assumption in the pairs like *pà-žada* 'promises' ∼ *pã́-žadas* 'promise;' *prà-neša* 'announces' ∼ *prã́-našas* 'prophet.' Lithuanian short vowels *a* and *e* are subject to a recent phonological development of lengthening under an accent in a non-final open syllable (cf. footnote 2 in CHAPTER 2). The nominal prefixes in *pã́-žadas* and *prã́-našas* reflect this phonological change, whereas the verbal prefixes in *pà-žada* and *prà-neša* do not. This means, according to Petit, that the nominal prefix had already been univerbated with the nominal stem, whereas the verbal prefix had not. This indicates that the univerbation of verbal prefix and verbal stem took place quite recently in Lithuanian.

This argument is insightful for the origin of the alternation of verbal

prefix / nominal prefix / preposition in Balto-Slavic. However, it leaves out a number of forms that do not fit the picture. For example, there are many nominal prefixes with short vowels that are not derived from prefixed verbs: e.g., *pradievas* 'charity,' *pratarmẽ* (3^b) 'preface,' *pãdaubis* (1) / *padaubỹs* (3^b) 'place by a ravine, *pagálvė* (1) 'pillow,' *pajū́ris* (1) 'seaside.' It is especially the case that when OPru. *passons* 'stepson,' *potowelis* 'stepfather,' *poducre* 'stepdaughter,' *pomatre* 'stepmother' compared to Lith. *pó-sūnis* (1) 'stepson,' *pó-dukra* (1) 'stepdaughter,' are included in the data, Petit's analysis does not cover them all. Yet, example like Lith. *sū́drus* (3/1) / *sūdrùs* (3) 'robust, solid' < *$h_1$su-drú- convincingly describe the factor of the possible lengthening in the nominal prefixes. Thus, the distribution of the long and short variants among the nominal prefixes alone must currently remain unsolved. It is interesting, though, that all the prepositions have the circumflex tone despite the unclear distribution of the tone and length of the prefix variants.

Also, while this hypothesis best explains some of the alternations of *pri- / príe- / priẽ*, *pà- /pó- / põ*, *prà- /pró- / prõ*, some particles still suggest that their underlying forms were present at the beginning of the system of the prefix / preposition. In what follows, we will look into such cases, examining how the operation of MC in PBS (cf. §4.2) can be related to them.

***nuõ* 'from'** As Petit (2011: 262) remarks, the protoform(s) of this preposition probably had a long vowel in PBS and even in PIE, as indicated by its cognates, e.g., Latv. *nùo* (ME II, 755), OPru. *no*, *na*(< PB **nō*),[45], OCS *na*, Ru. *na* (< PS **na* 'on(to), in(to)' < PBS **nō*), Gk. ἄνω 'above, onto' (Fraenkel 1962–65: 511).

In Dunkel (2014: II, 52ff.), a few more materials are related. Among them is Latv. *nuõst* 'away' < **nō-steh$_2$-*. This Latvian adverb is formed according to a type of adverbial formation, which is discussed in Forss-

[45] PEŽ (III, 162, 192ff.) mentions the etymological relationship between the preposition **nō* and the Baltic illative suffix **-nă̆*. However, it probably cannot stand with East Baltic forms because of phonological difficulties (**nō* would not give rise to **-nă̆*), and also because an adverbial ending **-na* (in modal or instrumental meaning) is attested in other IE languages: Gk. ἵνα 'where; so that,' Hitt. *ištarna* 'right in the middle of' (with another particle **enstér* 'in the middle, between' Dunkel 2014: II, 237), Skt. instr. ending *-ena* (*kéna*, *téna*, etc.), as cited in Dunkel (2014: I, 149).

man (2003: 97ff.) in detail. Forssman (ibid) recognizes a group of adverbs that are formed with prepositions and one of the suffixes *-tiā-, *-iā-, and *-stā-.[46] The examples are:

(49) a. Latv. *pruôjām*[47] 'away' ← (PB) preposition **prō* 'forward, forth, early (in the morning)' + suffix **-iā-*;

b. Latv. *nuõst* (*nuôst*[2]) ← (PB) preposition **nō* 'from' + **-stā-*;

c. Latv. *bešā, bešū, bešu, beš* 'alone, solely' ← preposition *be* 'without' + suffix **-tiā-*.

These derivatives provide a piece of evidence that the prepositions received acute tone in the polysyllabic environment. These Balto-Slavic cognates indicate a PBS **nō*, and Greek form allows a reconstruction of PIE **nō* 'upwards, above.' The meaning is considered to have developed from 'from above' with the genitive form used in an ablative sense to the current meaning in East Baltic (Fraenkel 1929: 102–103).

PIE **nō* is further analyzed as **no-o* with a directional particle **o* in Dunkel (2014: I, 154,156; II, 52).[48] While the source of the length can be explained by Petit's hypothesis as well, it is certain that the Balto-Slavic cognates point to an ancestral form with a long vowel as a preposition. Despite Petit's hypothesis that the lengthening was originally introduced only to the nominal prefix, the East Baltic system for this particular item seems to indicate that the length existed in the morpheme in all three functions:

[46] The suffix **-stā-* is analyzed as being derived from a verbal root **steh*$_2$- 'to stand' in Dunkel (id.).

[47] Lith. *prúojais* 'for naught' (cf. *prúojais eĩti* 'come to naught, decay') is a loan from the Latvian form (Skardžius 1932: 52).

[48] **no* without the directional particle **o* is found in a nominal composition **nó-h*$_3$*k*^{w}*-o-* 'looking above/seen above' (> Skt. *nā́ka-* 'heavenly vault,' OCS *vъznakъ* 'on one's back'). The directional particle **o* is attested in **(-)io* 'and' (> PCelt. **-io* (a relative particle); Goth. *ja*, OHG *ja*, Toch. A. *yo*; OCS *ješte* 'also, withal'), and verbal prefixes, **pró* 'forward' (> Hitt. *parā*, Gk. πρό, Goth. *fra*, OCS *pro*, Lith. *pra*), *apó* 'back' (Gk. ἀπό, Lat. *po-*, Goth. *af*, OCS *opaky* 'again'), **súpo* 'down' (Gk. ὑπό, Gaul. *uo-*, OIr. *fo*), etc. (Dunkel 2014: I, 154ff.).

	verbal prefix	nominal prefix	preposition
Lith.	(**nuo-* →) *nù-*	*núo-*	*nuõ* 'from'
	nu-rašýti 'copy'	*núo-rašas* (1) 'copy'	
Latv.	*nùo-*	*nuõ-*	*nùo* 'from'
	nùodalît 'to separate'	*nuõdaļa* 'section, chapter'	

It is therefore also possible to assume that the nominal prefix remained acute in polysyllabic environment, whereas the preposition underwent MC in PBS (cf. §4.2). This can be supported by the acute tone of the items in (49a) and (49b),[49] which show that the prefix/preposition with a long vowel can be reflected with acute tone in the polysyllabic environment. The circumflex tone in the Latvian verbal prefix can be explained by assuming that **nō* was univerbated with the verb after MC, and therefore it retains the circumflex tone.

Petit, denying MC, allusively assumes that the circumflex tone in the preposition was introduced by the metatony model (table 4.11). However, it is also possible to assume that it reflects the operation of MC in PBS, as **nō* was in its environment. It is also worth considering that the circumflexed **nō̃* provided the metatony model in table 4.11 for the prefixes/prepositions with a long monophthong.

***põ* 'after, by,' *prõ* 'through'** As discussed in Petit (2011: 261ff.) and above, Balto-Slavic seems to have inherited short ancestral forms for prepositions **po* and **pro*, and Lith. *prõ* in fact exhibits a secondary ablaut or neo-lengthened grade to *ă* (< PIE **o*), cf. Endzelīns (1944: 150), with *põ* after the model of PB **pra-* : **prā* (id. 146). The original long **prō-* is preserved in a nominal derivative Latv. *pruôjâm* 'away.'

Petit proposes that **pā* and **prā* were introduced based on the metatony model provided by **préi-* : **preĩ*. However, as discussed under *nuõ* above, the case of *núo- / nuõ* can provide a more straightforward model. Furthermore, while *põ* does not have any prepositional cognates in a long vowel, *prõ* has some cognates which indicate the length in PIE, e.g., Lat. *prō*, OHG *fruo*. This allows us to start from a long preposition **prō*, which can still provide the metatony model PB **pra* :

[49] The preposition in (49a), which is not preserved as a preposition in Lithuanian, is reconstructed as **pro-o* 'forward, forth,' with the directional particle **o* (Dunkel 2014: II, 639). Petit (2011: 264) assumes that this is the preservation of old **prṓ* with the lengthening having been taken over by **prā́*.

**prṓ* through the operation of MC on PBS **prṓ̱*, whose circumflex tone can be continued by the new **prā̃*.

Thus, the two cases, *nuõ* and *prõ*, can be seen as providers of the metatony model for prefixes/prepositions with a long monophthong under the assumption of MC.

peĩ* 'through'** Lith. *pér-/peĩ* (dial. *pár-/paĩ*) is equated with Latv. *pãr* 'through' (Fraenkel 1962–65: 572; ME III, 147ff.). The different quality of the vowels between Lith./Latv. dial. *pa**r and std. Lith. *pe**ĩ*** has been explained either as ablauting forms (Endzelīns 1923: 518) or by an unestablished sound change *er* > *ar* in an unaccented position (cf. Stang 1966: 33).

Contrary to the case of *nuõ* and *priẽ*, the Latvian form has the acute tone both as a preposition and a prefix, and Lithuanian has the acute tone as a verbal and nominal prefix as follows. Old Prussian and Slavic data are included in the table:

verbal prefix	nominal prefix	preposition
Lith. *pér-*	*pér-*	*peĩ*
pér-rašyti 'to rewrite'	*pér-raša* 'transcription'	
Latv. *pãr-*	*pãr-*	*pãr*
pãr-runât 'to discuss'	*pãr-runa* 'discussion'	
OPru. *per-*	*pēr-*	*pēr*
per-ēit 'he comes'	*pērgimmans* 'creatures' (acc. pl.)	
OCS *prě-*	*prě-*	(*prědъ*)
prě-imti 'to take'	*prě-gynja*	
	Ru. *pere-ginja* 'unpassable area of forest'	(*péred*)

The acute tone throughout the Latvian forms is explained by assuming that Latv. *pãr*, which is a short form of the adverb *pãri* 'over,' is used instead of the original *par* on the ground of the dialectal situation (see Endzelīns 1923: 517ff, 1951: 670ff). In many dialects (Valmiera, Rauna, Drusti, etc.), only *par* is found, but in some other dialects (Ogre, Brocēni, etc.), *pãr* is also used beside or instead of *par*. The adverb *pãri* is in fact often shortened to *pãr*. The even (acute) tone of Latv. *pãr* could in this way be considered secondary after the adverb *pãri*, just as *caũr* 'through' after *caũri* 'through (prep.)' is. However, the source of

the acute tone in the adverb *pãri* remains unclear.

Endzelīns (1923: 518ff, 1951: 671ff) further mentions *pér̃eiti* 'go over' in Dusetos dialect for std. *péreiti* and *pér̃sopėjo* 'stopped aching' in Kupiškis for std. *pérsopėjo*. Dusetos *pér̃eiti* and Kupiškis *pér̃sopėjo* alone allow a reconstruction of PIE **pēr*, otherwise **per* 'through.' This could have arisen as a parallel form to the dialectal variant *ýš-*, which has been lengthened under stress, involving *métatonie rude*, as mentioned in Kazlauskas (1968: 50). Therefore, the long *pér-* found in at least two Lithuanian dialects is not likely to point at a PIE **pēr*. The reconstruction with a short vowel **per* is supported by the IE cognates including OPru. *pēr, pēr-*, PS **per/*per-* 'over, through,' Goth. *fair*, Lat. *per* 'through,' etc.

According to Petit's (2011) proposal, the long vowel was originally supposed to be introduced to the nominal prefix. Feuvre (2011: 212) suggest that in this particular case the Lithuanian acute *pér-* for verbal prefix may have been adopted from the nominal prefix *pér-*, through the pairs like *pérėja* 'pass' : *pér-eiti* 'to go through.' Yet, this case is remarkable in that the alternation introduced by the lengthening only in the nominal-prefix is almost completely eliminated in most of the Balto-Slavic languages except in Lithuanian. In Lithuanian, it seems to adhere to the metatony model for nominal prefix and preposition, while, as a diphthong, it cannot support the quantity model after the shortening of long diphthongs.[50] In Latvian, the alternation is eliminated by generalizing the acute tone for all three forms. Also in Old Prussian, the alternation is eliminated by generalizing the circumflex tone. In Slavic too, the alternation is given up by generalizing the short diphthong (OCS *prě- / prě*, Ru. *pere- / péred*; SCr. *pred* [preposition]).

However, if we look at the data without any theoretical presumptions, the acute tone seems to have been introduced to the nominal and verbal prefixes only in East Baltic. In fact, as Kazlauskas (1968: 50ff.) discusses, the Lithuanian data present a more complicated situation than Petit describes: the nominal suffix occurs in circumflex tone in some

[50] Beside Osthoff's Law shortening in the environment of $\bar{\text{V}}\text{RC}\cdots$, there seems to be another shortening which took place in $\bar{\text{V}}\text{R}(\#)$ at a later stage, as shown by gen. pl. ensing *-ų* < **-uom* < **-ōm* < PIE **-oHom*; m. dat. pl. *-ui* < **-uoi* < PIE**-ōi*. Since these endings are non-acute syllables, this shortening was irrelevant to Leskien's Law.

nouns (cf. *peřkasas* (3^b) 'canal,' *peřmatas*[51] 'a fishing device to capture burbot [fish]'), even when the corresponding verbal prefix is in acute tone (cf. *pérkasti* 'to dig across,' *pérmesti* 'throw over'). Kazlauskas assumes that these exemplify the cases where the semantic specialization prevented the nominal prefix from adopting the acute tone of the verbal prefix. If Kazlauskas is right, acute tone may have been first introduced not to the nominal prefix but to the verbal prefix in the case of **per-*. However, it is unclear how acute tone was introduced, and whether it was already adopted in the preposition in Proto-East-Baltic or only in Latvian. If the acute tone was already transferred to the preposition in Proto-East-Baltic, the circumflex tone of Lithuanian *peř* could reflect the operation of *métatonie douce* in monosyllables in Lithuanian. Yet, this case remains ambiguous because of the speculative nature of this argument.

4.3.1.2 Other Particles

***nū̃* 'now'** Lith. *nū̃* has two synonyms, *nūnaĩ* and *nū̃n*. *nū̃n* is equated to Gk. νῦν by Trautmann (1920: 251), and also they are treated together in Fraenkel (1962–65: 509). However, Dunkel (2014: II, 580[25]) argues that the identification of Lith. *nū̃n* and Gk. νῦν from PIE **nū-n* is incorrect, since there is no such adverbial ending as **-n*, and the existence of Lat. *num* 'whether'[52] implies that the Greek and Latin forms should be from PIE **nuh*$_1$*-m*, which would not have given rise to Lith. *nū̃n*. He suggests that Lith. *nū̃n* is probably syncopated from *nūnaĩ*.

Therefore, *nū̃* should be equated to the following cognates without

[51] The accentual paradigm of this word is unspecified in LKŽ.

[52] For the semantics of Lat. *num*, Dunkel (2014: II, 579[18]) explains that the primary meaning 'now' that used to belong to older *num* was taken over by a newer and longer *nunc*, while a secondary meaning 'whether' is left to the older *num*, according to Kuryłowicz's 4th law of analogy (cf. Kuryłowicz 1949: 30). The development of such secondary meaning (temporal > interrogative) may have occurred in a question expressing amazement or wonder. Lühr (1997: 340) gives a parallel case in Old High German and Latin: e.g., Otfrid III, 18, 33, *Bistú* ***nu*** *zi wáre furira Abrahame?* '(with a surprise) are you greater than Abraham?;' Plautus, Amphitruo 753, ***num*** *tu quoque etiam insanīs, quom id me interrogas?* '(with a surprise) are you crazy to ask me for this?'

any adverbial ending, e.g., Latv. *nù*[2],[53] *nòu*[2],[54] Ved. *nū́*, YAv. *nū* (< PI-Ir. **núH*) and Alb. *-ni* (the 2nd.pl. ending of the imperative; < PIE **nú-h*$_1$) (Dunkel 2014: II, 578), where Pal. *nū́*, Lat. *nūper* 'recently, lately' probably belong to. The morpheme **-h*$_1$ is reconstructed as one of many adverbial endings in Dunkel (2014: I, 21, 127ff.). Its function is modal and instrumental, which is assumed in the stative suffix **-eh*$_1$- (in full grade) and instrumental case ending **-(e)h*$_1$. This suffix is considered to be the cause of monosyllabic lengthening of some adverbials in Dunkel's (id. 86) framework. On the other hand, the length of **nū́* can be assumed to be caused by Monosyllabic Lengthening (Kapović 2006: 152; Byrd 2015: 113), as it is in its environment, i.e., under stress and monosyllabic.

Both hypotheses provide PBS **nū́*, which could be assigned the acute feature without MC. Therefore, the circumflex tone of Lith. *nū̃* and Latv. *nòu* appears to be a good example of MC.

***võs* 'hardly'** Lith. *võs* is found beside disyllabic *advõs* and *adva*. Previous studies relate this item to OCS *jed(ъ)va* 'hardly' (Fraenkel 1962–65: 1274; Derksen 2008: 139–140; Dunkel 2009; ĖSSJa: VI, 16). Some more Slavic cognates are cited in ĖSSJa: Bulg. *edvá, edvám*, Ru. *edvá*, SCr. *jèdva*; Čak. *jedvä*. Derksen (2008) proposes **ed(ъ)vā́* with a final acute syllable for Proto-Slavic. In order to explain the Slavic reflexes that point to the acute tone of the last syllable in these cognates under the current discussion, Derksen (2008: 139–140) reconstructs a PBS form with a laryngeal: **edvaHs*. However, any convincing evidence for the laryngeal is not provided. PS **ed(ъ)vā́* seems to be supported by the last syllable of Čak. *jedvä*, considering that the Russian

[53] It is attested in Alūksne (E), Vārkava (E), and Krustpils (E) (ME II 754), and also in Kaldabruņa (E), Liepna (E), Līvāni (E), Lubāna (E), Pilda (E), Skaista (E), Sunāksts (E), and Varakļāni (E) (EH II 29).

[54] It is mentioned in Endzelīns (1923: 478; 1951: 626) as an East Latvian form, which probably is a form more phonetically accurate, considering that Std. Latv. *ū* corresponds to *ou* in the northern area of E. Latvian. Since the falling tone and the sustained tone merge to a falling tone in East Latvian, the possibility cannot be excluded that the falling tone in East Latvian forms points to an original acute. However, since there is no substantial evidence for an original acute tone found, the problem is pending here, while the first assumption would be that the non-acute tone applies to them.

and Čakavian forms keep the original place of the accent. On the other hand, the tone is hard to reconstruct in the final syllable. Furthermore, in the Čakaivian dialect, an acute tone can be assigned to a non-acute syllable in the word-final position. Therefore it remains unclear whether the last syllable was acute or not in Proto-Slavic.

The Baltic side has only the Lithuanian forms. Yet two of the three forms are of secondary origin: *adva* (Bretkūnas, Sirvydas) is a borrowing from Belorussian, and the dialectal form *advõs* is probably a blend of *võs* and a Slavic adverb **odva* (Fraenkel 1962–65: 2). There are a couple of related forms in Germanic: **-u̯ōz*, which occurs with multiplicative forms as in OIcl. *tisvar*, OHG *zwiror* 'twice,' and Skt. *kṛt-vas* '(multiplicative) time' (< *-*u̯a s*).[55]

On the other hand, Dunkel (2009: 49ff., 2014: 764ff.) gives a detailed etymological analysis to Sl. **ed(ъ)va*. He assumes that it goes back to a PIE protoform comprising three morphemes: **ed u̯a-es*. Since the first morpheme **ed* is attested only in Slavic cognates among the related forms here, **ed* was probably univerbated in Proto-Slavic. It is also found as the first component of **ed oi̯nom* 'that alone' (> OCS *jedinъ* 'one'), which is an anaphoric pronoun **e-d* in the neuter nom.-acc. singular, attested as Hitt. *-at* 'that,' Pal. *-at*, CLuw. *-ata*, Skt. *adás, adó* (< *adá-u*) 'that one' (Dunkel 2014: II, 185). The second **u̯a-* is an allomorph of **(s)u̯a-*, which is etymologically related to Lat. *suăd* 'so,' Goth. *swa* 'so,' probably the quotative particles in Anatolian, Hitt. *-wa(r)* and Luw. *-wa*, Skt. /va/ 'as,' as in *iva* 'in the way as, to the (same) degree as,' *vaí* 'indeed (emphasizing its previous word).' The particle **(s)u̯a-* is reconstructed for PIE, with the meaning 'so, as' (Dunkel 2014: 763ff.). The third **-es* is an emphatic particle, lexically meaning 'entirely, completely, quite, etc.' Therefore, the set of particles **u̯a-es* as a whole means 'just so, barely,' which developed to 'hardly, with difficulty,' through a possible pejoration process, as could be observed in 'he barely managed it' to 'he managed it with effort' (Dunkel 2014: 765[11]).

If **u̯a-es* is taken as the PIE form, **u̯a-es* could have been contracted already in late PIE parallel to m. nom. pl. ending **-o-es* > **-ōs*,

[55] For the reconstructions, see Dunkel (2014: 764). For the semantics of **-u̯ōz* occurring with multiplicatives, Schmidt (1962: 361) explains that this sort of adverb meaning 'just, exactly' can be easily univerbated with a multiplicative in a pleonastic way, as in 'just twice,' etc.

which gave the acute tone in the Balto-Slavic pronominal ending *-ai (see Jasanoff 2009: 56). Therefore, the contracted *u̯ās is expected to be reflected with the acute tone according to the traditional theory. The circumflex tone in Lith. *võs* can be a good example of MC within the framework of the traditional theory.

***tè, tẽ́* (permissive particle)** The Lithuanian permissive particle usually has a short vowel with a short stress accent (*tè*), which corresponds to Latv. *te*. But in some dialects (Kvėdarna, Rietavas, Dusetos, Mosėdis, Salantai), it has a long vowel with the circumflex tone (*tẽ́*). This dialectal form with the long vowel has been equated to Gk. τῆ 'there,' which always initiates an imperative in Homer, and mostly later, often in the sequence τῆ νῦν (Trautmann 1910: 449; Endzelīns 1923: 478; Būga 1958–61: I, 454[2]; Fraenkel 1962-65: 1071; Dunkel 2014: II, 789).

The relationship between the short *tè* and dialectal *tẽ́* has long been a topic of discussion. Hirt (1892: 29) suggests that the short *tè* has been shortened from **tē*, which presumably goes back to the locative form **tēi*. However, Streitberg (1892: 270ff.) disagrees with Hirt on the possible shortening, considering that the protoform in the locative would give rise to *ti* in Lithuanian after shortening; instead, the short form can be comparable to OCS *te* 'and' (also SCr. *te* 'and') and should be descended from an originally short form. This insight is also proposed by Endzelīns (1923: 478) and Fraenkel. Endzelīns refers to Persson (1893: 247) for his equation of Lith. *tè* and OCS *te* with Skt. *u-tá* 'and,' Av. *uta*, Gk. ἠΰτε 'as, like as' to support his assumption.[56] Fraenkel assumes that the long form would be reflecting the instrumental form of the pronominal stem **to-*, while the short form is from an originally short **te* based on the same pronominal stem **to-*. In more recent studies, Dunkel (2014: II, 789) agrees with the reconstruction of **te-h*$_1$ 'thus; hortative,' as being of instrumental origin, adducing the following cognates: OAv., YAv. *tā* (hortative), Gk. τῆ (hortative), as well as, Goth. *þe* 'um so,' and OPru. *tīt* 'thus, therefore'[57] with a slightly dif-

[56] Gk. αὖτε 'again' can be added here as well for its apophonic relation to Skt. *utá* (**h*$_2$*éu-te* ∼ *h*$_2$*u-té* 'in addition, and,' cf. Dunkel 2014: II, 337).

[57] OPru. *tīt* is analyzed as consisting of two parts: *tī* and *-t* (Trautmann 1910: 449, adopted by Mažiulis 1993–97: IV, 195). The first part *tī* is equated to the remaining cognates mentioned above, while the second part is equated to Slavic **-to* continued by Cze. *tak* 'so,' *takto* 'thusly.'

ferent modal sense. Yet, the short form is not discussed in detail, seemingly assumed to have been shortened from the long form possibly in the proclitic position.

Thus, it has not been agreed on whether short *te* is shortened from long **tē* or not. It is quite possible, on the one hand, for the long form *tẽ́* to be shortened in the proclitic position, considering its proclitic usage as a permissive prefix (*tedirba* or OLith. *tedirbiẽ* 'let him/her work'). Yet, if we look into the usages of the particles in Lithuanian, it seems that Streitberg, Endzelīns, and Fraenkel are correct in assuming that *tè* and *tẽ́* descend from different protoforms. In what follows, I will provide a solution from a different point of view on this problem.

LKŽ provides the primary usage of Lith. *tè*, which is equated to Latv. *te* in the locative sense, the same as *teñ* 'there,' as in *tè užaugau i už vyro tè išėjau* 'I grew up there and I got married to a man there;' *nei čia, nei te* 'neither here nor there;' *kur padėsi, tè bus gerei* 'where you'll help, there it'll be ok.' As a variant form, *tę* is attested in some dialects (Šakiai, Druski-ninkai, Seinai [in Suvalkai province], and Šakyna [in Šiauliai province], etc.); *tè* can be best interpreted as being shortened from a locative adverb *tę* (< *ten*), which is etymologically analyzed as an ablauting accusative form **te-m* in Schmidt (1962: 97), an illative form in Forssman (2003: 152), or a shortened form of OLith. *tenai* 'exactly there' (< *te* 'there' + *-nai*[58]) in Ostrowski (2011: 79). This primary function as place deixis of the original *ten* seems to be combined with the imperative mood,[59] highlighting the deictic sense of the propositional meaning, as seen in the following two examples taken from LKŽ:

(50) a. Tè savo knygą, pasiimk.
'there' refl.possess.pron. 'book' acc.sg. 'take' impr.2sg.
'pick up your book there;'

b. Tè, imk sau šitą kvietką.
'there' 'take' impr.2sg. refl.pron.dat. 'this' acc.sg. 'flower' acc.sg.

[58] The morpheme *-nai* is a more recent variant form of an emphatic particle *-ai* (> **eh₂ ih₁*; Dunkel 2014: II, 580[25], also 382[22]), which is also called a focus particle in Nau and Ostrowski (2010: 22).

[59] The imperative mood itself can possess a deictic nature in that there is a covert second person subject, a deictic reference, in imperatives (Levinson 1989: 249).

'here you go, take this flower with you.'

In (50a), the place deixis *tè* (std. *ten* 'there') may just have its original meaning 'there,' indicating the location of the book to be taken. It can be only observed that the place deixis goes in concert with the deictic sense of the propositional meaning '(*you*) take *your* book *there*.' In (50b), on the other hand, because of *šitą kvietką* 'this flower,' *tè* can no longer be taken as a mere place deixis. Rather, *tè* has a pragmatic effect of prompting the addressee to take the flower (cf. English *here you go*), highlighting the deictic sense included in the 2nd person imperative *imk (šitą kviektą)*. This function of highlighting the imperatives may serve as a linkage to its usage in the permissive sense of *tegu, tegul, testà, testáu* 'let,' as in *te Dievas mane nubaudžia, jeigu aš meluoju* 'let God punish me, if I tell a lie,' which is the same as the permissive prefix *te-* in meaning (examples are taken from LKŽ online). In fact, the historical connection between the particle *tè* and the permissive formation is implied in Zinkevičius (1984–95: vol. II, 235). This implication can be supported by some attestations of *te* being used as a permissive particle, juxtaposed to its "host" verbs, as well as already univerbated to the host verbs in Daukša, e.g., *te aug* 'grow,' *tędůd* 'give,' *tę giwen* 'live,' *tę łáuk* 'wait,' etc. (Kazlauskas 1968: 373ff.). As cited here, the spelling *tę* is also found and *tę łáuk* may indicate that the enclitic particle did not bear an accent. It can be seen that the place deixis *ten* was grammaticalized to a particle *te* with a function of prompting the addressee to perform what is indicated by the verbal phrases.

On the other hand, *tẽ́* is usually used as a hortative particle in a sense, as in English 'here you go, please,' e.g., *Tėvai, tẽ́, išgerk* 'father, here you go/please drink;' *Tẽ́, rink bul[v]es* 'here you go, collect the potatoes.' Whereas its meaning is very similar to the permissive particle *te*, there is a difference in their grammatical usages in addition to their origins — *te* occurs typically with a finite verb form (optative [OLith.], indicative present, future, imperative), while *tẽ́* can form an independent phrase by itself, sometimes occurring without a verb belonging to the same constituent: e.g.,

Tẽ́ tẽ́,	meldžamoji,	atiduodu,	tik	nežlembk!
(particle)	'dear' def. voc. sg. f.	'give away' pres. ind. 1sg.	'just, only'	NEG-'gorge' impr. 2sg.

‘Here you go (take it), my dear, I give it away (to you), just don’t gorge it.’

This is obviously reflected by the fact that *tẽ́* keeps its status as a free morpheme, while *te* has possibly developed to a permissive prefix. In this way, the meaning and the usage of these two words are quite different primarily, and they can be similar only when *tè* is used in the sense of *tegu*.

Thus, I conclude that *tẽ́* and *tè* are different lexical items also in the historical sense, with *tẽ́* descended from the old instrumental form **teh*$_1$,[60] and *tè* from a locative adverb *ten* ‘there,’ while Slavic forms can be derived from an originally short form, as Streitberg (1892), Persson (1893), and their followers assume. It is generally agreed that the sequence *VH]$_\sigma$ in **teh*$_1$ produces the acute tone, therefore, the circumflex tone of the particle should be understood as the result of MC. Unfortunately, there is no direct reflex of this form in Latvian, and it is impossible to examine the Latvian accentuation for this case.

***nẽ́* ‘not even’** The Lithuanian emphatic negation particle *nẽ́* is attested with the circumflex tone always, even in compounded forms, e.g., *nẽ́kas* ‘no one.’ There is a short unemphatic form *ne*, which, as well as Latv. *ne* and OCS *ne*, can simply be derived from PIE **né* ‘not’ (Dunkel 2014: II, 534).

On the other hand, there are particles cognate to Lith. *nẽ́* with the long vowel, e.g., OIr. *ní* ‘is not,’ Wels. *ny*, Goth. *ne*, OE *né*, OCS *ně* (a question particle), Latv. *nê* (< PBS **nē*). Dunkel (2014: II, 536) reconstructs **né eh*$_1$ ‘not at all (emphatic negation)’ as consisting of a plain negation particle **né* and an asseveration and word-emphatic particle **eh*$_1$/**oh*$_1$. On the other hand, Kapović (2006: 152) assumes a monosyllabic lengthening for PIE **né* to give rise to a long variant **nḗ*. A PBS form **nḗ* with a long vowel can be assumed according to both hypotheses. Therefore Lithuanian circumflex tone seems to support the existence of MC, while Latvian form seems contradictory.

Endzelīns (1913–14: 105) also discusses the aberrant tonal correspondence of this word, for Lithuanian circumflex tone regularly corresponds to the Latvian falling tone, not the broken tone. He notes an

[60] Nonetheless, we could see their historical connection in that both of them are formed to a PIE pronominal stem **to-*, which is not the topic of interest here.

interesting fact in that the particle has the broken tone even in certain East Latvian dialects where the broken tone of the standard Latvian is supposed to correspond to the sustained tone. He continues arguing that this fact indicates that the tone is not a phonological outcome, but probably a result of an emotional process, that is, the precise negation pronounced with a strong passage break. He quotes a couple of parallels from Slavic and Iranian for its support.

Although this hypothesis of his is hard to refute or examine, this is the only possible explanation for the broken tone of *nê* so far. Nonetheless, it is important that the tone of *nê* does not show a phonological correspondence even within Latvian dialects, as pointed out by him. That at least means that the broken tone of this form should not better be taken as phonological.

***vaĩ* 'woe'** This item is an interjection, with the circumflex variant found in Žemaitian dialects and the acute variant found in West Lithuanian (e.g., Jieznas in Dzūkija and Vertimai in South Žem.), cf. Trautmann (1923: 338). Its Latvian comparanda is *vaî* 'woe.' Their cognates given in Trautmann (1923: 338) are SCr. *vâj* 'woe!,' Goth. *wai*, Lat. *vae*, OAv. *voya-* m. 'woe,' Skt. *uvé* 'I see on myself,' OAv. *avōi, vayōi* 'auch!' Walde-Hoffmann further mentions Gk. ὀά, οὐά, οὐᾶ 'auch.' Gk. οὐαί 'woe' can be added from Beekes and van Beek (2009).

Mayrhofer (1986–96: I, 233) discusses the difficulty of relating Skt. *uvé* to Hitt. *a-ú* 'see!,' which is based on a verbal root **h₁eu̯-*, because he assumes that **h₁eu̯-* should give rise to Skt. *ávati* 'promote, encourage' and its meaning does not fit 'to see.' For this matter, LIV (243) sets up two different roots, **h₁eu̯-* 'to see' and **h₁eu̯H-* 'to encourage,' and assumes the first one gave rise to Skt. *uvé* (< **h₁(u)u̯é-*). If this etymology provided by LIV is employed, the starting point would be the verbal root **h₁eu̯-* 'to see,' and all the descended interjections are the so-called derived interjections from the original meaning 'see!' Although it is difficult to deny another possibility: that they are the primary interjections and the form can be formed just phonetically (not based on any verbal root), let us now move on to the reconstruction of the phonological shape of their parent form.

Gk. οὐαί, ὀά indicate that the root probably took an *o*-grade with a possible lengthening, followed by a vowel **-a(i)-*, which could be called a suffix or an extension, although this interjection does not seem

to follow the usual morphological structure of a lexical word. Balto-Slavic and Germanic forms lacks the first syllable, though, which may mean that they had a zero-grade root like *$*h_1\underset{\frown}{u}$-(V)*. OAv. *avōi, vayōi* imply that the "suffix" could be lengthened. Balto-Slavic and Germanic forms seem to share the lengthened "suffix," probably descended from something like *$*h_1\underset{\frown}{u}$-āi*. Therefore, the possible parent form for this interjection may have looked like *$*h_1\breve{\underset{\frown}{u}}$-ai/*$h_1\underset{\frown}{u}$-ā́i*, although the origin of this suffix-like element is unclear. If the Sanskrit form should be corresponding to the Greek forms, then, its parent form could be *$*h_1(u)\underset{\frown}{u}$-ái*. We could argue that *$*h_1\underset{\frown}{u}$-ā́i* gave rise to an acute *$*v\underline{ai}$* in PBS, which was later de-acuted by MC. However, this reconstruction of the interjection remains highly speculative partially due to the nature of its part of speech; therefore, there will be no further attempts to explain this item here.

4.3.2 Baltic Particles

***laĩ* (optative particle)** The particle *laĩ* is a Žamaitian counterpart of the std. Lithuanian permissive particle *te-* (see above). According to Fraenkel (1952–1965: 329), Lith. *laĩ* is from the 3rd person optative form of *léisti* (dial. *láisti*) 'let.' Latv. *laî*, the equivalent form of Lith. *laĩ*, is found with the accentuation opposite to the Lithuanian tone in ME (II, 400). Fraenkel and ME also note that Latv. *laî* is from *laid* attested in old texts, the shortened imperative form of *laîst* 'let.' Fraenkel further mentions that *lói* (< pre-Lith. **lái*) is attested in Kupiškis, an East Aukštaitian dialect. Since circumflex pronominal forms are not found in East Aukštaitian dialects (cf. §4.4), *lói* is likely to point to pre-metatonical accentuation, as is Latvian *laî*. However, another argument is possible. Etymologically speaking, the Lithuanian old imperative (*k*-less imperative) and the Latvian imperative descend from an Indo-European optative with the suffix **-$\acute{\underset{\frown}{o}}ih_1$/$ih_1$-* (thematic; cf. athematic **-$\acute{\underset{\frown}{e}}h_1$/$ih_1$-*). The ending is reflected as Lith. *-iẽ / -ỹ*; for *ā*-verbs, *-ai*; e.g., *dirbiẽ* 'work,' *sãkai* 'say,' etc. The old imperative forms in Lithuanian have their own distribution of tone. According to Zinkevičius (1984–1995: II, 221), optative forms in *-i* can be either root- or ending-accented (*téssi* [with the permissive particle *te*] 'be' (DP 552), dial. *stóvy* 'stand;' dial. *tylỹ* 'be quiet,' *dirbiẽ* 'work'), while *ā*-stem forms (ending in *-ai*) are always root-accented (dial. *rãšai* 'write'). This

distribution is quite clear in *Daukšos Postilė*. Therefore, the preform of *laĩ* could be **laidiẽ*, which could have given rise to *laĩ* through the retraction of the tone that used to be on the ending.[61] However, considering that the Latv. *laî* has also lost its ending, the loss of ending in this form can be their shared innovation. Even if the ictus retraction rule mentioned in footnote 61 applied already in PB, it would have given rise to a rising tone, which was still interpreted as an acute tone.[62] The acute tone of the E. Aukštaitian form supports this assumption. However, this would have given rise to a sustained tone in Latvian, which still speaks against the broken tone in *laî*. This may mean that syncope of an accented ending caused the ictus retraction rule only in Lithuanian, and in Proto-East Baltic, the retracted accent due to a syncope caused the newly accented syllable to surface the nature of its own syllable nucleus, i.e., acute or non-acute.

On the other hand, outside of East Baltic, no direct cognate of the particle is found. The Old Prussian conditional morpheme *-lai* is a suffix rather than a particle, and Endzelīns (1944: 188ff.) assumes that it may be a suffix *-le* enlarged with the vocalism *-ai*, analogical from the 3rd person optative form in *-ai*. In Stang (1966: 443), *-le* is considered to be found in OLith. *esle* 'be, be so' and dialectal imperative forms, such as *eĩkel'* and *dúokel'* (Šiauliai), bearing the meaning 'be so, be as such (Lith. *'tesie taipo'*).' The suffix can be further traced back to PIE particle **le, *li* 'there, then (far deictic particle)' (Dunkel 2014: II, 485ff.), which is reflected in Gk. λαι- 'very, too much,' Hitt. *dāla* 'let it be.' Therefore, the OPru. *-lai* should be regarded as etymologically irrelevant to Lith. *laĩ* and Latv. *laî*. Thus, Lith. *laĩ* and Latv. *laî* can be historically traced only as far back as Proto East-Baltic. Consequently, the circumflex tone of std. Lith. *laĩ* cannot be attributed to the Monosyllabic Circumflexion that was in operation in PBS, but must be an inner-Lithuanian phenomenon. This view is also supported by the acute *lói* in E. Aukštaitian, for this form suggests that the metatony that affected *laĩ* happened after the divergence of the Lithuanian dialects.

[61] The circumflex tone results from the retraction of the ictus on the recently lost ending, cf. *dienõj* < *dienojè* 'during the day,' *galvõn* < *galvonà* 'into a head,' etc. (Stang 1966b: 167).

[62] The shift of ictus, or the switch of rising and falling tones, took place in the prehistory of Lithuanian, cf. §2.3.3.

dẽl According to Fraenkel (1962–1965: 86ff.), the Lithuanian form has the older and fuller forms *dėla, dėliai, dėlei, dėlig*. ME (I, 463) note that Latv. *dẽļ* corresponds to Lith. *dẽl* and *dẽliai*.

Both of the two dictionaries connect the Lithuanian and Latvian forms with OCS/ORuss. *dělja* 'regarding, concerning' and Sl. **dě̋lo* (a) neut. 'work, deed,' which are ultimately derived from a PIE root **d^{h}eh$_1$-* 'to put.' As the root etymology and the acute accentuation of SCr. *djëlo* 'deed, act' (< Sl. **dě̋lo*; ĖSSJa: V, 7ff.) show, the expected accentuation for the particle is the acute. Therefore, the acute tone of Latv. *dẽļ* corresponds to the immobile acute accentuation of Sl. **dě̋lo* (a), while Lith. *dẽl* exhibits a mysterious circumflex tone.

Considering that two of the Lithuanian disyllabic "older and fuller" forms, *dẽliai* and *dėlei*,[63] are found with the circumflex tone, the circumflex tone of the relevant Lithuanian forms including the monosyllabic *dẽl* cannot be attributed either to Balto-Slavic MC or to a *métatonie douce* in the final syllables/monosyllables as related to Leskien's Law. I would rather suggest that *dẽliai* may have undergone the *métatonie douce*, which is triggered by the accented suffix **-ìi̯o-*,[64] as *dẽliai* seems to be an adverbial form of a derivative with the suffix **-ìi̯o-* of the old neuter **dé̋la(n)* (cf. Sl. **dě̋lo*).[65]

The *métatonie douce* caused by the suffix **-ìi̯o-* can be traced back to a Proto-Baltic stage, but there are some cases where Lithuanian forms alone underwent its operation (e.g., Lith. *lõpis* (2) 'patch' ∼ Latv. *lãpis* 'mulch (to cover hotbeds with)' [cf. Lith. *lópyti* 'patch,' Latv. *lãpît* 'id.']; Lith. *sẽdis* 'session' ∼ Latv. *sêde* 'id.' [cf. Lith. *sé̋sti* 'sit down,' Latv. *sêst* 'id.']; *korỹs* (4) 'honeycomb' ∼ Latv. *kãre* [cf. Lith. *kárti* 'hang,' Latv. *kârt* 'id.']). The possible derivative of **dé̋la(n)* may be one of such cases.

[63] *dẽlei* has the circumflex tone according to LKŽ.

[64] *Métatonie douce* caused by the accented suffix containing **-ìi̯-* is discussed in Stang (1966b: 160).

[65] As Forssman (2003: 119ff.) states that the adverbial ending *-(i)ai* has started to be attached to more parts of speech than only adjectives (e.g., *dovanaĩ* 'in vain' from *dovana* (3^{a}/1) 'gift,' *visaĩ* 'at all' from *vìsas* 'all (pron.)'), *dẽliai* could be derived directly from the noun **dé̋la* n. The adverbial suffix *-iai* seems to also cause *métatonie douce*, e.g., *drũčiai* 'thickly' to *drű̃tas* (3) 'thick.'

Deadjectival particles as endingless forms In Forssman (2003: 219ff.), a group of adverbs/particles that are derived from adjectives by the loss of their endings are discussed. Phonological and semantic aspects are pointed out there. In Latvian, the loss of ending exhibits a phonological regularity: the adverbial ending *-i* is in all cases lost after the segments *-n*, *-m*, *-t*, *-l*, and *-z*, e.g., *pẽrn* 'last year' ([pērni] still in Adolphi, also *pérnai* in Lithuanian), *līdz* 'with' (beside *līdzi*, Lith. *lýgiai*). Also, there is usually a semantic difference between the endingless adverb and the forms with an ending, e.g., Lith. *sẽn* 'old' ∼ *senaĩ* 'long time ago' (*sẽnas* 'old'); *véik* 'soon' ∼ *véikiai* 'quickly' (*veikùs* (3) 'fast').

The following two items taken up in this paragraph are to be mentioned in particular since they are cited as examples of metatony in Būga (1923/24). One of them looks like a good example of MC in Lithuanian, but the source of *métatonie douce* is different for the other, which makes it difficult to establish a general tendency for them.

***vẽl* 'again'** There are dialectal forms both in Lithuanian and Latvian. The East Lithuanian forms *vẽl'* and *vél*, and the East Latvian form *viêl* are mentioned in Būga (1923/24: 95ff.). He suggests that Lith. *vẽl* and ELith. *vẽl'* originate from **vėlì*, and *vél* (Šakiai, Suvalkai), *vél'ei and vélek* from **véli(a)*. On the other hand, Latv. *vêl* (dial. *viêl*) should be from Baltic **vẽli* (with accent on *-i*[66]), where the final adverbial ending **-i* was lost later, as the narrow root vowel *ē* implies (see also Endzelīns (1923: 465)).

If the final **-i* was lost in **véli(a)* before Leskien's Law, it would have been shortened to ✗*veĩ*. This means that the loss of the final *-i* must have been recent, after Leskien's Law. Thus, the relevant acute forms above can be the same case as OLith. f. pl. dat. *tómus* > *tóms* (20, p. 71).

On the other hand, the circumflex tone in the standard form and East Lithuanian forms needs more analysis. Beside Būga's and Endzelīns' view that Lith. *vẽl* should be from **vėlì*, Forssman (2003: 221) assumes that it is one of the deadjectival particles, descended from an adjective stem **vēlu-* which is attested as adjectives, Lith. *vėlùs* (4) 'late' and Latv. *vçls* 'id.' The non-acute root of the Lithuanian adjective is explained with *métatonie douce*, which affected Lithuanian *u*-stem adjec-

[66] It can be inferred that the form meant by him is probably **vēlì* (with the acute root and accented ending).

tives.[67] Therefore the original tone of the root should be considered to be acute. The Latvian and Lithuanian dialectal forms is to be understood as showing the original acute tone, and the circumflex tone in the Lithuanian form is secondary. The source of the acute tone can be found in its ancestral form. The adverbs are related by Dukel (2014: II, 488) with *u̯e 'or' + *le 'there' reflected by Lat. *vel* 'or.' Based on this formation, only Baltic forms reflect the long root. Alternatively, they are connected to a PIE root *u̯el- 'to turn, wander'[68] by Persson (1912: 542) and Fraenkel (1962–1965: 1217). Persson cites a few possible cognates with the long root, e.g., Arm. *gil* 'throwing stone (Wurfstein),' Skt. multiplicative *vāra-* as in *eka-vāram* 'once.' It is unclear whether these forms surely point to a PIE *u̯ēl-, lacking further evidence especially in Slavic, but East Baltic forms at least point at PEB *vēlu- as an adjective stem, and *vēli(a) as an adverb.

The Latvian broken tone seems to point to a retracted tone to the root, which makes the reconstruction *vēlí(a) more plausible. One possible explanation of the Lithuanian circumflex tone is that this form underwent a late MC after the loss of the adverbial ending, which must have taken place after Leskien's Law (see above). Its acute variants found in Latvian, Lithuanian dialectal forms, and disyllabic forms can be regarded as the forms that have not undergone Lithuanian MC, or were not in the environment of MC by virtue being polysyllabic. Thus, this form is not a good example of MC in PBS, but may imply the existence of a late MC in Lithuanian.

***daũg* 'a lot of'** Latv. *daũdz* 'a lot (of),' corresponding to Lith. *daũg* 'a lot (of)' (cf. Lith. *dáuginti* 'to multiply'), seems to be a good example of the effect of Monosyllabic Circumflexion at first glance. However, since the suffix *-inti* is known to be metatonical (e.g., *sveĩkas* 'healthy' ∼ *svéikinti* 'to greet' de Saussure 1894: 495; Derksen 1996: 325ff.), the acute tone of *dáuginti* may be secondary. Furthermore,

[67] *Métatonie douce* among *u*-stem adjectives is observed in the relatively recent history of Lithuanian: e.g., *saldùs* (3) 'sweet' [Daukša's Postilė (1599)] → *saldùs* (4), cf. Latv. *salîds* (Stang 1966b: 160).

[68] The reconstruction of this root in LIV (675) is 2. *u̯el- (cf. Lat. *uoluō* 'to roll, turn') as an *aniṭ* root. If Latv. *vêls* (∼ Lith. *vėlùs* (3)) is really derived from this root, the root of Latv. *vêls* may be a piece of evidence for a PIE plain long vowel reflected with the acute tone in Balto-Slavic.

Stang (1966b: 260) points out that these forms are from *daũgi*, which is a nom.-acc. sg. neuter of an *i*-stem **daugis* 'many, much' (adj.), whose substantive form *daũgis* (AP2; also an *i*-stem) is found in Mod. Lithuanian. Therefore, I assume that Derksen (1996: 326) is right in considering that this word can be originally non-acute. But the problem is that the Latvian acute tone remains unexplained, and it is hard to identify the source of this Latvian acute tone.

4.3.3 Analysis

Old particles often show the circumflex tone not only in Lithuanian but also in Latvian (Lith. *nū̃* ∼ ELatv. *nù*, *nòu*; Lith. *nuõ* ∼ Latv. *nùo*), if a Latvian cognate is available. These forms support the relative chronology in (48) on p. 132.

Yet at least *laĩ* and *vė̃l* support the existence of the Lithuanian layer of MC. MC in PBS could not have operated on the Baltic particles, but they still have a reflex with circumflex tone in Lithuanian, and with acute tone in some Lithuanian dialects and Latvian. The Lithuanian circumflex tone of the two Lithuanian forms exemplifies a clear case where the Lithuanian forms underwent a late MC after the divergence of Lithuanian and Latvian, or even after that of Lithuanian dialects. This may indicate another MC in Lithuanian, which Kortlandt (2014: 217) considers to have spread over W. Aukštaitian dialects (and not in E. Aukštaitian).

Thus, there seem to have been two "Monosyllabic Circumflexion"-like phenomena from PBS to Lithuanian, as already pointed out by Kortlandt (2014: 217). The first one is the MC evidenced by the circumflex tone in Lithuanian 3rd person future forms (§4.1) and the reflexes of root nouns (§4.2), and the other is an "inner-Lithuanian phenomenon" suggested by *laĩ* and *vė̃l*. One might be tempted to find a correlation between the second Lithuanian MC and the operation of Leskien's Law, as Petit (2002) does. He assumes that a circumflexion occurred in monosyllables and final syllables with acute diphthongs when Leskien's Law was in operation. The acute diphthongs in word-final position and in monosyllables turned to circumflex as seen in 1sg. pret *sukaũ* 'I turned' and *gaũs* 'will gain,' while the original acute tone is preserved in the Žemaitian form (*sọkâu*) or polysyllabic form (*gáuti*). Petit thinks that this metatony is the result of Leskien's Law, as he assumes that acute

diphthongs were still long diphthongs in pre-Lithuanian, and became circumflex when they were shortened by Leskien's Law in word-final position and in monosyllables.

However, *vė̃l* (< **vélі(a)*) suggests that the Lithuanian MC probably took place after Leskien's Law and the subsequent loss of **-i(a)*. This may indicate that the second MC can be seen as a part of the spread of MC forms in W. Aukštaitian dialects (see §4.1.4.7, §4.4.1.5).

4.3.4 Summary

The following relative chronology of MC was established in §4.2 based on the root nouns.

relative chronology II:

$$\left.\begin{array}{r} *D > *T/\ \_\_\# \rightarrow \text{Winter's Law} \\ \text{Hirt's Law, } *\underset{\circ}{R} > iR \rightarrow *VH]_{\sigma} > *\bar{V}]_{\sigma} \end{array}\right\} \rightarrow$$

$\rightarrow$ acute assignment, *i*-apocope $\rightarrow$ **MC** $\rightarrow$ generalization of *i*-stem to root nouns $\rightarrow$ Osthoff's Law $\rightarrow$ **o > *a*.

(= 48)

However, there are two particles with the circumflex tone, *laĩ*/Latv. *laî* and *vė̃l*/Latv. *vêl*, which could not have been affected by MC in (48). Moreover, *laĩ* has an acute variant in East Lithuanian. This may suggest a newer chronological layer of MC. Contrastively, a few old particles (*nū̃, nuõ, tė̃, nė̃*) have circumflex tone, which supports the assumption of MC and its relative chronology.

4.4 Pronominal Forms

This section will cover the pronominal forms that exemplfy MC. Three subsections below will discuss "non-participant" pronouns (i.e., 3rd person and demonstrative pronouns), "participant" pronouns (i.e., 1st and 2nd person pronouns), and a numeral, respectively.

There are a couple of reasons to distinguish "non-participant" and "participant" pronouns.[69] Semantically, participant pronouns are the 1st and 2nd persons, which are the speaker(s) and hearer(s) of a given discourse, while the 3rd person is always situated outside of a given discourse in that it is neither a speaker nor a hearer. As related to that fact, the 3rd person pronouns are essentially the demonstratives (also Katz 1998: 18); therefore they have gender distinctions, and they are in general plausibly reconstructible for PIE.

On the other hand, participant pronouns lack gender distinction, and most of them are highly suppletive. Therefore, in many cases, the oblique forms have different stems from their nominative stems. Hence, their paradigms have different natures from those of non-participant pronouns, requiring different approaches and treatments.

4.4.1 Demonstrative Pronouns and 3rd Person Pronouns

In this section the non-participant pronouns will be treated, i.e., anaphoric *jìs/jì*, demonstrative *tàs/tà* 'that' and *šìs/šì* 'this.' Out of their inflectional forms, only those will be treated which are monosyllabic, having the ancient plain long vowels. The relevant forms are highlighted with bold face in the following paradigms:

	singular		plural	
	m.	f.	m.	f.
nom.	*jìs*	***jì***	***jiẽ***	*jõs*
gen.	*jõ*	*jõs*	*jɥ̃*	*jɥ̃*
dat.	*jám*	*jái* (*jaĩ*)	*jíems*	*jóms*
acc.	*jɻ̃*	*jɰ̃*	***juõs***	***jàs***
instr.	***juõ***	***jà***	*jaĩs*	*jomìs*
loc.	*jamè*	*jojè*	*juosè*	*josè*

[69] Cf. Benveniste (1966: 251ff.), Rosinas (1995: 10ff.), and Katz (1998: 15ff.).

ill.	*jañ*	*jõn*	*júosna*	*jósna*

Table 4.13: *jìs, jì* 'he/she/it'

	singular		plural	
	m.	f.	m.	f.
nom.	*tàs*	***tà***	***tiẽ***	*tõs*
gen.	*tõ*	*tõs*	*tų̃*	*tų̃*
dat.	*tám*	*tái* (*taĩ*)	*tíems*	*tóms*
acc.	*tą̃*	*tą̃*	***tuõs***	***tàs***
instr.	***tuõ***	***tà***	*taĩs*	*tomìs*
loc.	*tamè*	*tojè*	*tuosè*	*tosè*
ill.	*tañ* (*tàna*)	*tõn* (*tõna*)	*túosna*	*tósna*

Table 4.14: *tàs, tà* 'that'

	singular		plural	
	m.	f.	m.	f.
nom.	*šìs*	***šì***	***šiẽ***	*šiõs*
gen.	*šiõ*	*šiõs*	*šių̃*	*šių̃*
dat.	*šiám*	*šiái* (*šiaĩ*)	*šíems*	*šióms*
acc.	*šį̃*	*šią̃*	***šiuõs***	***šiàs***
instr.	***šiuõ***	***šià***	*šiaĩs*	*šiomìs*
loc.	*šiamè*	*šiojè*	*šiuosè*	*šiosè*
ill.	*šiañ*	*šiõn*	*šiúosna*	*šiósna*

Table 4.15: *šìs, šì* 'this'

Noticeably, a few forms are excluded based on historical assumptions. The gen. sg. m. ending *-õ* is generally assumed to be from a PIE ablative ending, which can be further traced back to a sequence with a laryngeal hiatus **-oh₂ed* (Jasanoff 2002: 36), as implied by Skt. *-aat* (Arnold 1905: 99ff.). The ending of the gen. sg. f. *tõs* is well established as being derived from the same ending of the **eh₂*-stems, **-eh₂-es* with a laryngeal hiatus. Also for the nom. pl. f. *-õs*, **-eh₂-es* with a hiatus can be reconstructed. As for the genitive plural ending *-ų̃*, the opinions vary. Kortlandt (1978a: 281ff.) assumes that it is descended from

**-om*, assuming a sound change **-om* > PBS **-um*, while Jasanoff (2002: id.) considers a preform **-oHom* reconstructed with a laryngeal hiatus based on the disyllabic scansion in Ved. *-aam* (Arnold 1905: 92), and Kümmel (2013) reconstructs **-e/oh*$_1$*om* or **-oh*$_3$*om* based on a close survey in Indo-Iranian. According to either assumption, the circumflex tone is expected to be the regular outcome. However, Lith. acc. sg. m. *-ą* (< PIE **-om*) of the *o*-stem does not support Kortlandt's sound change. A phonological development PIE **-oHom* > PBS **-ōn* > pre-Lith. **-uon* > **-un* > Lith. *ų* (Stang 1966b: 184) seems more attractive. The dat. sg. m. ending *-ám* is not treated either, since the ending is from the older *-amui*. Likewise, dat. sg. f. *-ái* is not treated because the acute tone is secondarily introduced from the corresponding new masculine ending *-ám* (Zinkevičius 1966: 314). The older circumflex tone which is etymologically expected as well (cf. Latv. *tài*, Gk. τῇ < **teh*$_2$*-ei̯*) is attested in the Eastern Lithuanian area up to the line of Marijampolė – Žasliai – Ankščiai – Panemunėlis.

In what follows, the dialectal forms and etymologically related forms of each inflectional form or ending will be first treated. Since the usage of *jìs/jì* and *šìs/šì* is geographically more limited than *tàs/tà*, the inflectional form of *tàs/tà* will often represent the inflectional forms of the other two as was also done in Rosinas (1995). The anaphoric pronoun *jìs/jì* is not used in many Žemaitian dialects and some E. Aukštaitian dialects. Instead, *anas/ana* is used there (Zinkevičius 1978: 103). Also, *šìs/šì* is disappearing in E. Aukštaitia (Zinkevičius 1966: 318). The dialectal forms can be summarized as follows based on the data available in Zinkevičius (1966), Rosinas (1995), and Kurschat (1876). Following that, two suggestions will be presented.

4.4.1.1 Dialectal and Comparative Data

Instr. sg. fem. -à As in Rosinas (1995), the inflectional forms of *tàs/tà* represent the ending of other pronominal stems in the instr. sg. f. (*jà, šià*) in the following table.

<table>
<tr><th>Žem.</th><th colspan="3">Aukšt.</th><th>Pruss. Lith.</th></tr>
<tr><td rowspan="2">tà
(tọ̀ [N])</td><td>W. Aukšt.</td><td>S. Aukšt.</td><td>E. Aukšt.</td><td rowspan="2">tà/tá</td></tr>
<tr><td>tą́/tą́j</td><td colspan="2">tą́j,
tą́ (tú˞, tū̃^{z}[70]),
tà</td></tr>
</table>

W. Aukšt. *tą́*, *tą́j* are found in Liubavas, Vilkaviškis, etc. In E. Aukšt., *tà* type forms are found around Kupiškis and its neighbors. Prussian Lithuanian has both *tà* and *tá*. Elsewhere, *tą́* or *tą́j* is used. The pronunciation of *tą́* is *túˈ*, *tū́*, spread northeasternward, which indicates a protoform **tā́n*. The pronunciation of *tą́j*, which spread southeasternward, is *túˈi*, or in Žasliai *táˈi* (Zinkevičius 1966: 311). In Pašvitiniai *táˈi* is also found. Those forms with *-j* or *-i* are most likely from the definite form *tą́ja* (cf. *šią́ja*). The Latvian form is *tuõ* with the acute tone, agreeing with the Lithuanian dialectal form *túˈ*, pointing to Proto-East-Baltic **tā́n*. Thus, there is no evidence for the circumflex tone in Baltic. The final nasal segment in the ending found also in OCS *tojǫ* is peculiar in Balto-Slavic (Stang 1966b: 199), which may be from **-mi*, the instr. sg. ending of the consonantal, *i*-, and *u*-stems (Vaillant 1958: 82; 373–374). Therefore, PBS **taa̯ān* can be reconstructed.

Outside of Balto-Slavic, Skt. *táyā* can be adduced. Wackernagel and Debrunner (1896 1964: 115–119, 504) discusses *-áyā* as a pronominal ending in instr. sg. f., while *-ā́* (< *-eh₂(a)h₁* with modern notation) is a substantive ending. Based on this, PIE **toa̯ih₂(a)h₁* (**ioa̯ih₂(a)h₁*, **k̂ioa̯ih₂(a)h₁*) can be reconstructed. Therefore, it can be hypothesized that PBS **taa̯ān* was not in the environment of MC when MC was active in PBS. In Proto-Baltic, it was reduced to **tā́n*, whose acute tone is preserved in the daughter languages.

PIE		**toa̯ih₂(a)h₁*
PBS		**taa̯iā*
		**taa̯iā* + *-mi* → **taa̯iāmi* > **taa̯ān*
	MC	[vacuous operation]
PB		**tā́n*

In this way, it can be explained why there is no evidence for the circumflex tone in this ending in Balto-Slavic.

[70] The diacritic mark (ᶻ) is a sign used in Lithuanian dialectology. It denotes "transversal tone (Lith. *kirstinė priegaidė*)," which is a variant of the rising tone widely found in the E. Aukštaitian dialects in the shortened endings of inflectional words, e.g., *gˈerklā́* (std. *gerklẽ* (3/4)) 'throat,' *katˈé́* (std. *katẽ* (4/2)) 'cat' (Zinkevičius 1966: 36ff.).

Nom. sg. f. *tà* The dialectal data are as follows:

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
tà	*tà*	*tój*	*tà*, *tó/tój*[71]	*tà*

Zinkevičius (1966: 311) suggests that the form *tój* is possibly from a definite pronominal form *tóji* or **tója*. The loss of the final vowel must have occurred after Leskien's Law. This must be the case with the long acute E. Aukšt. *tó* as well. In contrast, *tà* in all other dialects is a reflex of a non-definite form, with the shortening by Leskien's Law. Therefore, a pre-Lith. **tā́* can be reconstructed. However, it is unclear whether the long acute vowel was inherited from the protolanguage as such, or it was restored through the definite ending.

The cognates from other IE languages are the following:

	nom. sg. f.	nom. sg. m.
Skt.	*sā́*	*sá*
Gk.	*hḗ*	*hó*
Goth.	*sō*	*sa*
OCS	*ta*	*tъ*
Latv.	*tã*	*tas*
PIE	**seh$_2$*	**so*

The paradigm was suppletive in PIE: **so/ā-* for the animate nominative singular and **to/ā-* for the remaining. Only in the Balto-Slavic languages, the animate nominative singular stem is replaced with the stem in **t-*. As Kortlandt (1982: 4–5) (cf. Majer 2011: 356[21], 357) points out, this is likely to be a late innovation independent in each Baltic and Slavic language. Considering the existence of MC shown in the previous sections, fem. nom. sg. **sā̃* (< **seh$_2$*) can be expected, and was later replaced in Proto-Baltic with **t-* from other case forms. In such a process, the ending **-ā́* could have been analogically taken from the nominal or adjective ending. This may possibly explain the aberrant fact that there is no piece of evidence for a circumflex tone regarding this form. Another possibility is shown on p. 179.

[71] E. Aukšt. *tà* is found in West Panevėžiškiai, and *tó/tój* elsewhere.

Nom. sg. fem. *-ì* This paragraph covers the nom. sg. f. *jì, šì*.

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
(*anà*)	*jì, šì*	*jój, šiój* *jý, šý,*		*jì, šì* *jinaĩ, jijẽ, jýja, jýji, jìji....*

In the Žem. dialects, another pronominal stem *anas, ana* is used for the 3rd person pronoun. No particular remarks on the pronoun *šìs, šì* in Žem. dialects are found (in Zinkevičius 1966, 1978; Rosinas 1995); therefore it is left out of consideration. But for the 3rd person pronoun *jì*, beside the usual form, Prussian Lithuanian uses various definite forms *jinaĩ, jijẽ, jýja, jýji, jìji, jóji, jójẽ*. Zinkevičius (1966: 311) observes that there are two types of nom. sg. fem. forms, the *jój/šiój* type and the *jý/šý* type. The *jý/šý* type also goes back to the definite forms *jýji, šýji* (Zinkevičius 1966: id.).

For its Indo-European etymology, it is usually assumed to have the same ending as the $*ih_2$-stem in the feminine, and reconstructed as $*\text{-}ih_2$, with some support from Aeol. ἴα 'a, one' $<$ $*ih_2$ (Dunkel 2014: vol. II, 366) for *jì*; Hitt. *kīni* (sg. neut.), OCS *si* (nom.-acc. pl. neut) [collective stem], OCS *si* (sg.nom. f.; id., 407) for *šì*. Therefore, *jì* and *šì* should descend from a monosyllabic form with a long vowel, and it is again aberrant that there is no indication of the operation of MC.

Acc. pl. f. *-às* This paragraph covers the accusative plural feminine ending in *jàs, šiàs*, and *tàs*. The dialectal variants of *tàs* represents those of the others stems.

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
tàs	*tą́s*	*tàs*	*tàs/tós*	*tàs, tás*

Žem./S. & E. Aukšt. *tàs* points to pre-Lith. $*t\acute{a}s$ with support from the illative ending *-ósna* (AP3, 4; e.g., *galvósna* 'into heads' formed to an accusative stem plus a postposition), while W. Aukšt./Pruss. Lith. *tą́s* is probably from the definite form in *-ąsias*. However, *tós* cannot be analogical from the definite ending but from the illative form *tósna*.

The cognate forms, Latv. *tãs*, OCS *ty*, Goth. *þōs*, Gk. τᾱ́ς, and Skt. *tā́s* point to the proto form in $*t\acute{a}s$ without the nasal, while the

Lithuanian definite ending *-ą́sias*, OPru. *stans*, and Cret. τῑ́μανς 'worship' (in acc. pl.) indicate the preexistence of the nasal in the ending.

Moreover, the Lithuanian definite ending means that the sequences of a long vowel and a nasal in **-āns-i̯āns* were treated differently in the absolute word-final position and in the word-internal position, as Arumaa (1985: 153) points out. If the internal **-āns-* lost the nasal to become **-ās-*, a definite ending like ✗*-ósias* would be expected. The attested *-ą́sias* indicates that the internal **-āns-* lost its nasal at the Lithuanian stage much later than Ostoff's shortening (cf. the nasal loss before a sibilant or a resonant, e.g., *žąsìs* 'goose') as follows: **-ān̲s-* > **-án̲s-* > *-ą́s-*. The denasalized *ą* does not undergo a change *ā* > *o*, which is diagnostic of the denasalization taking place after this change. The reason for these different treatments could be sought in differences in syllabification. The sequence **-V̆ns-* in the word-internal position can be syllabified as -V(ː)n]$_\sigma$ [s-...]$_\omega$, with the syllable boundary between *-n-* and *-s-* (**-ān.si̯āns*),[72] while in the absolute word-final position, the final *-s* had to be syllabified tautosyllabic with the preceding *-n-* as in -V(ː)ns]$_\omega$. A possible parallel to the loss of a nasal in front of a tautosyllabic *-s-* could be Ion./Old Att. μείς, Dor. μής (< **mēns*), cf. Schwyzer (1939–1950: I, p.569).[73,74]

[72] The onset *si̯-* is phonologically admitted in Lithuanian, cf. *siauras*, *-a* 'narrow,' which may support the possibility of such a syllabification.

[73] Olander (2009:156[3]) mentions the contraction of PIE **-V́ns* as in **agróns* (*μ́μ*) > ἀγρούς /agroús/ (*μ́*). Interestingly, irrelevant to the length of the vowel in **-V̆ns*, the contracted sequence **-V̄* received the acute tone in Greek. However, for Balto-Slavic, the acute-assignment should be considered. The acute tone in the ending may imply that the loss of the nasal took place early enough for the resulting long vowel in the accusative plural ending to receive the acute tone. Kim (2012: 151) assumes that the acute tone of the accusative plural endings in *i*-stem (**-ins* > Lith. **-ìs*) and *u*-stem (**-uns* > Lith. *-ùs*) as analogical to the endings in *ā-* and *o*-stems. However, if their acute tone is a phonological outcome, it is possible to assume that the nasal loss with compensatory lengthening in ⋯V(ː)ns]$_\omega$ took place early enough for the resulting long vowel to undergo PBS acute assignment. PBS **-ins* and **-uns* give rise to PS **-ī* and **-ū* (cf. Olander 2015: 244, 246), and that allows an assumption that the loss of nasal in ⋯V(ː)ns]$_\omega$ could possibly have taken place already in Proto-Balto-Slavic.

[74] Possibly, the sequence was avoided due to OCP (Obligatory Contour Principle): both *n* and *s* are dental. It can be observed in many languages that the

In the environment -V(ː)n]$_\sigma$ [s..., the nasal survived until the regular nasal loss in Lithuanian, while in the environment -V(ː)ns]$_\omega$, the nasal was lost already in PBS, as Latvian, OCS, and the Lithuanian illative (f. pl. *-os-na*) forms indicate. Furthermore, this proposal can explain why a possible remnant of the nasal is found in the definite adjective ending (*-ą́sias* [f.pl.]), where the loss of nasal can have taken place in Lithuanian due to the syllable boundary between the nasal and **s* as in **-**ān**.si̯ānas*.

Based on the assumption above, the nasal in OPru. *stans* may be explained as an analogical restoration of a nasal from the definite ending or from the acc. sg. *-ān*. This assumption can be supported by the original accusative plural ending fossilized in an adverb *perpett**as*** 'gosipping (lit. across shoulders)' (Mažiulis 1970: 311ff.).[75] Thus, PBS **tą́ns* (later, **tą́s*) can be reconstructed. The Slavic ending (e.g., OCS *ty*) is probably analogical to the masculine (Arumaa 1985: 154). With the other comparative evidence, PIE **tą́ms* < **teh$_2$ms* can be reconstructed. Therefore, the reflexes with the acute tone is the expected outcome, although the lack of support for any circumflex forms appears again aberrant, if we assume MC.

Acc. pl. m. *-uõs* This paragraph covers the accusative plural masculine ending in *juõs*, *šiuõs*, and *tuõs*. As in the previous paragraphs, the dialectal forms of *tuõs* represents those of the other pronominal stems.

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
tùs	*túos/tuõs*	*túos*		*tùs/túos*

The Lithuanian definite ending is *-úosius*. The Baltic forms with

pronunciation of a nasal stop followed by a strident *-s-* at the same position presents a problem, and the former drops in front of the latter. Therefore, **-ns* constituted a violation against OCP, which drove the sequence to undergo a sound change in Proto-Balto-Slavic, while the sequence escaped from the sound change if it was divided by a syllable boundary as in $\cdots$n]$_\sigma$[s$\cdots$.

[75] Mažiulis (1970: 188ff.) suggests that the nasal in OPru. acc. pl. *-ans* of *o*-stems and *ā*-stems remained because the nasal in OPru. **-ą́ns* of *ā*-stem was "not redundant," and therefore escaped the nasal loss, while the nasal in **-ą́ns* of *o*-stem was "redundant." I would rather consider an analogical process from the singular accusative ending *-an* or from the definite ending.

Latv. *tuõs* point to an ancestral form **tṓs* with the acute tone. OCS *ty*, OPru. *stans*, Skt. *tā́n*, Gk. τοῦς, Cret. τόνς, and Goth. *þans* point to PIE **tǒns* (< **tǒms*). While the Indo-Iranian and East Baltic endings clearly require a long vowel in their ancestral form, Greek, Germanic endings point to a short vowel. For these contradictory possible reconstructions, Kim (2012: 148ff.) proposes that the length was introduced through Szemerényi's Law, i.e., **-oms* > **-ōm/*-ōn*, with the final **-ms* reintroduced later analogically from the accusative plural endings of other stems. In this way, the long vowel of PBS **-ōns* can be understood as a descendant of the long-vowel variant.

PBS **ō* in a long diphthong usually results in *a* (see footnote 41, p. 132), therefore PBS **tōns* would give rise to Lith. ✗*tàs*, *-ą́s-*. Therefore the East Baltic endings require an ancestral form without a nasal. However, CS **-y*, ONovg. *-ě*, South Sl. **-ę*, and W./E. Sl. **-ě* point to PBS **-ōns* (> PS **-ōn*; Olander 2015: 251) with a nasal. OPru. acc. pl. m. *stans* also points to a nasal in its ancestral form.

My proposal above for the accusative plural feminine ending by which the sequence **-V̆ns-* can be treated differently in $\cdots \mathrm{V}(\mathrm{:})\mathrm{n}]_{\sigma}$ [s$\cdots$ and $\cdots \mathrm{V}(\mathrm{:})\mathrm{ns}]_{\omega}$ may offer a solution to this problem. The form without nasal **tōs* can be assumed to reflect the word-final treatment,[76] while the ending with nasal can be originated from the word-internal environment in compounded pronouns, which will be taken up below.

Consequently, **tōns* (later **tōs*) can be reconstructed for PBS, and its expected tone without MC should be the acute tone. The forms attested with the circumflex tone can be the possible result of MC. However, the distribution of the circumflex variant attested only in West Aukštaitian dialects allows us to consider that it is the result of the recent MC in the area (Kortlandt 2014: 218).

Nom. pl. m. *-iẽ* This paragraph covers the nominative plural masculine ending in *jiẽ*, *šiẽ*, and *tiẽ*. As in the previous paragraphs, the dialectal forms of *tiẽ* represent those of the other pronominal stems.

[76] In fact, this proposal predicts Lith. ✗*-ą́sius* (< **-ōnsi̯ōs*) for the definite ending. It is worth considering that the absolute word-final ending form was possibly copied to the word-internal syllable to give rise to **-ōsiōs* for the attested Lithuanian form. This assumption agrees with Rosinas (2005: 169) that the Proto-Baltic ending in accusative plural did not have a nasal.

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
tẽi (N) *tẽ̇* (W) *tĩ* (S)	*tíe/tiẽ*	*tíe/tíeji*		*tiẽ*

It is interesting that all the Žemaitian forms have the circumflex tone, since Žemaitian pronominal forms otherwise show evidence of the acute tone. This speaks against Kortlandt's suggestion that MC among pronouns is a recent and areal phenomenon in West Aukštaitian dialects. E. Aukštaitian acute long forms must be secondarily introduced after Leskien's Law, possibly from the definite form **tíeji* with double pronominal endings.

On the other hand, Latv. *tiẽ* unambiguously points to Proto-East-Baltic **tẽ̀* with the acute tone. OPru. *stai* (III) (cf. Lith. *šitas* '[emphatic] this,' cf. Stang 1966b: 232) and OCS *ti* suggest a reconstruction for PB/PBS **tái*, despite the Lithuanian circumflex tone. According to Jagić (1906: 120f.), Slavic *-ě* is the reflex of PS **-aı̯̂* with the circumflex tone and *-i* from PS **-aı̯̀* with the acute tone. His proposal is examined positively by Gorbachov (2015: 180ff.) with the analysis of the data in light of the updated accentological framework. If we follow their formulation, OCS *ti* points to the PBS acute tone. Bulg. *tija* has an interesting word formation that will be taken up in the following sections. The falling tone and length of SCr. *tî* is usually considered to be from the adjective definite ending, and it is not decisive for the original tone (Rasmussen 2007: 31). For PIE, **toı̯̂* can be reconstructed based on Skt. *te*, OAv. *tōi*, YAv. *te*, Gk. τοί, Goth. *þai*.

The origin of the acute feature of the ending has been a problem, because **-oi* is not a long diphthong, and is reflected with the circumflex tone in some other cases. Jasanoff (2009: 56) (also 2004a: 253[15]) has proposed that the pronominal ending **-oi* received the acute feature analogically to the lost nominal-proper ending PIE **ōs* (< **-o-es*) at the Proto-Balto-Slavic stage. Thus, in polysyllabic forms, it surfaces with the acute tone (*geríeji*) in word-internal position, and triggers Saussure's Law and Leskien's Law (*gerì*) in the word final-position. Therefore, the circumflex *tiẽ* is likely to be a result of MC, but the existence of the dialectal variants with acute tones even among the monosyllabic reflexes raises a problem.

Instr. sg. m. *-uõ* The following is the summary of the ending. The inflectional form of *tàs, tà* represents the inflectional ending of anaphoric and near-deixis pronouns.

Žem.	Aukšt.			Pruss. Lith.
	W. Aukšt.	S. Aukšt.	E. Aukšt.	
tù	*túo/tuõ*	*túo/tuõm*		*tuomì*

The circumflex *tuõ* is found only in the W. Aukštaitian dialects. The acute tone of *túo* must have been acquired after Leskien's Law through the definite ending. Two circumflex forms, *tuõm* in E. Aukštaitian and Pruss. Lith. *tuomì*, in contrast to *túo*, provide an important insight. The form *tuõm* is found in almost all Aukštaitian areas, and Rosinas (1995: 126ff.) claims that it is from **tuõmi*, with the instr.sg. ending of the *i*-stem *pats* 'oneself' due to a compound pronoun, **tas patis* 'the same' (instr. sg. m. *tuõ patimi*). The Prussian Lithuanian form *tuomì*, however, indicates the operation of Saussure's Law on **tuõmī̲*, which gave rise to *tuomì*. Thus generated *tuomì* could be further apocopated to *tuõm* with the ictus shift from the lost final accented vowel. Therefore the forms *tuõm, tuomì* possibly indicate the original circumflex tone as a monosyllable, being formed to the non-definite form.

Outside of Lithuanian, Latv. *tuõ* points to the acute tone. OCS *těmь* is probably a secondary formation with the plural stem **toi* and the instr. sg. ending of *i-/u*-stem **-mi*. For that matter, OCS *ta-že* 'therefore' would reflect the original ending **-ō* (Arumaa 1985: 175). Lat. *quō* 'whither' and Gk. ποῦ 'where' have the same ending. The ending of these forms is usually reconstructed as **-oh*$_1$ with the instrumental particle **-h*$_1$. The phonological condition is thus the same as the ancestral form of feminine *tà* (**-eh*$_2$) in that both can be boiled down to the sequence **CVH*. This raises a question as to what makes the difference in the tonal distribution of their Lithuanian dialectal forms. Moreover, just as in the case of *tiẽ* above, the circumflex form is not limited to the W. Aukštaitian dialects, but found in other dialectal areas as well (see the tables above). This fact speaks against Kortlandt's (2014: 217) assumption that MC among pronouns is a recent and local phenomenon in Aukštaitian dialects (except for the westernmost ones).

4.4.1.2 Analyses in Previous Studies

Thus, as seen in the paragraphs above, the tones of these pronominal forms are diverse. For standard Lithuanian, a generalization could be attempted, for example, as follows: the masculine has the circumflex tone, while the feminine forms have the acute tone. But when the dialectal forms are taken into consideration, almost all the forms discussed above have some dialectal attestations with the acute tone. For this problem, a few solutions have been proposed so far.

Kortlandt (2014) considers the phenomenon to be recent and local in the area based on the fact that metatonical forms are mostly found in (W.) Aukštaitian dialects. According to him, metatony occurred later than Leskien's Law, which, when it operated on monosyllables, affected only the high vowels *-ý-* and *-ū́-*. However, this is not the case, as shown in §4.1, for the 3rd person future forms. There is a morphological reason for most of the Leskien's shortening being limited to the roots in *ý* and *ū́*. Moreover, nom. sg. f. *tà*, acc. pl. f. *tàs*, and some Žemaitian forms, e.g., acc. pl. m. *tùs* (< *túos*), instr. sg. m. *tọ̀*, indicate that **ā́* and *úo* can also be shortened in monosyllables. Pruss. Lith. *tuomì* and Aukšt. *tuõm* indicate that the basis of these old forms augmented with the *i*-stem instrumental ending *-mì* is the circumflex *tuõ*, and the circumflex variant existed already before Leskien's Law.

Zinkevičius (1984–95: II, 162) maintains that Leskien's Law affected only di-/polysyllabic forms, and the acute long vowels (incl. *ie, uo*) turned to circumflex in the monosyllabic forms. In dialects, some pronominal forms still remain with the acute tone taken from the definite pronominal forms (Zinkevičius 1966: 313, 1980–81: 162), e.g., nom. pl. m. *tíej* < **tíeji*, nom. pl. f. *tój* < *tóji*, instr. sg. m. *túoj* < **túoju*, instr. sg. f. *tą́j* < *tą́ja*. For the shortened pronominal forms, he assumes that they are analogically from polysyllabic forms (e.g., *tà* [nom. sg. f.] from *gerà, kità*, etc.).

Rasmussen (1999: 481) furthermore advocates assigning the phenomenon to the older stage by pointing out that some Slavic pronouns also have the circumflex tone: Slov. *tî* 'you (sg.),' *mî* 'we,' *vî* 'you,' *tâ* 'she.' These may suggest the Proto-Balto-Slavic MC. His interpretation of the acute forms in Lithuanian dialects and Latvian (*tiẽ* [m. pl. nom.], *tuõs* [m. pl. acc.], etc.) is analogy from the acute form of the adjective and nominal endings (Rasmussen 2007: 31).

On the other hand, Villanueva Svensson (2011c: 17–18), admitting

the possibility of analogy for Lithuanian forms, claims that the Slavic pronouns do not provide unambiguous evidence because they were mobile in PS; therefore their circumflex tone may have resulted from Meillet's Law.

The problem may be that the Slavic data do not provide any decisive evidence as to whether MC affected those forms in Proto-Balto-Slavic, due to a number of accentological changes in Slavic. Therefore we are forced to rely on the accentological evidence from the Baltic languages, which is fraught with the risk of the arguments being too Baltic-centered. Yet, based on the results from the previous sections, MC in Proto-Balto-Slavic stage must now be taken into consideration.

The explanation provided by Zinkevičius and Rasmussen for the acute tone in the pronominal forms where MC is expected is an analogy from the definite adjective or nominal endings at different stages for different domains — for m. pl. nom. in Proto-Slavic (and also Latvian), only for feminine forms in Lithuanian, and for every form in Latvian. When the dialectal forms are taken into account, the domain affected by the analogy differs even in Lithuanian dialects. Yet, that does not immediately deny the validity of the explanation by means of analogy with definite adjectives. However, a clue to understanding the tonal distribution — the circumflex tone for the masculine, and the shortened (< acute) forms for the feminine — in standard Lithuanian can be found within the pronominal paradigm at a Proto-East-Baltic stage. In Proto-East-Baltic, some inflectional forms of the pronouns *tas/ta* can be reconstructed as follows if MC in Proto-Balto-Slavic is presumed:

m. sg. gen.	***tã̃***	f. sg. nom.	***tã̃***
instr.	**tõ̃*	gen.	***tãs̃***
pl. nom.	**tẽ̃*	instr.	**tą́n*
acc.	**tõs̃*	pl. acc.	***tãs̃***

Two pairs of homonyms are found above: **tã̃* for m. sg. gen. and f. sg. nom, and **tãs̃* for f. sg. gen., and f. acc. pl. These homonymic clashes are possible factors of the replacement of the tones in the f. sg. nom. **tã̃* and f. pl. acc. **tãs̃*. While m. sg. gen. **tã̃* and f. sg. gen. **tãs̃* had no variant forms in acute tone, f. sg. nom. **tã̃* and f. pl. acc. **tãs̃* did in the definite pronoun forms, cf. f. sg. nom. ****tą́jī***, f. pl. acc. **tánsjās̄*. The acute tone of these variants must have been adopted in the f. sg. nom. and f. pl. acc. in order to avoid the homonymic clashes. This implies

that the influence from the nominal inflection in the collocations like *tà rankà*, *tuõ vilkù* did not play as much a role as is often assumed (e.g., Zinkevičius 1980–81: II, 57–58). Rather, the synchronic situation within the pronominal paradigms at a certain stage in the prehistory affected the tone of the individual pronominal forms.

Therefore, I assume that it is more favorable to find a solution in the same grammatical category, i.e., pronouns, and to avoid analogy if a phonological account is possible. Among the suggested explanations, the definite forms of pronouns as the donors of some acute forms are particularly noteworthy, since they used to certainly be a part of the pronominal paradigms but obviously have failed to attract the attention that they deserve. In what follows, I will seek a possibility for them to provide the phenomenon with a less analogy-dependent explanation.

4.4.1.3 Compound Pronouns in Balto-Slavic and their Indo-European Origin

Pronouns with a definite ending in Lithuanian Senn (1966: 192ff.) states that for personal pronouns in the 3rd person and demonstrative pronouns, there exist the "definite forms" or the inflectional forms further extended with the inflectional forms of *jìs*, *jì*. They are not used so frequently nowadays. The paradigms of the definite forms of *jìs/jì*, *tàs/tà*, and *šìs/šì* are as follows:

	singular		plural	
	m.	f.	m.	f.
nom.	*jisaĩ*	*jinaĩ, jìji, jijẽ*	*jiẽji*	*jõsios*
gen.	*jõjo*	*jõsios*	*jų̃jų*	*jų̃jų*
dat.	*jájam*	*jáijai*	*jíesiems*	*jósioms*
acc.	*jį̃jį*	*ją̃ją*	*juõsius*	*jąsias*
instr.	*juõju*	*jąja*	*jaĩsjais*	*jõsiom(i)s*
loc.	*jãjame*	*jõjoje*	*juõsiuos(e)*	*jõsios(e)*

	singular		plural	
	m.	f.	m.	f.
nom.	*tasaĩ*	*tóji*	*tiẽji*	*tõsios*
gen.	*tõjo*	*tõsios*	*tų̃jų*	*tų̃jų*
dat.	*tájam*	*táijai*	*tíesiems*	*tósioms*

		/taĩjai		
acc.	*tą̃jį*	*tą̃ją*	*tuõsius*	*tą́sias*
instr.	*tuõju*	*tą́ja*	*taĩsjais*	*tõsiom(i)s*
loc.	*tãjame*	*tõjoje*	*tuõsiuos(e)*	*tõsios(e)*
ill.	—	*tõjon* (DP)	—	—

	singular		plural	
	m.	f.	m.	f.
nom.	*šisaĩ, šìsai*	*šiój̃i, šiój*	*šiẽji*	*šiõsios*
gen.	*šiõjo*	*šiõsios*	*šiū̃jų*	*šiū̃jų*
dat.	*šiájam*	*šiáijai*	*šíesiems*	*šiósioms*
acc.	*šį̃jį*	*šią̃ją*	*šiuõsius*	*šią́sias*
instr.	*šiuõju*	*šią́ja*	*šiaĩsjais*	*šiõsiom(i)s*
loc.	*šiãjame*	*šiõjoje*	*šiuõsiuos(e)*	*šiõsios(e)*
ill.	*šiãjan*	*šiõjon*	*šiúosiuosna*	*šiósiosna*

It is notable that the originally acute first members of some forms have now the circumflex tone, e.g., instr. sg. m. *-uõju*, nom. pl. m. *-iẽji*, acc. pl. m. *-uõsius*. Their original tone was clearly the acute tone, as shown by the dialectal forms *túoj* < **túoju*, *tíej* < **tíeji*. The vacuous operation of Saussure's Law on these forms, in addition, supports this assumption. If we assume **tiẽjie* as the preform, it would have become **tiejíe* (> ✗*tiejì*). This points to **tíejie* as its protoform, which did not appear in the environment of Saussure's Law. Also, not only the dialectal forms with the final *jod* (palatal glide), but also the long acute forms (e.g., *tíe, túo, túos* [< **túosius*], *tó*, etc.) can be shortened forms of the definite forms. The reduction must be later than Leskien's Law, because otherwise they would have given rise to shortened forms (e.g., ✗*tì, tù, tùs*). Therefore, the circumflex tone in those definite forms can be acquired through the circumflex pronominal forms as simplexes. This has another implication in that the long acute forms resulting from the loss of the definite ending after Leskien's Law do not exhibit MC, at least in E. Aukšt. dialects, where such forms are most often found.

The first suggestion is that since some of the forms mentioned as dialectal forms are shortened forms of those with definite endings (see above; Zinkevičius 1966: 313, 1980–81: 162), the shortened forms reflecting the acute tone can be considered as having taken the acute tone from the definite forms, rather than the adjective definite ending,

although both of them are essentially the same morpheme. This is a trivial point, but when the acute variant endings are available among the pronominal forms, I believe that they must have been a more natural option for the speakers than the endings in the adjective paradigms.

The second suggestion is that such "definite pronouns" are the possible source of the tonal variants of pronominal forms. These definite forms above can be seen as some sort of compound pronoun of *jìs, jì, tas/ta, šìs, šì* and *jìs, jì*. If the definition of the definite pronouns is broadened to compounded pronouns, various types of compounded pronouns are found in more Baltic and Slavic languages, which will be seen in the following paragraphs.

Old Prussian OPru. *stas* 'that' is considered to be a contamination of either the original animate demonstrative stem **sa-* and **tas* (van Wijk 1918: 111) or **ši-* 'this' and *tas* (Stang 1966b: 232). Rosinas (1995: 86) takes up the attestation of gen. sg. f. *stesseias* (III, 125_6), *stesses* (III 111_{16}, 117_7), *stessies* (III 123_9, 75_{35})[77] and analyzes them as **stă̆s* + **i̯ă̆s*. In Stang (1966: 236), *tāns* 'he' is analyzed as a contaminated stem *tana-* < *ta-* + *ana-*. The second component *ana-* can be equated as a far deictic pronoun **anó-* 'that,' which is attested as a far deictic pronoun in Lith. *anàs*, OCS *onъ* 'that,' and as a second member in Gk. κεῖνος 'that there,' τῆνος 'id,' Skt. *aná-* 'that' (Dunkel 2014: II, 55ff.).

Latvian A definite form-like pronominal form *šuojuo* is found in *Latwju dainas* 10232, 1 (Endzelīns 1923: 390).[78] In addition, *šitas*, E. Latv. *šitis* (cf. Lith. *šitas* 'this,' OPru. *stas*) is from *šis* 'this' and *tas* 'that.' ELatv. *itis* (Lith. *ìtas* 'this') descends from PIE **e̯i̯-tó-* (Endzelīns 1923: 395; Dunkel 2014: II, 371). The 3rd person pronouns *viņš/viņa* 'he/she' are possibly from **u̯ina-* (← **u̯eina-* 'one') + *jis/ji* 'he/she' (Rosinas 1978).

Slavic As Ostrowski (2014: 246) notes, it is interesting to find compound pronouns also in Slavic, cf. ORu. *tyiže* 'the same,' Cze. *tý* (m.)/*tá*

[77] The attested locations are taken from Mažiulis (1988–1997: IV, 152–155).

[78] Kr. Barons un H. Wissendorfs *Latwju dainas.* I–IV. Jelgawâ un Petrogradâ 1894–1915.

(f.)/*té* (n.), and Cze. *týden*, Pol. *ty-* in *tydzień* 'week' (< *'precisely this day'). Vaillant (1958: 385ff.) in fact discusses that the **tad-je* (< n. **tad-ja(d)*; m. **tъ-jь*), comparable to Gk. ὁ αὐτός (m.)/ ταυτό(ν) (n.), is the background of the Slavic forms in *-žde*, cf. OCS *tъžde* 'the same,' gen. sg. *togožde*, *sьžde* 'this same,' and the Slavic words for 'week' listed by Ostrowski above.

In addition, a couple more parallels have been pointed out in the preceding works. Vasmer (1921: 139ff.) discusses OCS *kyjь* 'who/what' as being compounded from **k^{w}o/ā-* + **i̯o/ā-*. Schmalstieg (1972: 133ff.) considers the possibility that some Slavic inflectional forms of *jь* may descend definite pronominal forms; e.g., sg. dat. f. *jeji* ∼ Lith. *jájai*.

The origin of compound pronouns in Balto-Slavic and PIE Apart from the compound pronouns or definite declension of the pronouns, Balto-Slavic has a grammatical category that shows a parallel morphology, namely the definite adjectives. It has been suggested for definite adjectives that they originate from conflation with the relative pronoun **(H)i̯o-*[79] (cf. Delbrück 1893: 433; Zinkevičius 1957: 9–11; Koch 1992: 52ff.). However, the postponed component **is/*ī* cannot be a direct descendant of the PIE relative pronoun **(H)i̯o-*. Therefore, it is also assumed that the Balto-Slavic anaphoric pronoun **is/*ī* arose from the syncretism of the relative pronoun **(H)i̯o-* and anaphoric **is/*ih$_2$* (cf. Koch 1992: 59; Dunkel 2014: II, 312[5], 313[6]). Some case forms, e.g., m. nom. sg. *jis* , f. *jì*, m. sg. acc. *jį̃*, clearly descend the anaphoroic paradigms, while m. sg. gen. *jõ*, instr. *juõ*, f. gen. sg. *jõs*, etc. continue the relative pronoun paradigm.

Koch (1992:53ff.) argues that **(H)i̯o-* was the restrictive relative pronoun as opposed to the non-restrictive **k^{w}i-/*k^{w}o-* (cf. Sturtevant 1930: 146ff.), and its internal position in a nominal relative clause can be explained as the enclitic being in the second position (Wackernagel's position). Moreover, adducing Greenberg's word-order universal, he assumes that PIE word order (SOP) would have required a word order of a nominal attributive followed by its head noun. This explains the position of the compounded relative pronoun in the construction, i.e., Lith. *dangujé-**jis** têvas* 'the father who art in heaven (m. sg. nom.),' *dangujé-**jo** têvo* (m. sg. gen.), *šaltó-ji diena* 'the cold day (the day which

[79]Since the laryngeal is in the environment of Pinault's Law, it is expected to have been lost at an early stage even in Proto-Balto-Slavic.

is cold).' The Slavic material confirms the construction found in Baltic, e.g., OCS *utrějь* 'tomorrow' ← loc. *utrě* (n. nom. sg. *utro*) + rel.-pron. *-i* (< **jь*).

Koch (1992: 64) also claims that both the Baltic and Slavic definite forms phonologically show that the univerbation of the definite adjective forms occurred after the divergence of Baltic and Slavic. In Slavic, the univerbation of the adjective and relative pronoun was preceded by the Slavic Auslautgesetz, e.g., PIE **neû̯-o-s* > PS **nov-ъ*; **nov-ъ* + *jь* → **novъ-jь* 'the new;' however, Lith. *naujàsis* 'id' (< PBS **-os-jis*). In Baltic, it was preceded by the extension of pronominal endings to the simplex adjectives, e.g., m. dat. sg. **geruoi* → *geramui*; *geramui* + *jamui* → **geramuijamui* (→ *gerãjam*), and by the attachment of postpositions in locative and the secondary locative cases, e.g., f. loc. sg. **gerāi* → *gerāi* + *en*; **gerāję* + *jāje* → **gerojęjoje* → Lith. *gerojoje*, cf. PS. def. **dobrěi* to indef. **dobrě*.

In this way, the definite declension of the adjectives are assumed to have originated from the conflation of adjectives with the relative pronoun **(H)î̯o-* in Proto-Balto-Slavic, although the univerbation process took place after the split of the branches. If the definite declension of the pronouns can be attributed to the same process, it can be assumed that they also originated from the conflation with the relative pronoun. Vaillant (1958: 430) in fact points out that **tad-je* (n.) underlying the Slavic forms in *-žde* is a remnant of the productivity of such formations, and this means that the postponed relative pronouns were often employed in Balto-Slavic. In the case of the definite pronouns, however, the univerbation can be expected to have taken place earlier, because in **tad-je* (n.), the Slavic Auslautgesetz had not taken place yet. It can be even dated before the final devoicing of obstruents in Proto-Balto-Slavic (cf. Olander 2015: 50).

On the other hand, we also find compound pronouns in other Indo-European languages as well, e.g., Lat. *is-te, is-ta, is-tud* 'that,' Gk. οὗτος, αὕτη, τοῦτο 'this.' Lane (1961: 469) discusses the possible formation of compounded pronouns in Proto-Indo-European. He considers semantic factors rather than phonetic factors to be the motivation of such formations, stating that "a demonstrative tends to become weaker and weaker in its deictic force, and is therefore continually reinforced by being compounded with itself or with other demonstratives or with adverbs."

Lat. *is-te, is-ta, is-tud* 'that' is considered a composition of an anaphoric pronoun **is* and a demonstrative pronominal stem **to-* in Sihler (1995: 394). In its paradigm, the first member does not inflect anymore, but he thinks that both of the components were originally inflected pronouns based on an attested form *eāste* (acc. pl. f.). The first element **is* is etymologically exactly the same morpheme as Lith. *jìs/jì* 'he/she' (Dunkel 2014: III, 363ff.). Gk. οὗτος, αὕτη, τοῦτο 'this' is analyzed as a composition of demonstrative ὁ/ἥ/το + full-grade of a particle **u* + demonstrative **to-* (Sihler 1995: 390). Its paradigm retains more remnants of the inflectional forms of both elements, but the first member exhibits some leveling of the stem. The particle **u* is called an asseverative or deictic particle in Sihler, while it is analyzed as an allomorph of a particle **h₂o* 'thereby, thereto, also' in Dunkel (2014: II, 334ff; 344[45]). In addition, Skt. *aná-* 'he' (< anaphoric **e̯i̯* + far deictic pronoun *nó-*) and Skt. *etád*, Lith. *ìtas*, ELatv. *itis* 'this' (< **e̯i̯-tó-*; Dunkel 2014: II, 371) may belong here.

Consequently, the Balto-Slavic definite pronouns can be also interpreted as the descendants of such compound pronouns commonly seen among the Indo-European languages. Both interpretations, though, allow us to assume that the definite declension has already started to develop in the early Proto-Balto-Slavic stage.

4.4.1.4 Analysis

The argument on the origin of the definite adjectives above offered the insight that the definite declension of the pronouns may have also originated from the conflation with a relative pronoun that was syncretized with the anaphoric pronoun **is/*ī* in PBS. Alternatively it could be also interpreted as a compound pronoun with demonstrative and anaphoric pronouns.

As Ostrowski (2014: 246) and Vaillant (1958: 385ff.) note, there are some Slavic data which indicate the formation of definite pronoun forms in Slavic as well. Especially the Slavic forms in *-žde* indicate that the formation of compound pronouns could have been at an early Proto-Balto-Slavic stage. Consequently, there could have been both simplex and compound/conflated demonstrative pronouns side by side in PBS. This may fit the data of the pronouns also from a phonological point of view. As we saw in §4.4.1.1, some fragments of evidence for MC in PBS discussed in the previous sections predict the circumflex tone

for monosyllabic pronominal forms. Therefore, the acute tone in some definite forms (e.g., m. nom. pl. *tíej* [< **tíejie*], f. nom. pl. *tóji/tój*) indicate that their formation may be at the Proto-Balto-Slavic stage before the operation of MC.

Therefore, it is reasonable to expect that the compound pronouns consisting of a demonstrative pronoun and relative/anaphoric **i̯o/i̯ā* in Proto-Balto-Slavic later developed into the definite pronouns in Baltic, leaving some remnant forms in Slavic. With the assumption of MC in Proto-Balto-Slavic, it can be suggested that MC created two types of variants originating from simplex pronouns and compound pronouns; the simplex pronouns provided the circumflex variants, while compound pronouns provided the acute variants. These variants can be the source of the complex tonal variants of the pronouns in Lithuanian, while in Latvian the acute variants are exclusively selected. This assumption can explain the circumflex tone in the nom. pl. m. **tę̃* for pre-Lithuanian in contrast to the acute tone in Latvian and Slavic.

4.4.1.5 Spread of Metatony to Polysyllabic Pronominal Forms

Some endings of polysyllabic pronominal forms have the irregular circumflex tone, e.g., instr. sg. *anuõ* 'that,' *katruõ* 'which' from *tuõ*; nom. pl. *aniẽ*, *katriẽ* from *tiẽ*; acc. pl. *anuõs*, *katruõs* from *tuõs*, etc. (Hanssen 1885: 617; Zinkevičius 1984–95: 206).[80]

In the case of 3rd person future forms, the different treatment of the MC forms affected the treatment of the polysyllabic forms differently in dialects (§4.1.4.7). Therefore the same analogical relation may be expected for the pronominal forms. Although it may not be as clear-cut as among the 3rd person future forms, a similar tendency is observed. For example, in Žemaitian dialects, nom. pl. m. *ãnie* with the long ending is found (cf. *teĩ*, *tẽ*, *tĩ*), and acc. pl. *anùs*, *katrùs* are found (cf. *tùs*; Zinkevičius 1966: 310). Likewise, in East and South Aukštaitian dialects, the long acute endings, nom. sg. fem. *-ó*, instr. sg. m. *-úo*, nom. pl. m. *-íe*,

[80] Old Lithuanian definite adjective forms with unshortened endings, e.g., *teiſuſie* interpreted as *teisūs-jie*, which are considered to be a piece of evidence that the conflation of the adjective and relative pronoun after MC by Hock (forthcoming), can be alternatively taken as one of the cases where the MC forms spread to polysyllabic forms.

acc. pl. m. *-úos*, for monosyllabic pronouns spread to polysyllabic pronouns e.g., *kataró* (std. *katrà* 'which'), *katarúo*, *kataríe*, *katarúos*. They further spread to adjectives in some cases, e.g., nom. sg. f. *baltó*, etc. (but acc. pl. m. ✗*baltúos*, f. ✗*baltós*; Zinkevičius 1966: 312).

Both the 3rd person future forms and pronominal forms mentioned here show a tendency. The different choices of the monosyllabic (circumflex) or polysyllabic (acute) variant in dialects further spread to the final syllable of the polysyllabic forms. If the acute variants are chosen for particular categories, the acute endings spread to the polysyllabic forms (acc. pl. m./instr. sg. m. pronouns in Žemaitian dialects and 3rd person future forms in E. Aukštaitian dialects). If the circumflex variants are chosen, then the circumflex endings spread (the pronominal forms in instr. sg. m./nom. pl. m./acc. pl. m. and 3rd person future forms in W. Aukštaitian dialects). This can make it appear that the MC phenomenon is spreading among the W. Aukštaitian dialects and is an areal phenomenon, according to Kortlandt's (2014: 218) analysis. However, taking the results from §4.1 and 4.2 into account, it has to be assumed that the MC forms themselves have existed since the old stage, while the biased choice of MC forms and its spread to polysyllabic forms in W. Aukštaitian dialects is more recent.

4.4.2 1st and 2nd Person Pronouns

In this section, the participant pronouns will be examined. Due to their suppletive nature and the irregular correspondence of their assumed cognates in the daughter languages, the systematic treatment that has been attempted for non-participant pronouns above is not valid for these participant pronouns. They will instead be treated individually, with the analysis focusing more on their individual histories and the semantic relations among them.

4.4.2.1 1sg. *aš/eš*

It can be assumed that the parent form of Lithuanian 1sg. pronoun was probably not in the environment of MC.

1sg. nom. *aš* (OLith. *eš*) has Indo-European cognates with a short vowel with a possible "extension," cf. OCS *azъ*, ORu. *(j)azъ*, SCr. *jâ*, Gk. ἐγώ, Lat. *egŏ*, Skt. *ahám*, among others. Its reconstruction for PIE is disputed, but it would be a shape like **eĝ(H)-ŏ́m* (cf. **eĝ(H)-ŏ́(H?)m*

by Katz 1998: 21, **eĝHóm* by Kapović 2006: 36). Beside this disyllabic form inherited to Proto-Balto-Slavic, as indicated by the Slavic forms, an inherited monosyllabic form **eĝ* (**eḱ*) is also indicated by the Baltic forms, OLith. *eš*, Latv. *es* and OPru. *as, es*, which lack the operation of Winter's Law.

In fact, the first syllable of **eĝ-(H)ó̯m* is in the environment of Winter's Law, therefore the vowel in the initial syllable is expected to be lengthened. This is reflected by a few Slavic cognates: Sln. *jàz*, North and some Central Čakavian *jä(z)*, and Kajkavian *jä(z)*, as Kapović (2006: 34) states. Based on this fact, he (also Kapović 2009a: 64ff.) argues that the Baltic forms reflect the monosyllabic variant **eḱ* with a final devoicing that probably took place in Proto-Balto-Slavic, while Slavic inherited both the monosyllabic variant **eĝ*, which gave rise to the PS acute **jā́* via Winter's Law, and the disyllabic variant **eĝ-(H)ó̯m*, which gave rise to an end-accented **jāzъ́* and later received neo-acute tone on the first syllable (**jázъ*) via Ivšić's rule (more commonly known as Stang's Law).

However, there are a few questionable points in Kapović's assumption of the PBS monosyllabic **éĝ*. As he assumes that the Baltic forms lack Winter's Law and therefore reflect the devoiced **eḱ*, the devoiced **eḱ* must have existed in Proto-Balto-Slavic. Indeed, according to Olander (2015: 50), the word-final devoicing rule in Proto-Balto-Slavic is supposed to precede Winter's Law as the PIE *o*-stem pronominal neuter nom.-acc. sg. **-od* gives rise to PS **-o*. Therefore, the acute tone of monosyllabic PS **jā́* may not be attributed to Winter's Law in PBS **éĝ*. Also, Shintani (1985) proposes that Winter's Law most likely operated on an unstressed vowel preceding an unaspirated voiced stop. If this proposal is correct, the monosyllabic **éĝ* was not in the environment of Winter's Law, which may constitute another counterargument against this assumption.

Alternatively, it can be assumed that while monosyllabic PIE **éĝ* developed into **éḱ* before Winter's Law operation, which eventually gave rise to Baltic short monosyllabic forms including Lith. *eš, aš*, disyllabic PIE **eĝ-(H)ó̯m* developed into PBS **eĝóm*, which gave rise to **ēĝóm* through Winter's Law. The monosyllabic and disyllabic variants inherited in Proto-Slavic assumed by Kapović (2009a) may have arisen from PBS **ēĝóm* at an early Proto-Slavic stage, as **ēĝ* > PS **jā́*; **ēĝóm* > PS **jāzъ́* (> **jázъ*). The Slavic data aside, it is thus clear

that Lith. *eš*, *aš* reflect an ancestral form with a short vowel in PBS; therefore this won't be discussed furthermore in this thesis.

4.4.2.2 1pl. *mẽs*

1pl. nom. *mẽs* is an irregular form since the originally short vowel *-e-* is lengthened in a closed syllable. Short vowels *a* and *e* are usually lengthened in an open syllable that is accented (cf. footnote 2, p. 30). The short vowel in Lith. *mẽs* can be equated to Arm. *mekʿ* 'we,'[81] OPru. *mes*, Latv. dial. *mes* (ELatv. *mas*), and Endzelīns (1971: 188) assumes that the short vowel is original to this form. He explains that the long vowel in Latv. *mẽs* and Lith. dial. *mẽ̃s* is a secondary lengthening under the influence of 2pl. *jūs*. Stang (1966b: 254) assumes another factor, namely, a possibility of an emphatic lengthening. Therefore, this form does not need to be discussed in the MC context, either.[82]

Thus, the personal pronoun forms to be discussed in the environment of MC are 1pl. acc. *mùs*, 2sg. nom. *tù*, 2pl. nom. *jūs*, and 2pl. acc. *jùs*, all of which can be descended from forms with old long vowels.

4.4.2.3 2pl. nom. *jūs*

2pl. nominative pronoun has cognates such as OAv. *yūš*, Goth. *jūs*, Skt. *yūyám* and OAv. *yūžəm* with an extension. They all point to a root with a long vowel. These forms point to a **i̯ūs* or **i̯uHs* in PIE. Therefore, a PBS **i̯ūs* is expected as a pre-MC form. In fact, the circumflex tone is supported by Čak./SCr *vî* (< PS **vŷ*) and Lith. *jūs*; on the other hand, Latv. *jũs* and probably OPru. *joūs* also point to the acute. Since,

[81] We find also Skt. *vayám* and Goth. *weis* for the 1pl. pronoun, both of which point to PIE **u̯ei-*. Stang (1966b: 254) states that there can be two different stem formations for 1pl. nom. pronoun in PIE, although it is not possible to determine the mutual relationship of the two. Katz (1998: 25, also fn. 40) also adheres this view, mentioning another possibility that the difference between the two stems may have been that of inclusive and exclusive pronouns. Endzelīns (1948: 163) maintains a different view, namely that **m-* may have developed from the 1pl. verbal ending **-mes-* beside the original **u̯-*.

[82] Monosyllabic Lengthening (see below), proposed by Kapović (2006), might be considered as a possible explanation for short/long variants in East Baltic. However, in the case of **mẽs*, there is not enough comparative evidence for a long variant already in PIE.

according to Rinkevičius (2009: 83), the diphthongized *ou, ei* (< *ū, ī*) never occur with a macron on the first element in the IIIrd Catechism,[83] it is not totally clear whether the macron on *joūs* can be immediately interpreted as denoting the acute tone.

The Lithuanian circumflex tone of Lith. *jūs* is difficult to explain without MC. It has been shown already in §4.1 that the monosyllabic acute forms are indeed subject to Leskien's shortening, and that would have applied to **i̯ūs* giving rise to ✗*jùs*. Moreover, the shortened 3rd person future forms indicate that there was no MC after the restoration of the acute root to their stem in PB until Leskien's Law. Yet, even if that is the case, the long vowel could have still been restored from gen. pl. *jū́sų*, but that would yield ✗*jū́s* without MC.

Kapović (2006: 89ff.) assumes that the circumflex tone of PS **vŷ* is analogically copied from 2sg. *tŷ*. He reconstructs a mobile paradigm for the 2sg. pronoun **tŷ* and attributes its circumflex tone to the operation of Meillet's Law. Contrastively, an immobile paradigm can be reconstructed for the pronouns in 2pl., as well as in 1pl., 1du., and 2du., where their nominative forms have the circumflex tone (2pl./2du. **vŷ*, 1pl. **mŷ*, 1du. **vę̂*) unattributable to Meillet's Law. He argues that their rhyming with 2sg. **tŷ* led them to accept the circumflex tone. However, it is left unexplained that 1du. **vę̂* without rhyming also received the circumflex tone. Moreover, if an analogy was at work in all the nominative pronominal forms in 1st and 2nd persons (except 1sg.), we might expect the other four forms with the alleged acute tone would have eliminated the circumflex tone of 2sg. **tŷ*, which would be the only circumflex nominative form among them without MC. Finally, Rasmussen (2007: 31) points out another possibility for the paradigm of the 2sg. pronoun. The accent on the 2nd syllable in 2sg. gen. (SCr. *tèbe*. Ru. *tebjá*) and dat. (*tèbi*, *tebé*)could be the result of Dybo's Law in comparison to Skt. *táva* and *túbhyam*, and Meillet's Law was not at work in that case. If this is correct, the circumflex tone of nom. **tŷ*, and consequently that of 2pl. **vŷ* as well, should be attributed to MC.

Thus, in my opinion, Slavic and Lithuanian forms instead point to a parent form with MC. Then, we are left with a problem of the acute tone

[83] This means that the roots corresponding to the Lithuanian forms with circumflex root are also spelled with the macron on the second element, e.g., *doūsin* 'soul' ∼ Lith. *dūšià* (2; acc. sg. *dūšią*) 'soul, spirit,' *salaūban* ∼ Lith. *šliūbas* (2) 'church wedding ceremony.'

of the Latvian cognate. For this problem, I would instead like to seek a solution in individual analogical processes in each of the languages. Latv. *jũs* may be from gen. pl. *jũsu*. If the Old Prussian spelling ⟨oū⟩ denotes the acute tone in the 2pl. pronominal forms, then, OPru. *ioūs* could be from the gen. pl. *ioūsan* and dat. pl. *ioūmas*. In fact, the same process has taken place in some Lithuanian dialects as well – according to Zinkevičius (1966: 296), in areas like Tirkšliai, Laukuva, Jurbarka, Veliuona, etc., an acute nom. pl. *jū́s* is used due to the acute tone of the genitive form. Also, short *jùs* is found in south Žemaitian dialects, which Zinkevičius (1966: id.) attributes to the short 1pl. nom. *mès* in the same area. Therefore, the spread of the long acute vowel to 2pl. nom. pronoun would be after Leskien's Law had taken place, since otherwise only the shortened form *jùs* would be exclusively observed.

As seen in §4.1, the archaic result of MC among the 3rd person future forms is preserved only in the southern West Aukštaitian dialects of Lithuanian. In many of other dialects and Latvian, it was eliminated through paradigmatic leveling at different times – before Leskien's Law in E. Aukštaitian, after Leskien's Law in Žemaitian, unclear in Latvian. Thus, it may be another phonological archaic feature of southern West Aukštaitian dialects that the result of MC is preserved relatively intact, escaping the peer pressure in the paradigms. This fact may lead us to expect that the elimination of the result of MC through analogy may happen more often in other dialects and languages.

4.4.2.4 2sg. nom. *tù*

2sg. nominative pronoun has both short and long cognates. The closest sister language, Latvian, has a short form *tu*, as do OE *þu*, Gk. Dor. τὺ, Skt. *tú*, OIr. *tu-ssu*, Arm. *dow*.[84] On the other hand, the following cognates have a long vowel: OPru. *tū*, *toū*, OCS *ty*, SCr. *tî*, Lat. *tū*, Gk. Hom. τύνη, Av. *tū*, Skt. *tū*, Alb. *ti*, Hitt. *zīg*, Pal. *tī*.[85]

Often the form **tuH* is reconstructed for PIE with a laryngeal based on the cognates with a long vowel and an assumption that Lith. *tù* has been shortened from an acute long form **tū́* by Leskien's Law. However, as Katz (1998: 24) expresses, there actually seems to be no ev-

[84] Cf. Katz (1998: 178) for the parent form of Arm. *dow* with a short vowel.

[85] For PIE **ū* > PA **ī*, and the original 2pl. nom. **tū́*, see Melchert (1994: 84, 132).

idence that allows us to decide between **tū́* and **tuH*. There was a proposal that a PIE sequence **-uH(-)* should give rise to PGk. **-u̯ā(-)*. This assumption would predict ✗σσά̓ or ✗σσή̓ for Gk. 2sg. nom. However, this proposal has not met a general acceptance due to many counterexamples.[86] Alternatively, Katz (1998: 177ff.) proposes that besides the tonic pronoun **tū́*, there was also a "weakened" clitic variant **tu*, which was probably used as a discourse particle. Since both PIE **ū* and **ŭ* yield *ow* in Armenian, the vocalism is not decisive, but the initial consonant *d-* raises a problem because PIE **t-* usually gives rise to Arm. *t'-*. Katz (1998) focuses attention on the fact that many IE languages have clitic and tonic forms, e.g., Skt. *tú* ∼ pronoun *t(u)vám* with an **-om* suffix, Av. *tū* (clitic/pronoun) ∼ *tuuəm* (pronoun), and a discourse particle developed from the 2nd person pronoun, like Gk. τοι 'let me tell you' and Eng. *y'know*. Besides this, another fact that the majority of the attested forms have the long vowel allows one to assume that the short form probably developed from the long tonic form through its use as a discourse particle with a weaker stress. He continues that this further explains the unexpected initial consonant **d-*, which is paralleled in the development of the demonstrative clitic *-d* (< **(-)to-*) under reduced stress.

On the other hand, according to Kapović (2006: 147), who proposes Monosyllabic Lengthening for PIE, **tū́* can be the long variant of **tu* produced through ML. He rejects the reconstruction **tuH* because it cannot explain the short variant. Whichever is the original form or the derived form, the existence of the long and short variants of the pronoun makes the reconstruction without a laryngeal more favorable.

For Balto-Slavic, PIE **tū* gives rise to **tū*, which is clearly continued by PS **tȳ*, whose circumflex tone is supported by SCr. *tî*, Sln. *tî*. As discussed in the last section, the circumflex tone of PS **tȳ* is probably due to MC. Latvian short form can either be the short variant inherited from PIE, or a result of enclitic shortening. The Lithuanian form is ambiguous at first glance, since it can be either from an East Baltic short form like Latvian, or from **tū́* later shortened by Leskien's Law. But Žem. *tọ̀* clearly points to the short **tu*, cf. Zinkevičius (1966: 298); Stang (1966b: 247). OPru. *toū* has the same problem that *ioūs* presented above. I just mention a possibility that this might be due to the

[86] An informative summary of the view and the counterarguments against it is found in Clackson (1994: 41–49).

influence of the acute 2pl. nom. *ioūs*, as 2pl. nom. *jūs* caused 1pl. **mes* to be lengthened to *mẽs* in Lithuanian (see §4.4.2.2), in the case that this form has the acute tone.

4.4.2.5 1pl. acc. *mùs* and 2pl. acc. *jùs*

Lith. *mùs*, *jùs*, Latv. *mũs* (1pl. acc.), *jũs* (2pl. acc.), and OPru. *mans* (1pl. acc.) are probably innovative form, as compared to OCS *ny*, *vy*, Skt. *nas*, *vas*, Lat. *nōs*, *uōs*, OPrus. 2pl. *wans*. Stang (1966: 256) explains that first EB **júns* was reformed based on the nominative form *jūs*, and 1pl. **múns* was created after the model of **júns*. Endzelīns (1923: 380) more specifically proposes the *u*-stem declension as the possible model of this remodeling of 2pl. accusative form. Contrastively, the remodeling of OPruss. *mans, wans* is not after the *u*-stem declension, but rather after the **tōns* type. Therefore, the reformation of **múns* and **júns* was probably at the Proto-East-Baltic stage.

Accentologically, the acute tone of Latv. *mũs* and *jũs* corresponds to Lith. *mùs* and *jùs*, assuming that Lithuanian forms are resulted through Leskien's Law from **mṹs* and **jṹs*. These probably intermediate parent forms (between **muns*, **juns* and *mùs*, *jùs*) may be justified by a possibility brought up by Zinkevičius (1966: 305). He cites seven types of adessive forms in 1pl. and 2pl. attested in various dialects, and one of them in the type *mūsp(i)* and *jūsp(i)* (variously accented in different dialects) is probably formed based on the accusative plural stem, not on the usual locative plural.

The problem is, though, that the formation of **múns* and **júns* is estimated in the Proto-East-Baltic stage, since Slavic still keeps the *ny*, *vy*-type forms. In Proto-East-Baltic stange, it was already long after the operation of MC in Proto-Balto-Slavic, and it may need to be examined how the supersegmental feature of such new (but not entirely new) vowels were treated. Theoretically, such new long vowels are expected to receive the circumflex tone as shown by some loan words with the circumflex tone. Where does the acute tone of **múns* and **júns* come from?

Now I would like to draw the reader's attention to Endzelīns' (1923: 380) remark that the possible model of their accusative plural ending is the *u*-stem declension. If his assumption is correct, the acute was brought to those accusative forms from the *u*-stem accusative plural

ending **-uns* (> PB **-ūs*).[87] As long as I have observed, there has not been any monosyllabic words in *u*-stems. Therefore, the ending must have been available only with the acute tone. This could provide a possible source of the acute tone in those pronominal forms.

4.4.3 Numeral: *dù* (m.), *dvì* (f.) 'two'

This numeral has monosyllabic and disyllabic cognates among IE languages.

(51) monosyllabic:
Skt. m. *dvā́*, f. *dvé*, Goth. *twai*, OPruss. *dwai*

(52) disyllabic:
Skt. *duvā́* (*duvā́-daśan* 'twelve'), Gk. δύω, Lat. m. *duō*, f. *duae*, OCS *dъva* (m.)/*dъvě* (f.), Russ. m./n. *dva*, f. *dve*, SCr. m./n. *dvâ*, f. *dvïje*, Latv. *divi* (nom.-acc. m./nom. f.),

The masculine form reflects variants in PIE **dṵoh*$_1$ and **duṵoh*$_1$, which are Lindeman's Law variants (Lindeman 1965: 60ff., 70). Even Lithuanian and Latvian reflect different Lindeman's variants. In addition to the disyllabic *divi*, Latvian preserves monosyllabic variants in both the simplex (ELatv. *dū*) and in the compound (*duokārt*, *duoreiz* 'twice' in Adolphi). Because of these diverged data, Stang (1966b: 277) states that **duṵō* and **dṵō* were still altering in Proto-Baltic according to a rhythmic rule. The East Baltic data may suggest that this alternation survived even as late as Proto-East-Baltic. With the reflexes of **duṵ-* in OCS, the alternation between **dṵ-* and **duṵ-* can be securely traced back to Proto-Balto-Slavic. As the data from other IE languages show, this is supposed to be a phenomenon inherited from the protolanguage. Consequently, the monosyllabic variant PBS **dṵó* could give rise to **dṵõ* through MC, which should give rise to Lith. ✗*duõ*. On the other hand, the disyllabic variant **duṵoh*$_1$ would develop to **duṵó*, giving rise to Lith. ✗*duvù*.

[87] The sound change discussed earlier in §4.4.1.1, I assume, applies to the *u*-stem ending in accusative plural as well. This assumption explains the acute tone in this ending, as in *turgùs* (*tur̃gus* (2) 'market'), *pelùs* (*pẽlūs* (4) 'chaff').

The feminine form is reconstructed as **dṵeh₂ih₁* (with the feminine stem in **-eh₂* and the dual ending **-ih₁*, cf. Eichner 1982: 20; Olander 2015: 194).[88] The reconstructed form **dṵeh₂ih₁*, however, would not give rise to any source for the acute tone in Baltio-Slavic. Eichner (1982: 20) operates with a laryngeal metathesis to handle this problem. According to his suggestion, **dṵeh₂ih₁* (> **dṵah₂ih₁*) could develop to **dṵaih₂h₁* through a laryngeal metathesis, which could give rise to the acute tone in Balto-Slavic without an assumption of MC. Otherwise, the acute tone in its Baltic descendants needs to be understood as analogical to the m. nom. du. **-ō̲* (Gorbachov 2015: 190). If we accept Eichner's suggestion, **dṵaih₂h₁* would have a Lindeman's variant **duṵaih₂h₁*, which would give rise to PBS **duṵāi̯*. On the other hand, the monosyllabic variant **dṵaih₂h₁* possibly developed into PBS **dṵāi̯*, further to **dṵāi* through MC. With Jagić's (1906: 120) proposal that Slavic *ě* reflects a non-acute PBS **ai* in mind, OCS *dvě* (f. nom.-acc. du.) seems to reflect the non-acute **dṵāi*.

At face value, the Lithuanian attested forms *dù*/*dvì* are shortened from the monosyllabic preform **dṵṓ*/**dṵḗ*. Therefore, the problem is why they do not reflect **dṵṍ*/**dṵḛ̃* with MC. There are only two monosyllabic forms with the long vowel, *dŭ̀o, duò* in Linkuva (E. Aukšt.), and Žem. *dou* (Zinkevičius 1966: 322). Petit (2002: 258ff.) considers this to be a piece of evidence against the existence of MC, whereas there have been a few explanations proposed on the form under the presumption of MC. Zinkevičius (1980–81: II, 57–58) assumes that the disyllabic variant **duṵṓ* gave rise to pre-Lith. **duvúo*, reduced to **dvúo*, further to **dúo*, which was shortened to *dù* by Leskien's Law. He also suggests that the form can have been shortened by the influence of the nominal ending in dual, especially in a construction like *dù vilkù* 'two wolves' (< **duõ vilkúo*), and a pronoun *abù* (m.)/*abì* (f.) 'both' may also have had some influence especially in a usage *abùdu/abìdvi*. This sort of traditional explanation requires a relative chronology of MC to be older than Leskien's Law. Petit (2002) does not accept this view, since he assumes that the alleged examples of MC are byproducts of Leskien's Law. Against Zinkevičius' view, he presents a question as

[88] In Klingenschmitt (1994a: 383[125]), **dṵeih₁* is also suggested. However, PIE **-ĕi* gives rise to Slavic *-i* (cf. **h₁ei-* 'to go' > OCS *iti* 'to go,' Lith. *eĩti*; **seh₁i-to* (LIV 519) > OCS *sito*, SCr. *sȉto* 'sieve,' Lith. *síetas* (1), Bräuer 1961–1969: I, 70, 74), which is not compatible with OCS *d(ъ)vě* 'two (f.).'

to why the same thing did not happen to the pronoun *tuõ* in *tuõ vilkù* 'with the wolf.' This makes the point, although I do not agree on his view, that the examples of MC are in fact byproducts of Leskien's Law, since, as we have seen in the previous sections, MC is projected to a Proto-Balto-Slavic stage. Indeed, the reason that the collocation *tuõ vilkù* did not affect the vocalism of *tuõ* should be explained by there being no form in homonymic clash in the pronominal paradigm in the prehistory, as shown on p. 179. It follows that the rhyming in collocations like *tuõ vilkù* did not play as important a role as assumed so far. Moreover, the syncope of the vowel assumed for **duvúo* > **dvúo* appears to be *ad hoc*,[89] and certainly the traditional explanation is not entirely satisfactory.

Alternatively, I suggest a contamination between the monosyllabic and disyllabic descendants. The monosyllabic descendant PBS **dų̂ố /*dų̂ẵi* could give rise to pre-Lith. **duõ/*dviẽ*, while the disyllabic descendant **duų̂ố/*duų̂ẵi* could give rise to **duvúo / *duvíe*. In fact, the dual forms of the demonstrative pronoun *tàs/tà* have three variants in different dialects: m. *tuõdu, túodu, tùdu*/ f. *tiẽdvi, tíedvi, tìdvi* (Zinkevičius 1966: 316). One set of them, i.e., m. *tuõdu*/f. *tiẽdvi*, seems to reflect the dual ending in the monosyllabic variant. Through a contamination process, the onset structure of the monosyllabic variant was kept, while the rhyming part of the disyllabic part was adopted. The motivation for such a choice could have been the avoidance of the possible homonymic clash with the endings, i.e., PEB m. instr. sg. **-ō̄* > Lith. *-uõ* and PEB m. nom. pl. **-ę̄* > Lith. *-iẽ* of pronouns. As the alternation between the monosyllabic and disyllabic variants are reasonably expected to survive until Proto-East-Baltic and are still observed in Latvian, this contamination process does not have to be as old as Proto-East-Baltic. The dialectal forms (E.Aukšt. *dŭò/duò* and Žem. *dou*) that Petit (2002: 258ff.) mentions can be explained as an influence from the ending of the polysyllabic variant, as in m. *túodu*/f. *tíedvi*.

[89] The loss of the glide **u̯* (> *v*) preceding a round vowel is not *ad hoc*, with parallels (*sesuõ* 'sister' < **sų̂esōr*; *sãpnas* 'dream' < **sų̂op-no-* 'sleep') and with a phonetic motivation of avoidance of the labial segments in sequence.

4.4.4 Summary

In this section on pronouns, I have discussed the demonstrative pronouns, participant pronouns, and a numeral. Unlike the 3rd person future forms, the data are more diverged, and it is difficult to attribute all the reflexes of each pronoun to one and the same protoform with the same tone. Therefore, I have not attempted to prove the existence of MC based on the pronouns. Rather, there was an attempt in this section to show how the pronominal forms can be accommodated by the results of the previous section, which showed that MC must have taken place in Proto-Balto-Slavic.

I have pointed out the existence of disyllabic variant forms of these pronouns and suggested that they can be better source of the acute tone of the acute monosyllabic reflexes. The variant forms were definite pronouns for the demonstrative pronouns, while it was Lindeman's variant that contributed the numeral 'two.' However, the participant pronouns cannot be explained in the same way. They do not have disyllabic variants. What is more, the paradigms of these pronouns are highly suppletive, and a usual paradigm leveling cannot be expected. Some unique analogical influences have been proposed. Nonetheless, the distribution of the circumflex variants of demonstrative pronouns (instr. sg. m., nom. pl. m., and acc. pl. m.) in West Aukštaitian is noteworthy, because the metatonical pattern in the 3rd person future forms is also spreading (except to Gp. 1 verbs) in the area, too. The pattern was rather overgeneralized among the 3rd person future forms in N-W. Aukštaitian dialects, while the same thing did not happen with the demonstrative pronouns. This may indicate a tendency of the W. Aukštaitian dialects to preserve the metatonical forms of the monosyllables.

5. Conclusion

This thesis has examined monosyllabic forms with the unexpected circumflex tone to establish the existence of MC and its relative chronology. The purpose of this examination is to make a partial contribution to the solution of the problem concerning whether PIE long vowels are reflected by the acute or circumflex tone in Balto-Slavic.

The following sections will summarize the results of the survey, evaluate its contribution to the solution of the problem, and consider the phonetic nature of MC in more depth.

5.1 Results

The chapters above have examined the existence of MC and its relative chronology. The first two chapters are devoted to the preliminary and the review of the preceding works on the topic. CHAPTER 3 argued that some examples of MC cannot be attributed to a result of analogy. The alleged analogical models of MC forms often have the acute tone (e.g., *ger**íe**ji* 'the good (nom. pl. m.)' --→ ***tiẽ*** 'they;' *ger**úo**ju* (instr. sg. m.) --→ ***tuõ*** 'that (id.);' *d**úo**siu* 'I will give' --→ ***duõ**s* 'will give (3p.);' ***dé**siu* 'I will place' --→ ***dẽ̃**s* 'will place (3p.)'). Therefore, the circumflex tone in the monosyllabic forms requires an assumption of a *métatonie douce* in monosyllables, i.e., MC. There is also another argument in favor of MC. The circumflex tone of m. instr. sg. *tuõ* (< PIE **-oh*$_1$) indicates that circumflex tone in monosyllables cannot be attributed to the laryngeal loss after the lengthened-grade vowel (**-$\bar{V}H$*), which Kortlandt (1985: 115, 2002: 16) proposes for explaining the circumflex tone of the examples of Proto-Balto-Slavic MC. Taking into account the acute tone of the same ending in polysyllabic forms (e.g., *ger**úo**ju*), this instead undoubtedly shows that a morpheme with acute tone must be circumflexed in a monosyllabic form.

CHAPTER 4 examined instances of MC in accordance with the four categories in which they are found. In §4.1, a close examination of

the distribution of MC and shortening of the 3rd person future forms of monosyllabic acute stems revealed that the shortening is limited to a morpho-semantic group of verbs, i.e., inchoative thematic verbs (e.g., 3p. pres. *pũ̃va* (< **puñva*), 3p. fut. *pùs* ∼ *pū́ti* 'to rot;' 3p. pres. *šlỹja* (< **šliñja*), 3p. fut. *šlìs* ∼ *šlýti* 'to lean'), which may have been related to the intransitive inchoative thematic verbs in the Northern Indo-European languages (cf. Gorbachov 2007). Contrastively, the result of MC is preserved among the future forms with inherited full-grade roots. Therefore, MC should be regarded as the regular phonological development of an acute monosyllabic word, and the phenomenon cannot be regarded as a byproduct of Leskien's Law (§4.1.5) contra Petit (2002). This also shows that Leskien's Law was not blocked in monosyllabic words (Blevins 1993).[1]

Furthermore, the Baltic future stem formation of the inchoative thematic verbs are considered to be morphologically secondary. Its synchronic structure comprises the zero-grade root with the future formant *-s-* and Narten-type endings. This would not have been admissible in Proto-Indo-European, and therefore must be the result of a morphological reformation based on the Baltic future formation, according to which the stem is based on that of the infinitives, and the endings are adopted from that of the Narten-type. And MC must have taken place before this morphological reformation took place to the future stems of the intransitive inchoative thematic verbs. In addition, the future forms that were in the environment of Winter's Law, e.g., *sẽ̃s* 'will sit' (< **sed-s-*) and *bẽ̃gs* 'will run' (< **b^{h}eg^w-s-*; p. 105), would not contradict a relative chronology of MC taking place after Winter's Law.

Consequently, the answer to the question as to when the two Latvian reflexes of PIE root nouns (*gùovs* 'cow,' *sàls* 'salt' [§4.2.1.1, §4.2.1.3]) and some Baltic particles/prepositions (e.g., *nũ̃* 'now,' *nuõ*, Latv. *nùo* 'from,' §4.3) could have undergone the process of MC should be searched for in the stages no later than Proto-Baltic. In particular, the morphological shift of the root nouns to PBS *i*-stems (PIE **ĝ^{h}u̯ḗr* 'wild animal' → PBS **źvḗris*) provides important clues for identifying the relative chronology in Proto-Balto-Slavic. Thus, the following relative chronology has been established, incorporating the results from preced-

[1] This means that Minimal Word Syndrome is not so influential constraint (i.e., low-ranked) in Lithuanian at least since the epoch of the operation of Leskien's Law pace Blevins (1993: 243).

ing works:

relative chronology II:

$$\left.\begin{array}{r} *D > *T/\_\_\# \rightarrow \text{Winter's Law} \\ \text{Hirt's Law, } *\underset{\circ}{R} > iR \rightarrow *VH]_{\sigma} > *\bar{V}]_{\sigma} \end{array}\right\} \rightarrow$$

$\rightarrow$ acute assignment, *i*-apocope $\rightarrow$ **MC** $\rightarrow$ generalization of *i*-stem to root nouns $\rightarrow$ Osthoff's Law $\rightarrow$ **o* $>$ **a*.

(= 48)

In this way, the origin of the MC forms in Lithuanian is traced back to an old stage. Adopting this result, it must be assumed that the monosyllabic pronominal forms in Proto-Balto-Slavic have undergone the process of MC as well. To account for the acute and circumflex pronominal forms in Lithuanian dialects (e.g., nom. pl. m. *tíe*, *tiẽ*; instr. sg. m. *tù*, *túo*, *tuõ*), I have proposed in §4.4 a possibility that the definite pronominal forms *tiẽji*, *tóji*, etc. descended from some compounded constructions in PBS, which can be either a relative construction or compounded pronouns like PS **tad-je* ($\rightarrow$ OCS *tъžde* 'the same'), Skt. *etád* 'this' ($<$ **e$\underset{\circ}{\text{i}}$-tó-*), Lat. *is-te*, *is-ta*, *is-tud* 'that' ($<$ **is-to-*). Such compounded pronominal stems in PBS could have given rise to the acute variant through a vacuous operation of MC, while simplex stems would have given rise to the circumflex variant through MC. Therefore, the attestation of masculine pronominal forms with MC in W. Aukštaitian dialects as opposed to acute or shortened forms in Latvian or other Lithuanian dialects does not necessarily mean that MC took place in W. Aukštaitian dialects, pace Kortlandt (2014: 218). But it instead means that different choices of circumflex/acute variants of the pronominal forms have been made in the Baltic languages and Lithuanian dialects. This may better explain why feminine monosyllabic pronominal forms do not exhibit the MC forms even in W. Aukštaitian dialects.

This shows as well how the results of MC were variously treated in the individual Balto-Slavic languages, and even among the dialects of Lithuanian. Thus, they are rarely preserved in Latvian (the only possible examples are *gùovs* 'cow,' *sãls* 'salt,' *nùo* 'from,' ELatv. *nòu* 'now'), and different distributions of the MC forms are found among Lithuanian dialects. For example, in the case of the 3rd person future forms, MC

forms are relatively well preserved in W. Aukštaitian dialects, overgeneralized in the N.-W. Aukštaitian dialects, eliminated before Leskien's Law in E. Aukštaitian dialects, and after Leskien's Law in Žemaitian dialects (cf. table 4.2). In Latvian, they are completely eliminated.

Those distributions of MC forms in the dialects may indicate some dialectal "trends." As briefly mentioned in §4.4.4, it is an interesting tendency that, for both the 3rd person future forms and pronominal forms, MC forms are better preserved among the W. Aukštaitian dialects, while they are almost completely eliminated in E. Aukštaitian dialects and to a less extent in the Žemaitian dialects. In addition, the MC forms in W. Aukštaitian dialects spread to the word-final position of polysyllabic forms (nom. pl. m. *tiẽ* ⇢ *aniẽ* 'that,' *katriẽ* 'which;' cf. §4.4.1.5). The particles *laĩ* and *vė̃l* discussed in §4.3.2 show the circumflex tone in std. Lithuanian but have the acute tone in E. Aukštaitian dialects and Latvian. According to Kortlandt's (2014) view, this could be regarded as the second layer of the circumflexation of monosyllables. Observing the W. Aukštaitian tendency, this can be instead viewed as the result of such a spread of MC forms in W. Aukštaitian dialects. The W. Aukštaitian tendency to preserve and even generalize (in some cases) the circumflex tone has been observed through this research.

5.2 Contribution to the Solution of the Tone Problem of PIE Long Vowels

The purpose of the examination of MC in this thesis is to contribute to the solution of the problem as to whether PIE long vowels are reflected with the acute or circumflex tone in Balto-Slavic. While examining the data, a few more examples that may speak for the traditional view that PIE plain long vowels are reflected with an acute tone in Balto-Slavic have been found. The forms Latv. *pruôjãm* 'away' in (49a), Latv. *nuõst* 'away' in (49b), and Latv. *vêls* 'late' (fn. 68) have the acute root, which may be descended from the late PIE forms with a plain long vowel.

In addition, by establishing the existence of MC and its relative chronology, the long vowels in some Lithuanian (and Latvian) monosyllables with irregular circumflex tone now have a phonological account. Not only the reflexes of root nouns whose etymology have been var-

iously discussed, but also Lithuanian 3rd person future forms in general, a few particles, and pronominal forms that have relatively clear etymologies (e.g., *nū̃* 'now' < PBS **nū́* < PIE **nū́* or **nuh*$_1$, *nuõ* 'from' < PBS **nō*, permissive *tė̃* < **teh*$_1$, m. instr. sg. *tuõ* < **toh*$_1$, m. acc. pl. *tuõs* < **tŏ̃ns*) also have the circumflex tone in the monosyllabic forms. The circumflex tone of the reflexes of PIE monosyllables with plain long vowels (*nū̃*, *nuõ*) does no longer support the hypothesis that the regular PBS reflex of PIE plain long vowels is circumflex tone. These facts seem to support the hypothesis that the PIE plain long vowels are reflected with the acute tone in Balto-Slavic in the polysyllabic environment, by the exception of monosyllables.

5.3 Phonetic Nature of MC

The phonetic nature of MC can be differently interpreted depending on the assumptions. If the opposition of acute and circumflex in the early Proto-Balto-Slavic is assumed to be already a tonal opposition, then the process can be interpreted as a rising tone turning to a falling tone, or a leftward shift of a high tone in a monosyllable. Alternatively, if the opposition is interpreted as the presence or absence of the glottalization in a syllable nucleus, the phenomenon can be interpreted as the loss of glottalization in monosyllables. Since the acute feature in Proto-Balto-Slavic as early as MC operated was probably a glottalization, as suggested in Vaillant (1936: 114–115), Stang (1966b: 137) among others, this assumption seems more plausible.

However, if we have to assume a loss of glottalization among monosyllabic forms, that would require an additional phonological process in monosyllables. This can be an unnatural assumption because monosyllabic forms are cross-linguistically known to escape from otherwise regular sound change or linguistic changes, as discussed in footnote 44 (p. 141). There, a case from Latin is explained, where an analogical change ($s \rightarrow r$) in word-final position of monosyllabic nominative forms was blocked or delayed, while it was going on among polysyllabic forms. On p. 141, a positional faithfulness IDENT-σ_1(F) was introduced as a theoretical background of the phenomenon.

Beside the initial-syllable faithfulness hypothesis, other theories have been suggested to account for this cross-linguistic tendency for monosyllables to escape from sound changes: the neighborhood activation

model (Luce and Pisoni 1998; Vitevitch and Luce 1998), and moraic-based markedness (Pycha, Inkelas, & Sprouse 2007). The neighborhood activation model is based on the result of a statistic survey that neighborhood density is inversely correlated with the morpheme size, which means that small words are less contrastive than larger words. This may prevent the small words from phonological alternations. The latter hypothesis, moraic-based markedness, assumes that the minimal words (such as monosyllabic CVC words) are syllabified at an earlier derivational level, and are therefore immune to some phonological processes.

All three hypotheses are concluded based on statistical research on the synchronic language data. Although these accounts may need further research for justification, the tendency for monosyllables to be persistent against linguistic changes have certainly been observed. It is possible that such a synchronic tendency, if it already existed in the ancient prehistoric languages, could have resulted in a diachronic peculiarity of monosyllabic forms.

Consequently, there is another possible interpretation. Acute assignment is introduced in §2.3.7 as a rule to assign a long syllable nucleus with some sort of acute feature, which is probably a glottalization of the nucleus. Although I have concluded that MC took place after acute assignment in (48), it may be more reasonable to assume that acute assignment did not operate on monosyllables, i.e., glottalization was blocked in monosyllabic forms, which resulted in non-acute syllable nuclei in monosyllables.[2]

This interpretation may give a coherent account to the assumed failure of glottalization in monosyllables in PBS and the cross-linguistic tendency for monosyllabic forms to escape from linguistic changes.

[2] Since the initial syllables are assigned with the acute feature or a glottalization (e.g., **ś̲ird-*) in polysyllables, and it can be blocked only in monosyllables, the constraint IDENT-σ_1(F) may not be the exact factor in this case.

Sammanfattning

I denna avhandling behandlas fenomenet *Monosyllabic Circumflexion* ur ett språkhistoriskt och fonologiskt perspektiv. *Monosyllabic Circumflexion* avser det litauiska eller baltoslaviska fenomen som innebär att långa vokaler och diftonger uppvisar cirkumflex ton i stället för den väntade akuta tonen i enstavelseord. Fenomenet kan observeras i följande fyra kategorier:

I. Futurumsformer i 3 person av enstaviga verb:
šõ̀ks – šókti 'att hoppa;' *vỹ̀s – výti* 'att driva' osv.

II. Nomina som härstammar från proto-indoeuropeiska rotnomina:
Latv. *gùovs* 'ko' (< $*g^{w}\hat{o}\underset{\frown}{u}s$ ←-- acc.sg. $*g^{w}\hat{o}m$); *šuõ̀* 'hund' (< $*\hat{k}\underset{\frown}{u}\hat{o}$) osv.

III. Prepositioner/adverb:
nuõ 'från' ∼ *núotaka* 'brud;' *vẽ̀l* 'åter' ∼ Latv. *vêl* 'fortfarande, än' < PB $*v\bar{\underline{e}}li$; *tẽ̀* (permissiv partikel) < $*teh_1$; jfr. Grek. τῆ 'där' osv.

IV. Pronominala fromer:
tuõ̀ (< $*toh_1$ m. sg. instr. ∼ *geráoju* 'den goda (m. sg. instr.)'), *tiẽ̀* (< **toi* pl.nom. ∼ *geríeji* 'id. (pl.nom)'), *tuõ̀s* (< $*t\breve{o}ns$ pl. acc. ∼ *geráosius* 'id. (pl.acc.)') osv.

Den svårförklarade cirkumflexa tonen i dessa kategorier är ett centralt problem när det gäller vår förståelse av den baltoslaviska accentologin. Genom att klarlägga fenomenet *Monosyllabic Circumflexion* och fastställa en relativ kronologi för de ljudliga utvecklingarna i de relevanta kategorierna är målet för undersökningen att bidra till en ökad förståelse för de historiska utvecklingar som ligger bakom realiseringen av tonerna i baltiska och slaviska språken.

I den första kategorin, futurumsformer i 3:e person av enstaviga verb, återfinns en stor mängd exempel där fenomenet uppträder; dessa

exempel har således cirkumflex ton. Men det finns också en liten grupp av verb som har akut ton, vid en första anblick tycks dessa exempel vara möjliga motexempel till fenomenet *Monosyllabic Circumflexion*. Vid en närmare undersökning av dessa möjliga motexempel visade det sig dock att de utgjordes av en väl avgränsad morfosemantisk grupp av verb vars futurumsformer genomgått en omfattande omstrukturering, vilket också förklarar varför fenomenet inte förekommer i denna avgränsade grupp av verb. När denna avgränsade grupp verb kan förklaras separat utifrån deras historiska utveckling blir det tydligt att de verb som kvarstår alla uppvisar fenomenet *Monosyllabic Circumflexion*.

Den andra kategorin, som består av nomina som härstammar från proto-indoeuropeiska rotnomina, ger oss därtill viktig information för att kunna etablera en relativ kronologi för fenomenet *Monosyllabic Circumflexion* och sätta in det i dess baltoslaviska kontext. Den relativa kronologin för fenomenet utforskas vidare i samband med de tonala skillnaderna i de enstavelsesord som förekommer i kategori tre och fyra. I dessa kategorier är materialet mer heterogent och vi finner exempel på enstavelsesord med såväl akut som cirkumflex ton. En närmare undersökning kunde dock identifiera en mängd olika morfologiska faktorer, såsom undvikande av homonymer inom det pronominala paradigmet, vilka kan förklara varför vissa enstavelsesord inom dessa kategorier har akut ton. Vidare undersöktes det västaukštaitiska dialektdraget vilket innebär att resultatet av *Monosyllabic Circumflexion* bevaras i en större utsträckning än i andra dialekter. De västaukštaitiska dialekterna spelade en framträdande roll i framväxandet av det litauiska standardspråket.

Sammanfattningsvis kunde de undersökta enstavelsesorden som uppvisar cirkumflex ton i litauiska förklaras med en kombination av fenomenet *Monosyllabic Circumflexion* i protobaltoslaviska och den dialektala tendensen i de västaukštaitiska dialekterna.

Bibliography

Ambrazas, Vytautas (Ed.). 1994. *Dabartinės lietuvių kalbos gramatika (DLKG)*. Mokslas, Vilnius.

Arnold, Edward V. 1905. *Vedic metre*. Cambridge University Press, Cambridge.

Arumaa, Peeter. 1985. *Urslavische Grammatik*, Vol. III. Carl Winter, Heidelberg.

Bammesberger, Alfred. 1990. *Die Morphologie des urgermanischen Nomens*. Carl Winter, Heidelberg.

Barr, Cragg R. 1994. *A lexical model of morphological change*. Ph.D. thesis, Harvard University.

Becker, Micheal, L. E. Clemens, J. Levine, & A. Nevins. 2011. "Universal grammar protects initial syllables." February 10, 2011, an invited talk at Harvard University linguistics department (Handout).

Beckman, Jill. 1998. *Positional faithfulness*. Ph.D. thesis, University of Masachusetts.

Beekes, Robert & L. van Beek. 2009. *Etymological dictionary of Greek*. Brill, Leiden/Boston.

Benveniste, Émile. 1966. *Problèmes de linguistique générale*, Vol. I. Gallimard, Paris.

Bjarnadóttir, Valgerður. 2003. "Spread and motivations for apocope in case endings in Old Lithuanian." *Baltu filologija*, *12*(2), 5–20.

Blevins, Juliette. 1993. "A tonal analysis of Lithuanian nominal accent." *Language*, *69*(2), 237–273.

Būga, Kazimieras. 1923–1924. “Die Metatonie im Litauischen und Lettischen.” *Zeitschrift für vergleichende Sprachforschung*, *51*, 109–142; *52*, 91–98, 250–302.

Būga, Kazimieras. 1958–1961. *Rinktiniai raštai*, Vol. I, II, III. Valstybinė politinės ir mokslinės literatūros leidykla, Vilnius.

Boutkan, Dirk. 1995. *The Germanic ‘Auslautgesetze’*. Rodopi, Amsterdam/Atlanta.

Bräuer, Herbert. 1961–1969. *Slavische Sprachwissenschaft*, Vol. I–III. Walter de Gruyter, Berlin.

Byrd, Andrew M. 2015. *The Indo-European syllable*. Brill, Leiden/Boston.

Cardona, George. 1960. *The Indo-European thematic aorists*. Ph.D. thesis, Yale University.

Carrasquer Vidal, Miguel. 2013. “Balto-Slavic long vowels.” *Baltistica*, *48*, 205–217.

Chene, Brent & S. R. Anderson. 1979. “Compensatory lengthening.” *Language*, *55*(3), 505–535.

Clackson, James. 1994. *The linguistic relationship between Armenian and Greek*. Blackwell, Oxford & Cambridge, MA.

de Saussure, Ferdinand. 1894. “A propos de l’accentuation lituanienne (intonations et accent proprement dit).” *Mémoires de la Société de Linguistique de Paris*, *8*, 425–446. Quoted from Ferdinand de Saussure *Recueil des publications scientifiques de Ferdinand de Saussure*, Genève / Lausanne / Heidelberg: Société anonyme des éditions sonor, 1922, pp. 490–512.

de Saussure, Ferdinand. 1896. “Accentuation lituanienne.” *Indogermanische Forschungen*, *6*, 157–166.

Delbrück, Berthold. 1893. *Vergleichende Syntax der indogermanischen Sprachen*, Vol. 1. Karl J. Tübner, Strassburg.

Derksen, Rick. 1996. *Metatony in Baltic*. Rodopi, Amsterdam – Atlanta.

Derksen, Rick. 2008. *Etymological dictionary of the Slavic inherited lexicon*. Leiden Indo-European etymological dictionary series. Brill, Leiden/Boston.

Dini, Pietro U. 2014. *Foundation of Baltic languages*. Eugrimas, Vilnius. English translation by Milda B. Richardson and Robert E. Richardson.

Dunkel, George. 2009. “Lithuanian chips from an aptotologist’s workshop.” *Baltistica*, *45*(1), 37–57.

Dunkel, George. 2014. *Lexikon der indogermanischen Partikeln und Pronominalstämme*, Vol. I, II. Universitätsverlag Winter, Heidelberg.

Dybo, Vladimir A. 1960. “L. Sadnik. Slawische Akzentuation. Wiesbaden, 1959.” *Voprosy jazykoznanuja*, *6*, 113–119.

Dybo, Vladimir A. 1961. “Sokraščenie dolgot v kel’to-italijskix jazykax i ego značenie dlja baltoslavjanskoj i indoevropejskoj akcentologii.” *Voprosy slavjanskogo jazykoznanija*, *5*, 9–34.

Dybo, Vladimir A. 1962. “Chr. Stang. Slavonic accentuation. Oslo, 1957.” In: Mološnaja, T. M. (Ed.), *Structurno ∼ typologičeskie issledovanija*, pp. 220–225. Izdatel’stvo Akademii nauk SSSR, Moscow.

Dybo, Vladimir A. 1977. “Raboty F. de Sossjura po baltiskoj akcentologii.” In: Ferdinand de Saussure*, Trudy po jazykoznaniju*, pp. 583–597. Progress, Moskow.

Dybo, Vladimir A. 1981. *Slavjanskaja akcentologija: opyt rekonstrukcii sistemy akcentnych paradigm v praslavjanskom*. Nauka, Moscow.

Eichner, Heiner. 1982. *Studien zu den indogermanischen Numeralia*. Hablitation at Freie Universität Berlin.

Endzelīns, Jānis. 1899. “Über den lettischen Silbenakzent.” *Beiträge zur Kunde der indogermanischen Sprachen*, *25*, 259–274.

Endzelīns, Jānis & E. Hauzenberga. 1934–1946. *Ergänzungen und Berichtigungen zu K. Mühlenbachs lettisch - deutschem Wörterbuch*. Kultūras Fonda Izdevums, Rīga.

Endzelīns, Jānis. 1913–14. “Weiteres zu den lettischen Intonationen.” *Indogermanische Forschungen*, *33*, 104–118.

Endzelīns, Jānis. 1922a. *Lettisches Lesebuch*. Carl Winter, Heidelberg.

Endzelīns, Jānis. 1922b. “Zur baltischen Deklination der „ablautenden" *(i)i̯o*-Stämme.” *Zeitschrift für vergleichende Sprachforschung auf dem Gebiete des deutschen, griechischen und lateinischen*, *50*(Neue Folge 12), 13–34.

Endzelīns, Jānis. 1923. *Lettische Grammatik*. Carl Winter, Heidelberg.

Endzelīns, Jānis. 1928. "Sīkumi." *Filologu Biedrības Raksti*, *8*, 107.

Endzelīns, Jānis. 1944. *Altpreussische Grammatik*. Latvju Grāmata, Rīga.

Endzelīns, Jānis. 1948. *Baltu valodu skaņas un formas*. Latvijas Valsts Izdevniecība, Rīga.

Endzelīns, Jānis. 1951. *Latviešu valodas gramatika*. Latvijas Valsts Izdevniecība, Rīga.

Endzelīns, Jānis. 1971. *Comparative phonology and morphology of the Baltic languages*. Mouton, The Hague/Paris. Translated by William R. Schmalstieg and Benjamiņš Jēgers from Jānis Endzelīns *Baltu valodu skaņas un formas*, Rīga 1948.

Endzelīns, Jānis. 1971–1982. *Darbu izlase*, Vol. I–IV. Zinātne, Rīga.

Ford, Gordon Jr.. 1971. *The Old Lithuanian catechism of Martynas Mažvydas (1547)*. Van Gorcum, Assen.

Forssman, Berthold. 2003. *Das baltische Adverb: Morphosemantik und Diachronie*. Universitätsverlag Winter, Heidelberg.

Fraenkel, Ernst. 1929. *Syntax der litauischen Postpositionen und Präpositionen*. Carl Winter, Heidelberg.

Fraenkel, Ernst. 1962–1965. *Litauisches etymologisches Wörterbuch*, Vol. I, II. Carl Winter, Heidelberg.

Frarenkel, Ernst. 1950. *Die baltischen Sprachen*. Carl Winter, Heidelberg.

Fritz, Matthias. 1996. "Das urindogermanische Wort für 'Nase' und das grundsprachliche Lautgesetz **R̥HV > *RV*." *Historische Sprachforschung*, *109*, 1–20.

Fritz, Matthias. 2011. *Der Dual im Indogermanischen*. Universitätsverlag Winter, Heidelberg.

Gamkrelidze, Tamaz Valeryanovich & V. V. Ivanov. 1973. "Rekonstruktion der indogermanischen Verschlüsse: Vorläufiger Bericht." *Phonetica*, *27*, 150–156.

Girdenis, Aleksas. 1992. "Žemaitians: the development of inflexional endings and the chronology of the divergence of dialects." In: *Science, Arts, and Lithuania*, Vol. 3 (2–3), pp. 95–101. Lituanus, Vilnius. Quoted from *Aleksas Girdenis darbai 3: 1988–2000*, Mokslo ir enciklopedijų leidybos institutas, Vilnius 2001, pp. 32–44.

Gorbachov, Yaroslav. 2007. *Indo-European origins of the nasal inchoative class in Germanic, Baltic and Slavic*. Ph.D. thesis, Harvard University.

Gorbachov, Yaroslav. 2014. "The origin of the Baltic inchoative in *-sta-*." *Indogermanische Forschungen*, *119*(1), 21–53.

Gorbachov, Yaroslav. 2015. "Dual treatment of **-oi* in Slavic revisited." *Balkanistica*, *28*, 175–199.

Griepentrog, Wolfgang. 1995. *Die Wurzelnomina des Germanischen und ihre Vorgeschichte*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Halle, Morris & Jean-Roger Vergnaud. 1987. *An essay on stress*. The MIT Press, Cambridge/London.

Hanssen, Friedrich. 1885. "Der griechische circumflex stammt aus der ursprache." *Zeitschrift für vergleichende Sprachforschung*, *27*(Neue Folge 7), 612–617.

Hayes, Bruce. 1989. "Compensatory lengthening in moraic phonology." *Linguistic Inquiry*, *20*(2), 253–306.

Hill, Eugen. 2004. "Die sigmatischen Modus-Bildungen der indooooogermanischen Sprachen. Erste Abhandlung: Das Baltische Future und seine Verwandten." *International Journal of Diachronic Linguistics and Linguistic Reconstruction*, *1*, 69–171.

Hirt, Hermann. 1892. "Vom schleifenden und gestossenen Ton in den indogermanischen Sprachen. Erster Teil." *Indogermanische Forschungen*, *1*, 1–42, 195–231.

Hirt, Hermann. 1895. *Der indogermanische Akzent: ein Handbuch*. Trübner, Straasburg.

Hirt, Hermann. 1921–1937. *Indogermanische Grammatik*, Vol. I – VII. Carl Winter, Heidelberg.

Hock, Hans H. 2007. "Morphology and *i*-apocope in Slavic and Baltic." In: Jones-Bley, Karlene, M. E. Huld, A. D. Volpe, & M. R. Dexter (Eds.), *Proceedings of the eighteenth annual Indo-European conference, Los Angeles, November 3–4, 2006 (selected papers)*, pp. 65–76. Institute for the Study of Man, Washington, D. C.

Hock, Wolfgang. (forthcoming). "Pronominierte Nominalformen im Altlitauischen – Ausnahmen zu Leskiens Gesetz?" *Indogermanische Forschungen*, *submitted*.

Hock, Wolfgang et al.. 2015. *Altlitauisches etymologisches Wörterbuch*, Vol. I, II, III. Baar, Hamburg.

Hoffmann, Karl & B. Forssman. 2004. *Avestische Laut- und Flexionslehre*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Illich-Svitych, Vladislav M. 1963. *Imennaja akcentuacija v baltijskom i slavjanskom*. Institute Slavjanovedenija, Akadamija Nauka SSSR, Moscow.

Illich-Svitych, Vladislav M. 1979. *Nominal accentuation in Baltic and Slavic*. The MIT Press, Cambridge, Massachusetts/London. (English translation of Illich-Svitych (1963) by Richard L. Leed and Ronald F. Feldstein.).

Jagić, Vtroslav. 1906. "Die Formen der aks. Deklination, angez. von V. Jagić." *Archiv für slavische Philologie*, *28*, 117–125.

Jasanoff, Jay. 1988. "PIE *ĝnē 'recognize, know."' In: Bammesberger, Alfred (Ed.), *Die Laryngealtheorie und die Rekonstruktion des indogermanischen Laut- und Formensystems*, pp. 227–239. Carl Winter, Heidelberg.

Jasanoff, Jay. 1989. "Old Irish *Bé* 'Woman."' *Ériu*, *40*, 135–141.

Jasanoff, Jay. 2002. "The nom. sg. of Germanic *n*-stems." In: Wedel, Alfred R. & H.-J. Busch (Eds.), *Verba et litteræ: explorations in Germanic languages and German literature. Esseys in honor of Albert L. Lloyd*, pp. 31–46. Linguatext, Ltd., Newark – Delaware.

Jasanoff, Jay. 2003. *Hittite and the Indo-European verb*. Oxford University Press, New York.

Jasanoff, Jay. 2004a. "Acute vs. circumflex: some notes on PIE and post-PIE prosodic phonology." In: Hyllested, Adam, Anders Richardt Jørgensen, Jenny Helena Larsson, & Thomas Olander (Eds.), *Per Aspera ad Asteriscos*, pp. 247–255. Institut für Sprachen und Literaturen der Universität Innsbruck, Innsbruck.

Jasanoff, Jay. 2004b. "Balto-Slavic accentuation: telling news from noise." *Baltistica*, *39*(2), 171–177.

Jasanoff, Jay. 2009. "Notes on the internal history of the PIE optative." In: Yoshida, Kazuhiko & B. Vine (Eds.), *East and west*, pp. 181–188. Hempen, Bremen.

Kallio, Petri. 2012. "The prehistoric Germanic loanword strata in Finnic." *Suomalais-Ugrilaisen Seuran Toimituksia = Mémoires de la Société Finno-Ougrienne*, *226*, 225–238.

Kapović, Mate. 2006. *Reconstruction of Balto-Slavic personal pronouns – with emphasis on accentuation*. Ph.D. thesis, University of Zagreb.

Kapović, Mate. 2009a. "The accent of Slavic **ja(zъ)* 'I.'" In: *Stressing the past: papers on Baltic and Slavic accentology*, pp. 53–73. Brill, Leiden/Boston.

Kapović, Mate. 2009b. "Rising mobility in Slavic *i*-stems." In: Lühr, Rosmarie & S. Ziegler (Eds.), *Protolanguage and Prehistory. Akten der XII. Fachtagung der Indogermanischen Gesellschaft, Krakau, 11. bis 15. Oktober 2004*, pp. 236–243. Reichert, Wiesbaden.

Kariņš, Atrus K. 1996. *The prosodic structure of Latvian*. Ph.D. thesis, University of Pennsylvania.

Katz, Joshua T. 1998. *Topics in Indo-European personal pronouns*. Ph.D. thesis, Harvard University.

Kazlauskas, Jonas. 1968. *Lietuvių kalbos istorinė gramatika*. Mintis, Vilnius.

Kim, Ronald. 2012. "The PIE thematic animate accusative plural revisited." In: Sukač, Roman & O. Šefčík (Eds.), *The sound of Indo-European 2*, pp. 144–158. Lincom Europa, München.

Klingenschmitt, Gert. 1994a. "Das Tocharische in indogermanistischer Sicht." In: Schlerath, Bernfried (Ed.), *Tocharisch: Akten der Fachtagung der Indogermanischen Gesellschaft, Berlin, September 1990*, pp. 310–411. Málvísindastofnun Háskóla Íslands, Reykjavík.

Klingenschmitt, Gert. 1994b. "Die Verwandtschaftsverhältnisse der indogermanischen Sprachen." In: Rasmussen, Jens Elmegård & B. Nielsen (Eds.), *In honorem Holger Pedersen, Kolloquium der Indogermanischen Gesellschaft vom 26. bis 28. März 1993 in Kopenhagen*, pp. 235–251. Ludwig Reichert Verlag, Wiesbaden.

Kluge, Friedrich. 1882. "Sprachhistorische Miscellen." *Beiträge zur Geschichte der deutschen Sprache und Literatur*, *8*, 506–539.

Koch, Christoph. 1992. "Zue Vorgeschichte des relativen Attributivkonnexes im Baltischen und Slavischen." In: Barschel, Bernd, M. Kozianja, & K. Weber (Eds.), *Indogermanisch, Slavische und Baltisch. Materialien*

des vom 21.–22. Sept. 1989 in Jena in Zusammenarbeit mit der Indogermanische Geselschaft durchgeführten Kolloquiums, pp. 45–88. Otto Sagner, Múnchen.

Kortlandt, Frederik. 1975. *Slavic accentuation*. The Peter de Ridder Press, Lisse.

Kortlandt, Frederik. 1977. "Historical laws of Baltic accentuation." *Baltistica*, *13*(2), 319–330.

Kortlandt, Frederik. 1978a. "On the history of the genitive plural in Slavic, Baltic, Germanic, and Indo-European." *Lingua*, *45*, 281–300.

Kortlandt, Frederik. 1978b. "Proto-Indo-European obstruents." *Indogermanische Forschungen*, *83*, 107–118.

Kortlandt, Frederik. 1982. "Innovations which betray archaisms." *Baltistica*, *18*, 4–9.

Kortlandt, Frederik. 1985. "Long vowels in Balto-Slavic." *Baltistica*, *21*(2), 112–124.

Kortlandt, Frederik. 1988. "Remarks on Winter's Law." In: Barentsen, A.A., B. Groen, & R. Sprenger (Eds.), *Dutch contributions to the 10th international congress of Slavists*, pp. 387–396. Rodopi, Amsterdam.

Kortlandt, Frederik. 1994. "From Proto-Indo-European to Slavic." *The Journal of Indo-European Studies*, *22*, 91–112.

Kortlandt, Frederik. 1997. "PIE. lengthened grade in Balto-Slavic." In: Adams, Douglas Q. (Ed.), *Festschrift for Eric P. Hamp*, Journal of Indo-European Studies Monograph No.23, pp. 26–31. Institute for the Study of Man, Washington D.C.

Kortlandt, Frederik. 2002. "Shortening and metatony in the Lithuanian future." *Baltistica*, *37*(1), 15–16.

Kortlandt, Frederik. 2008. "Balto-Slavic phonological developments." *Baltistica*, *43*(1), 5–15.

Kortlandt, Frederik. 2014. "Metatony in monosyllables." *Baltistica*, *49*(2), 217–224.

Kudzinowski, Czesław. 1977. *Indeks-słownik do "Daukšos Postilė"*, Vol. I–II. Uniwersytet im. Adama Mickiewica, Poznań.

Kümmel, Martin. 2013. "Zur Endung des Genitivs Plural im Indoiranischen." *Indogermanische Forschungen*, *118*, 193–211.

Kurschat, Fredrich. 1883. *Litauisch-deutsches Wörterbuch*. Verlag der Buchhandlung des Waisenhauses, Halle.

Kurschat, Friedeich. 1876. *Grammatik der litauischen Sprache*. Verlag der Buchhandelung des Waisenhauses, Halle.

Kuryłowicz, Jerzy. 1931. "Le problème des intonations balto-slaves." *Rocznik Slawistyczny*, *10*, 1–80.

Kuryłowicz, Jerzy. 1948. "Le degré long en balto-slave." *Rocznik slawistyczny*, *16*, 1–14.

Kuryłowicz, Jerzy. 1949. "La nature des procès dits 'analogiques.'" *Acta Linguistica*, *5*, 15–37.

Lane, George S. 1961. "On the formation of the Indo-European demonstrative." *Language*, *37*(4), 469–475.

Lane, George S. 1963. "Bimoric and trimoric vowels and diphthongs: laws of Germanic finals again." *Journal of English and Germanic Philology*, *62*, 155–170.

Larsson, Jenny H. 2001. "Proto-Indo-European root nouns in the Baltic languages." In: Huld, Martin E. (Ed.), *Proceedings of the 12th annual UCLA Indo-European conference, Los Angeles May 26–28, 2000*, Journal of Indo-European studies monograph, pp. 50–64. Institute for the Study of Men, Washington D. C.

Larsson, Jenny H. 2002. "Deverbative root nouns in Baltic?" *Linguistica Baltica*, *10*, 99–104.

Larsson, Jenny H. 2004. "Length and *métatonie douce* in Baltic deverbative nouns." In: Clackson, James & B. A. Olsen (Eds.), *Indo-European word formation*, pp. 159–170. Museum Tusculanum Press, Copenhagen.

Larsson, Jenny H. 2010a. *Proto-Indo-European root nouns in the Baltic languages*. University of Copenhagen, Copenhagen.

Larsson, Jenny H. 2010b. *Studies in Baltic word formation* (2nd edition). Ph.D. thesis, University of Copenhagen, Copenhagen.

Le Feuvre, Claire. 2011. "L'allongement des prépositions en composition en baltique et en slave et les composés en **sm̥-*." In: Petit, Daniel, C. L. Feuvre, & H. Menantaud (Eds.), *Langues baltiques, langues slaves*, pp. 199–222. CNRS Éditions, Paris.

Leskien, August. 1881. "Die Quantitätsverhältnisse im Auslaut des Litauischen." *Archiv für slavische Philologie*, *5*, 188–190.

Levin, Jules F. 1976. *The Slavic element in the Old Prussian Elbing Vocabulary*. University of California Press, Berkeley, Los Angeles, London.

Levinson, Stephen. 1989. *Pragmatics*. Cambridge University Press, Cambridge. First published in 1983.

Lietuvių kalbos institutas (Ed.). 1968–87. *Lietuvių kalbos žodynas.* Mintis/Mokslas, Vilnius. (online: http://www.lkz.lt/).

Lindeman, Frederik O. 1965. "La loi de Sievers et le début du mot en indo-européen." *Norsk Tidsskrift for Sprogvidenskap*, *20*, 38–108.

Lubotsky, Alexander. 1990. "La loi de Brugmann et **H*$_3$*e-*." In: Kellens, Jean (Ed.), *La reconstruction des laryngeals*, pp. 129–136. Société d'Edition Les Belles Lettres, Liège-Paris.

Luce, Paul A. & D. B. Pisoni. 1998. "Recognizing spoken words: the neighborhood activation model." *Ear and Hearing*, *19*, 1—36.

Lühr, Rosemarie. 1997. "Altgermanische Fragesätze. Der Ausdruck der Antworterwartung." In: Crespo, E. & J. García-Ramón (Eds.), *Berthold Delbrück y la sintaxis indoeuropea hoy: Actas Del Coloquio De La Indogermanische Gesellschaft Madrid, 21-24 De Septiembre De 1994*. Reichert, Madrid/Wiesbaden.

Lühr, Rosemarie. 2000. "Zum Gebrauch des Duals in der Indogermania." In: *25 Jahre Indogermanistik in Graz*, pp. 263–74. Leykam, Graz.

Lyberis, Antanas, A. Ivaškevičius, & J. Kruopas. 1979. *Pirmasis lietuvių kalbos žodynas — Konstantinas Sirvydas dictionarium trium linguarum*. Mokslas, Vilnius.

MacDonell, Arthur A. 1910. *Vedic grammar*. Karl J. Trubner, Strassburg.

Majer, Marek. 2011. "PIE **sos, *seh*$_2$*, *tod* / PSl. **tъ, *ta, *to* and the development of PIE word-final **-os* in Proto-Slavic." In: Krisch, Thomas, T. Lindner, M. Crombach, & S. Niederreiter (Eds.), *Indogermanistik und Linguistik im Dialog*, pp. 352–360. Reichert, Wiesbaden.

Matasović, Ranko. 1995. "A reexamination of Winter's Law in Baltic and Slavic." *Lingua Posnaniensis*, *37*, 57–70.

Matasović, Ranko. 2005. "Toward a relative chronology of the earliest Baltic and Slavic sound changes." *Baltistica*, *40*, 147–157.

Matasović, Ranko. 2012. "Dybo's Law in Proto-Celtic." *Zeitschrift für celtische Philologie*, *59*, 129–141.

Matusevičiūtė, Izabelė. 1938. "Prierašai Berlyno valstybinės bibliotekos Sengstacko originale." *Archivum Philologicum*, *7*, 88–101.

Mažiulis, Vytautas. 1970. *Baltų ir kitų indoeuropiečių kalbų santykiai*. Mintis, Vilnius.

Mažiulis, Vytautas. 1988–1997. *Prūsų kalbos etymologijos žodynas*, Vol. I–IV. Mokslo ir enciklopedijų leidybos institutas, Vilnius.

Mažiulis, Vytautas. 2004. *Prūsų kalbos istorinė gramatika*. Vilniaus universiteto leidykla, Vilnius.

Mayrhofer, Manfred. 1986–96. *Etymologisches Wörterbuch des Altindischen*, Vol. I, II. Carl Winter, Heidelberg.

McCone, Kim. 1991. *The Indo-European origins of the Old Irish nasal presents, subjunctives, and futures*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Meillet, Antoine. 1897. "Séance du samedi 8 septembre, à 1 jeure et demie." In: *Actes du dixième congrès international des orientalistes, session de Genève 1894*, Vol. I. Brill, Leiden/Boston.

Meillet, Antoine. 1900. "Note sur un déplacement d'accent en slave." *Mémoires de la Sociètè de Linguistique de Paris*, *11*, 345–351.

Meillet, Antoine. 1913. "La désinence *-tų̂* du vieux slave." *Mémoires de la Société de Linguistique de Paris*, *18*, 232–238.

Meillet, Antoine. 1924. *Le slave commun*. Champion, Paris.

Melchert, Craig H. 1994. *Anatolian historical phonology*. Rodopi, Amsterdam – Atlanta.

Mīlenbachs, Kārlis & J. Endzelīns (Eds.). 1923–32. *Latviešu valodas vārdnīca / Lettisch-deutsches Wörterbuch*, Vol. I–IV. Kultūras Fonda Izdevums, Rīga.

Morkūnas, Kazys. 1969. “Rytų Aukštaičių pietinės tarmės morfologija.” *Lietuvių kalbatyros klausimai*, *11*, 107–144.

Nau, Nicole & N. Ostrowski. 2010. “Background and perspectives for the study of particles and connectives in Baltic languages.” In: Nau, Nicole & N. Ostrowski (Eds.), *Particles and connectives in Baltic*, pp. 1–37. Vilniaus Universitetas / Asociacija “Academia Salensis”, Vilnius.

Neri, Sergio. 2003. *I sostantivi in -u del gotico: morfologia e preistoria*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Nussbaum, Alan. 1986. *Head and horn in Indo-European.* Walter de Gruyter, Berlin – New York.

Olander, Thomas. 2009. *Balto-Slavic accentual mobility*. Mouton de Gruyter, Berlin.

Olander, Thomas. 2015. *Proto-Slavic inflectional morphology*. Brill, Leiden/Boston.

Ostrowski, Norbert. 2011. “On the origin of the Lithuanian *tačiaũ* ‘but, however, yet.”’ *Lingua Posnaniensis*, *53*(2), 75–81.

Ostrowski, Norbert. 2014. “On the postponed neuter pronoun **-ja* in Baltic.” In: Civjan, Tatjana, M. Zavjalova, & artūnas Judžentis (Eds.), *Baltai ir slavai: dvasinių kultūrų sankirtos*, pp. 242–253. Versmė, Vilnius.

Otrębski, Jan S. 1956. *Gramatyka języka litewskiego – nauka o formach*, Vol. 3. Państwowe Wydawn Naukowe, Warszawa.

Pedersen, Holger. 1933. *Études lituaniennes*. Levin & Munksgaard, København.

Persson, Per. 1893. “Über den demonstrativen Pronominalstauun *no- ne-* und Verwandtes.” *Indogermanische Forschungen*, *2*, 199–259.

Persson, Per. 1912. *Beiträge zur indogermanischen Wortforschung*, Vol. I, II. Akademiska bokhandeln, Uppsala.

Petit, Daniel. 2002. “Abrègement et métatonie dans le futur lituanien: pour une reformulation de la loi de Leskien.” *Bulletin de la Société de Linguistique de Paris*, *IIIC*(I), 245–282.

Petit, Daniel. 2004a. *Apophonie et catégories grammaticales dans les langues baltiques*. Collection linguistique publiee par la societe de linguistique de Paris. Peeters, Leuven/Paris.

Petit, Daniel. 2004b. "L'adjectif lituanien *sū́drus/sūdrùs*." *Bulletin de la Société de Linguistique de Paris*, *99*, 259–279.

Petit, Daniel. 2011. "Preverbation et prefixatoin en baltique." In: Petit, Daniel, C. L. Feuvre, & H. Menantaud (Eds.), *Langues baltiques, langues slaves*, pp. 235–271. CNRS Éditions, Paris.

Piwowarczyk, Dariusz. 2015. "The Proto-Indo-European **-VTs#* clusters and the formulation of Azemerényi's Law." *Indogermanische Forschungen*, *120*(1), 269–278.

Pokorny, Julius. 1959. *Indogermanisches etymologisches Wörterbuch*, Vol. I, II. Francke, Bern/München.

Pronk, Tijmen. 2012. "Proto-Indo-European long vowels and Balto-Slavic accentuation." *Baltistica*, *47*(2), 205–247.

Pycha, Anne, S. Inkelas, & R. Sprouse. 2007. "Morphophonemics and the lexicon: a case study from Turkish." In: Solé, M. J. (Ed.), *Experimental approaches to phonology*, pp. 369–385. Oxford University Press, Oxford.

Rasmussen, Jens E. 1989. *Studien zur Morphophonemik der indogermanischen Grundsprache*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Rasmussen, Jens E. 1999. "Die Vorgeschichte der baltoslavischen Akzentuierung – Beiträge zu einer vereinfachten Lösung." In: *Selected papers on Indo-European linguistics, Part 2*, pp. 469–489. Museum Tusculanum Press, University of Copenhagen. First published in: B. Barschel, M. Kozianka & K. Weber (Hrsgg.): *Indogermanisch, Slawisch und Baltisch.* Materialien des vom 21.–22. September in Jena in Zusammenarbeit mit der Indogermanischen Gesellschaft durchgeführten Kolloquiums (= *Slavistische Beiträge,* Bd. 285), Otto Sagner, München 1992, pp.173–200.

Rasmussen, Jens E. 2007. "The accent on Balto-Slavic monosyllables." In: Kapovic, Mate & R. Matasovic (Eds.), *Tones and theories: proceedings of the International Workshop on Balto-Slavic Accentology*, pp. 29–38. Institut za hrvatski jezik i jezikoslovlje, Zagreb.

Rau, Jeremy. 2009. "Myc. *te-re-ja* and the Athematic Inflection of the Greek Contract Verbs." In: Yoshida, Kazuhiko & B. Vine (Eds.), *East and west*, pp. 181–188. Hempen, Bremen.

Raun, Alo. 1954. “On quantity in Estonian.” *Studia Linguistica*, *8*(2), 62–76.

Rinkevičius, Vytautas. 2009. *Prūsų kalbos kirčiavimo sistema*. Ph.D. thesis, Vilnius University.

Rix, Helmut et al. (Eds.). 2001. *Lexikon der indogermanischen Verben* (2 edition). Ludwig Reichert Verlag.

Rosinas, Albertas. 1978. “Kelios pastabos apie latvių kalbos įvardį.” *Baltistica*, *14*(2), 100–104.

Rosinas, Albertas. 1995. *Baltų Kalbų įvardžiai*. Mokslas, Vilnius.

Rosinas, Albertas. 2005. *Latvių kalbos daiktavardžio linksniavimo sistema*. Mokslo ir enciklopedijų leidybos institutas, Vilnius.

Rysiewicz, Zygmunt. 1956. *Studia językoznawcze*. Zakład imienia Ossolinskich – Wydawnictwo, Wrocław.

Schaffner, Stefan. 2001. *Das Vernersche Gesetz und der innerparadigmatische grammatische Wechsel des urgermanischen im Nominalbereich*. Institut für Sprachen und Literaturen der Universität Innsbruck, Innsbruck.

Schindler, Jochem. 1967. “Das idg. Wort für „Erde“ und die dentalen Spiranten.” *Die Sprache*, *13*, 191–205.

Schindler, Jochem. 1972. “L’apophonie des noms-racines Indo-européens.” *Bulletin de la Société de Linguistique de Paris*, *67*, 31 – 38.

Schmalstieg, William. 1958. “The vocalism of the Lithuanian sigmatic future.” *The Slavic and East European Journal*, *2*(2), 120–129.

Schmalstieg, William. 1972. “Die Entwicklung der *ā*-Declination im Slavischen.” *Zeitschrift für slavische Philologie*, *36*, 130–146.

Schmidt, Gernot. 1962. *Studien zum germanischen Adverb*. Ph.D. thesis, Freie Universität Berlin.

Schrijver, Peter. 1991. *The reflexes of the Proto-Indo-European laryngeals in Latin*. Rodopi, Amsterdam/Atlanta.

Schwyzer, Eduard. 1939–1950. *Griechische Grammatik*, Vol. I, II. Beck, München.

Senn, Alfred. 1944. “Standard Lithuanian in the making.” *Slavonic and East European Review. American Series*, *3*(2), 102–116.

Senn, Alfred. 1966. *Handbuch der litauischen Sprache*. Carl Winter, Heidelberg.

Shintani, Toshihiro. 1985. "On Winter's Law in Balto-Slavic." *Arbejdspapirer udsendt af Institut for Lingvistik, Københavns Universitet*, *5*, 273–296.

Sihler, Andrew L. 1995. *New comparative grammar of Greek and Latin*. Oxford University Press, New York / Oxford.

Sims-Williams, Nicholas. 1979. "On the plural and dual in Sogdian." *Bulletin of the School of Oriental and African Studies, University of London*, *42*, 337–346.

Skardžius, Pranas. 1932. "Lietuvių latvių kalbos žodyno dalykai." *Archivum Philologicum*, *3*, 47–54.

Skardžius, Pranas. 1935. *Daukšos akcentologija*. Kaunas: Humanitarinių Mokslų Fakulteto leidinys.

Sližienė, Nijolė & A. Valeckienė. 1989. *Lietuvių kalbos rašyba ir skyryba* (2nd edition). Mokslas, Vilnius.

Smoczyński, Wojciech. 2000. *Untersuchungen zum deutschen Lehngut im Altpreussischen*. Wydawnictwo Uniwersytetu Jagiellońskiego, Krákow.

Specht, Franz. 1933. "Weiteres zur Geschichte der pronominalen Flexion." *Zeitschrift für vergleichende Sprachforschung*, *60*(3/4), 254–271.

Stang, Christian S. 1929. *Die Sprache des litauischen Katechismus von Mažvydas*. I Kommisjon Hos Jakob Dybwad, Oslo.

Stang, Christian S. 1942. *Das slavische und baltische Verbum*. I Kommisjon hos Jakob Dybwad, Oslo.

Stang, Christian S. 1957. *Slavonic accentuation*. Universitetsforlaget, Oslo.

Stang, Christian S. 1965. "Indo-Européen **g^{w}ōm, *d(i)i̯ēm*." In: *Symbolae linguisticae in honorem Georgii Kuryłowicz*, pp. 292–296. Zakład Narodowy imienia Ossolińskich, Wrocław.

Stang, Christian S. 1966a. ""Métatonie douce" in Baltic." *International Journal of Slavic Linguistics and Poetics*, *10*, 111–119.

Stang, Christian S. 1966b. *Vergleichende Grammatik der baltischen Sprachen*. Universitetsforlaget, Oslo.

Stang, Christian S. 1972. *Lexikalische Sonderübereinstimmungen zwischen dem Slavischen, Baltischen und Germanischen*. Universitetsforlaget, Oslo.

Streitberg, Wilhelm. 1892. "Der Genitiv Pluralis und die baltisch-slavischen Auslautgesetze." *Indogermanische Forschungen*, *1*, 259–299.

Sturtevant, Edgar H. 1930. "Relatives in Indo-European and Hittite." In: Hatfield, James Taft, W. Leopold, & A. J. Friedrich Zieglschmid (Eds.), *Language Monographs 7 (Curme volume of linguistic studies)*, pp. 141–149. Baltimore.

Sukač, Roman. 2013. *Introduction to Proto-Indo-European and Balto-Slavic accentology*. Cambridge Scholars Publishing, Newcastle upon Tyne.

Szemerényi, Oszvald J. L. 1970. "The Indo-European name of heart." In: Draviņa, Velta Rūķe (Ed.), *Donum Balticum*, pp. 515–533. Almqvist & Wiksell, Stockholm.

Szemerényi, Oszvald J. L. 1996. *Introduction to Indo-European linguistics*. Clarendon Press, Oxford. Translated from *Einführung in die vergleichende Sprachwissenschaft* 4th edition, 1990, with additional notes and references.

Thöny, Luzius. 2013. *Flexionsklassenübertritte – zum morphologischen Wandel in der altgermanischen Substantivflexion*. Institut für Sprachwissenschaft der Universität Innsbruck, Innsbruck.

Thurneysen, Rudolf. 1975. *A grammar of Old Irish*. The Dublin Institute for Advanced Studies, Dublin. First published in 1946. Translated from *Handbuch des Altirischen,* 1901, by D. A. Binchy and Osborn Bergin.

Townsend, Charles E. & L. A. Janda. 1996. *Common and comparative Slavic phonology and inflection*. Slavica, Ohio.

Trautmann, Reinhold. 1910. *Die altpreussischen Sprachdenkmäler*. Vandenhoeck und Ruprecht, Göttingen.

Trautmann, Reinhold. 1920. "Die litauischen Adverbia auf *-ai* und die slavischen Adverbia auf *-ě*." *Zeitschrift für vergleichende Sprachforschung auf dem Gebiete der Indogermanischen Sprachen*, *49*, 251–252.

Trautmann, Reinhold. 1923. *Baltisch-Slavisches Wörterbuch*. Vandenhoeck & Ruprecht, Göttingen.

Trubačev, Oleg N. 1974–. *Ėtimologičeskij slovar' slavjanskix jazykov*. Nauka, Moscva.

Ulvydas, Kazys (Ed.). 1965–1976. *Lietuvių kalbos gramatika (LKG)*. Mokslas, Vilnius.

Vaillant, André. 1936. "Le problème des intonations balto-slaves." *Bulletin de la Société de Linguistique de Paris*, *37*, 109–115.

Vaillant, André. 1958. *Grammaire comparée des langues slaves*, Vol. II. Klincksieck, Paris.

van Wijk, Nicolaas. 1918. *Altpreussische Studien*. Martinus Nijhoff, Haag.

Vasmer, Max. 1921. "Die Flexion von altbulg. *kyjь* 'qui."' *Indogermanische Forschungen*, *40*, 139–44.

Vermeer, Willem. 1998. "Christian Stang's revolution in Slavic accentology." In: rnflaten, Jan Ivar Bjø, G. Kjetsaa, & T. Mathiassen (Eds.), *A centenary of Slavic studies in Norway: the Olaf Broch symposium, Oslo*, pp. 240–254. Norwegian Academy of Science and Letters, Oslo.

Vijūnas, Aurelijus. 2006. *The Indo-European primary t-stems*. Ph.D. thesis, University of California, Los Angeles.

Villanueva Svensson, Miguel. 2010. "Baltic *sta*-presents and the Indo-European desiderative." *Indogermanische Forschungen*, *115*, 204–233.

Villanueva Svensson, Miguel. 2011a. "Anticausative-inchoative verbs in the norther Indo-European languages." *Historische Sprachforschung*, *124*, 33–58.

Villanueva Svensson, Miguel. 2011b. "The derivational history of Lith. *šerdìs*, OCS *sréda*." *International Journal of Diachronic Linguistics and Linguistic Reconstruction*, *8*(2), 161–172.

Villanueva Svensson, Miguel. 2011c. "Indo-European long vowels in Balto-Slavic." *Baltistica*, *46*(1), 5–38.

Villanueva Svensson, Miguel. 2012. "A note on the Baltic future participle." *Baltistica*, *47*(1), 15–21.

Villanueva Svensson, Miguel. 2014. "Tone variation in the Baltic *ia*-presents." *Indogermanische Forschungen*, *119*(1), 227–249.

Vine, Brent. 1988. "Review: *Indoevropejskij jazyk i indoevropejcy: Rekonstrukcija i istoriko-tipologičeskij analiz prajazyka i protokul'tury* [The Indo-European language and the Indo-Europeans: Reconstruction and historical-typological analysis of a proto-language and a proto-culture] By Tamaz V. Gamkrelidze and Vjačeslav V. Ivanov. With a preface by Roman Jakobson. 2 vols. Tbilisi: Izdatel'stvo Tbilisskogo Universiteta, 1984, pp. xcvi, 1328. Rb. 4.80, 8.50." *Language*, *64*(2), 396–402.

Vine, Brent. 2004. "On PIE full grades in some zero-grade contexts: **-tí-, *-tó-*." In: Clackson, James & B. Olsen (Eds.), *Indo-European word formation*, pp. 357–380. Museum Tusculanum Press, Copenhagen.

Vitevitch, Michael S. & P. A. Luce. 1998. "When words compete: levels of processing in perception of spoken words." *Psychological Science*, *9*, 325–329.

Wackernagel, Jakob & A. Debrunner. 1896–1964. *Altindische Grammatik*, Vol. I–III, Index. Vandenhoeck und Ruprecht, Göttingen.

Winter, Werner. 1978. "The distribution of short and long vowels in stems of the type Lith. *ésti* : *vèsti* : *mèsti* and OCS *jasti* : *vesti* : *mesti* in Baltic and Slavic Languages." In: Fisiak, J. (Ed.), *Recent developments in historical phonology*, pp. 431–436. Mouton, Hague.

Yamazaki, Yoko. 2014. "Monosyllabic circumflexion or shortening? – the treatment of the long vowels in the 3rd person future forms in Lithuanian." *Indogermanische Forschungen*, *119*, 339–354.

Yoshida, Kazuhiko. 2012. "The loss of intervocalic laryngeals in Sanskrit and its historical implications." In: Klein, Jared & K. Yoshida (Eds.), *Indic across the millennia: from the Rigveda to modern Indo-Aryan*, pp. 237–246. Hempen, Bremen.

Young, Steven. 2008. "Winter's Law and etymologies, with special reference to Lithuanian." *Baltistica*, *43*, 201–218.

Zinkevičius, Zigmas. 1957. *Lietuvių kalbos įvardžiuotinių būdavardžių istorijos bruožai*. Valstybinė politinės ir mokslinės literatūros leidykla, Vilnius.

Zinkevičius, Zigmas. 1966. *Lietuvių dialektologija*. Mintis, Vilnius.

Zinkevičius, Zigmas. 1978. *Lietuvių Kalbos Dialektologija*. Mokslas, Vilnius.

Zinkevičius, Zigmas. 1980–1981. *Lietuvių kalbos istorinė gramatika*, Vol. I–II. Mokslas, Vilnius.

Zinkevičius, Zigmas. 1984–1995. *Lietuvių kalbos istorija*, Vol. I–VII. Mokslas, Vilnius.

Zinkevičius, Zigmas. 1998. *The history of the Lithuanian language*. Mokslo ir enciklopedijų leidybos institutas, Vilnius.