Linguistica Uralica XLIII 2007 1

TIIT-REIN VIITSO (Tartu)

LIVONIAN GRADATION: TYPES AND GENESIS*

Abstract. Gradation consists of regular alternations of strong and weak grades of stressed syllables (and corresponding stems and words) in inflected words. In Livonian, gradation concerns words having both a short nuclear vowel and a heavy coda in the first syllable of strong-grade forms. A heavy coda is produced with the broken tone or it contains a phonetically half-long or full-long vowel or consonant in syllables with the plain tone. In weak-grade forms coda is either absent or light. weak-grade forms have a long vowel in the second syllable if the first syllable is short or in the first syllable if this syllable is long. On the basis of co-occurrence in inflectional paradigms of 11 weak- and 6 strong-grade stem types 21 main types of gradational paradigms are established. The emergence of gradation in Livonian is caused mainly by strengthening of coda in initial syllables as a counterbalance to long vowels or diphthong in the second syllable and as a compensation for syncopated and apocopated vowels in the second syllable.

Keywords: Livonian, syllable, stem, morphophonology, gradation, sound change.

1. The aim and general premises

This article attempts to capture the essence of Livonian gradation, to find out its main types, and to formulate the outlines of its genesis. The article is based on East Livonian and uses the Standard Livonian orthography[1] as established by the Livonian Language Conference held in Irē (Mazirbe) in March 1996, the only exception being that the open *ǭ* is extracted from *ō* and the broken tone is indicated by an apostrophe.

Gradation or grade alternation consists of regular alternations of the STRONG GRADE and WEAK GRADE of stressed syllables when the word is inflected. Depending on the grade of the stressed syllable it is possible to

* This study is an improved and extended version of the paper given in the Tenth International Congress of Finno-Ugricists held in Joškar-Ola, Mari El in August 2005. The study has been supported partly by Estonian Science Foundation (grant no. 6528), and partly by the Estonian Ministry of Education and Research (targeted research project no. 0182572s03).

[1] Note that the Livonian orthography uses letters with a macron to render long vowels and letters with the Latvian (comma-shaped) cedilla (*ļ, ņ, ŗ, ţ*) to render palatalized consonants. The letters *õ* and *ȯ* render correspondingly high and mid central vowels (cf. also Kreinin 1996; Karma 1998 : 44—45).

speak about strong-grade or weak-grade feet and about strong-grade or weak-grade stem or suffix allomorphs.[2] Such alternations occur in most Finnic languages, in Lappic, in Nganasan, and in Ket Selkup although not all inflected words undergo gradation in these languages.

Livonian gradation includes alternation, in an inflectional paradigm, of quantity patterns of stressed syllables that is accompanied either by structural differences in the post-tonic syllable or by the loss of the post-tonic syllable in strong-grade forms and may also be accompanied by simultaneous alternation of tone as in the following 18 nominals with a disyllabic weak-grade stem; stems are separated from inflectional suffixes by a vertical stroke:

	NPl	**NSg**	**PSg**	**Gloss**
(1)	*kalā|d*	*kalā*	*ka'll|õ*	fish
(2)	*kuŗē|d*	*kuŗē*	*ku'ŗŗ|õ*	devil
(3)	*piņī|d*	*pi'ņ*	*pi'ņņ|õ*	dog
(4)	*tiegū|d*	*tie'g*	*tie'gg|õ*	facial expression
(5)	*aigā|d*	*aigā*	*a'ig|õ*	edge
(6)	*kuoigī|d*	*ku'oig*	*ku'oig|õ*	ship
(7)	*jougū|d*	*jo'ug*	*jo'ug|õ*	river
(8)	*liepā|d*	*liepā*	*liepp|õ*	alder
(9)	*kikī|d*	*kik*	*kikk|õ*	rooster
(10)	*lõpsnā|d*	*lõpsnā*	*lõpsn|õ*	kind (adj.)
(11)	*uskū|d*	*usk*	*usk|õ*	belief
(12)	*sō̆ra|d*	*sō̆ra*	*sarr|õ*	horn
(13)	*līlõ|d*	*lil*	*lill|õ*	stem of an umbellifer
(14)	*lēba|d*	*lēba*	*leib|õ*	bread; loaf of bread
(15)	*ōkõ|d*	*ouk*	*ouk|õ*	hole; pit
(16)	*lāista|d*	*lāista*	*laist|õ*	slat
(17)	*kūonda|d*	*kūonda*	*kuond|õ*	heel
(18)	*lūoikõ|d*	*luoik*	*luoik|õ*	hollow; valley

All nominals have (a) a weak-grade nominative and genitive plural form with a disyllabic vocalic stem followed by the plural marker *-d*, (b) a strong-grade partitive singular form with a consonantal stem followed by the partitive case ending *õ*, (c) a morphologically unmarked nominative and genitive singular form that is either (i) a disyllabic weak-grade *ā*-, *ē*-, or *a*-stem identical with that in nominative and genitive plural form, or (ii) a monosyllabic strong-grade consonantal stem, similar to that in the partitive case for verbs that have in nominative and genitive plural an *ī*-, *ū*-, or *õ*-stem.

In short, non-high stem vowels *ā*, *ē*, and *a* of disyllabic weak-grade stems are preserved in morphologically unmarked forms whereas high stem vowels *ī*, *ū*, and *õ* are apocopated in morphologically unmarked forms and the resulting monosyllabic stem ends in a consonant and is in the strong grade.

In view of the similarity of monosyllabic consonantal strong-grade stems in nominative and genitive singular forms and disyllabic consonantal strong-grade stems in partitive singular forms when followed by the partitive suffix *õ*, below all cases of automatic resyllabification of stems before vowel-initial suffixes are ignored when speaking about stem length.

[2] Following the existing tradition, different stem allomorphs below are simply called STEMS.

2. The syllabic mechanism of Livonian gradation

2.1. Syllable structure

The general scheme of Livonian syllable structure in the present study includes an optional consonantal ONSET (O), an obligatory RHYME (R) and an optional TERMINATION (T). The rhyme includes at least a NUCLEUS (N), which in a stressed syllable can be followed by a CODA (C), and is accompanied by a superposed TONE in the primary stressed syllable. Nuclei are either short or long and filled by vowels. For the sake of simplicity we classify homosyllabic sequences of high and mid vowels together with monophthongs into short vowels and long vowels. The set of all vowels V includes the following subsets: the subset of short vowels V_S = {*i*, *e*, *ä*, *õ*, *ȯ*, *a*, *u*, *o*, *ie*, *uo*} and the subset of long vowels V_l = {*ī*, *ē*, *ǟ*, *ō̃*, *ō̇*, *ā*, *ū*, *ō*, *ō̰*, *īe*, *ūo*} in the nucleus and the subset V_c = {*i*, *u*} in the coda of primary stressed syllables, the subsets V_{su} = {*i*, *õ*, *a*} and V_{lu} = {*ī*, *ē*, *ā*, *ū*} in the nucleus of unstressed syllables. The set of all consonants C includes the following subsets: the subset of fortis obstruents C_F = {*p*, *t*, *ṭ*, *k*, *s*, *š*}, the subset of lenis obstruents[3] C_L = {*b*, *d*, *ḍ*, *g*, *z*, *ž*}, and the subset of resonants C_R = {*m*, *n*, *ṇ*, *l*, *ḷ*, *r*, *ṛ*, *v*, *j*}. In a syllable, the nucleus contains only one vowel and the coda one vowel or one consonant; the termination contains either a single consonant or a consonant cluster. In primary stressed syllables two tones occur: the PLAIN (or RISING) TONE, and the BROKEN TONE, which is rising-falling or predominantly falling and articulated with laryngealization (stød or creaky voice); for a short nucleus, laryngealization may be continued in the coda. Figure 1 presents the general structure of primary stressed syllables. In Figure 1, the plain tone is indicated by an acute accent ´, whereas elsewhere the plain tone is unmarked.

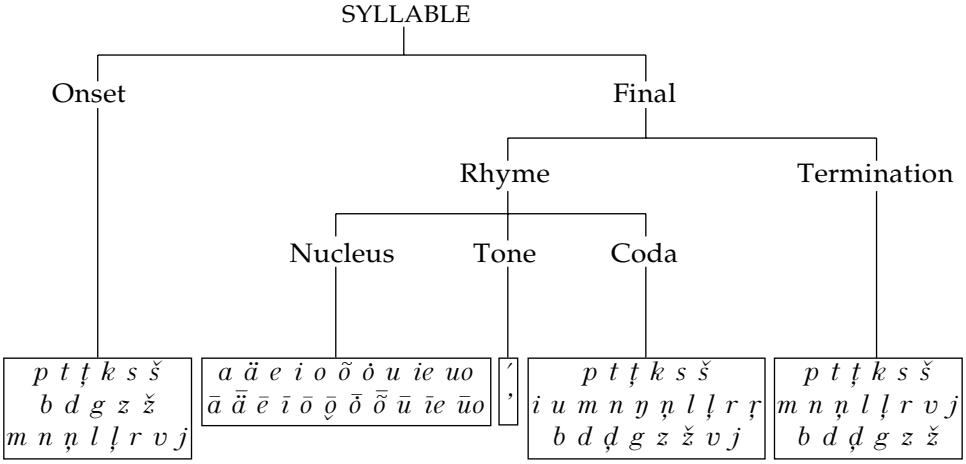

Figure 1. **Structure of primary stressed syllables.**

[3] Lenis obstruents are (a) voiced [*b*, *d*, *ḍ*, *g*, *z*, *ž*/*ź*] before vowels, resonants or lenis obstruents and (b) half-voiced [*ʙ*, *ᴅ*, *ᴅ́*, *ɢ*, *ᴢ*, *ž*/*ᴢ́*] between a short vowel and a fortis obstruent in a primary stressed syllable and in the word-final position before a pause. To be more exact, a half-voiced obstruent includes a voiced initial part, approximately 0.3 of the total duration of the obstruent.

The plain tone is automatic (a) in a stressed syllable followed by an unstressed syllable containing either a long vowel of subset V_{lu} or a short vowel *a*, (b) in a stressed syllable containing a short nuclear vowel of subset V_s that is either syllable-final or followed by a fortis obstruent of subset C_F. The broken tone is automatic in syllables containing a short nuclear vowel of subset V_s when followed by a lenis obstruent of subset C_L. Tone is contrastive and phonologically unpredictable (a) in a long primary stressed syllable with a long vowel of the subset V_l, (b) in a long primary stressed syllable with a short vowel of the subset V_s followed by coda vowel of the subset V_c or a coda resonant of the subset C_R either in a monosyllabic word or when the following unstressed syllable contains a short vowel different from *a*.

Feet in modern Livonian can be one to three syllables long. In stressed monosyllables ending in a vowel, the occurrence of short and long vowels is contrastive and, for long vowels, the occurrence of plain and broken tone is contrastive, cf. *li* 'go! (2Sg)', *sī* 'fault', and *rī*' 'threshing house'. Syllables of all three kinds can occur at the beginning of di- and trisyllabic feet, cf. *ligīd* 'go! (2Pl)', *vīgid* 'take (to somewhere) (2Pl)', *vī'ri* 'yellow'; *kilāli* 'guest (NSg)', *bībiļi* 'bibels (PPl)', *vī'ridi* 'yellow ones (PPl)'.

2.2. Structure of minimal weak- and strong-grade forms

Given that a syllable σ = (O)R(T) = (O)N(C)(T), where items in parentheses are optional, Livonian gradation concerns words having both a short nuclear vowel and a coda in the first stem syllable of strong-grade forms. Moreover, the coda is heavy in strong-grade forms, which means that its production requires special effort, similar to that for stød, cf. *ka'llõ* [*ka'llə̂*], *ku'ŗŗõ* [*ku'ŕŕə̂*], *pi'ņņõ* [*pi'ńńə̂*] and *pi'ņ* [*piⁿ̂'*], *tie'ggõ* [*tⁱe'ggə̂*] and *tie'g* [*tⁱe'g̀*], *a'igõ* [*a'igə̂*], *jo'ugõ* [*jo'ugə̂*], *kuo'igõ* [*kᵘo'igə̂*] and *kuo'ig* [*kᵘo'iG*], *jo'ugõ* [*jo'ugə̂*] and *jo'ug* [*jo'uG*] and in view of phonetically half-long coda vowels or half-long or full-long coda consonants in syllables with the plain tone, cf. *lieppõ* [*lⁱeə̀ppə̂*], *kikkõ* [*kiə̀kkə̂*] and *kik* [*kiə̀k*], *lõpsnõ* [*lǫ̀psnə̂*], *uskõ* [*uə̀skə̂*] and *usk* [*uə̀sk*], *sarrõ* [*saə̀rə̂*], *lillõ* [*liə̀llə̂*] and *lil* [*liə̀l*], *leibõ* [*leə̀ibə̂*], *oukõ* [*oə̀ukkə̂*] and *ouk* [*oə̀uk*], *laistõ* [*laə̀istə̂*], *kuondõ* [*kᵘoə̀ndə̂*], *luoikõ* [*lᵘoə̀ikkə̂*] and *luoik* [*lᵘoə̀ik*].

In weak-grade forms coda is either absent, cf. *kalād* [*kalàD*], *kuŗēd* [*kuŕèD*], *piņīd* [*piń̀iD*], *tiegūd* [*tⁱegùD*], *sǭrad* [*sǭraD*], *līlõd* [*līlə̂D*], *sǭrad* [*sǭraD*], *lēbad* [*lēbaD*], *ōkõd* [*ōkkə̂D*], or it is light, which means that coda consonants and vowels are phonetically half-short or full-short, cf. *aigād* [*aĭgàD*], *kuoigīd* [*kᵘoĭgìD*], *jougūd* [*joŭgùd*], *liepād* [*lⁱeĕppàD*], *kikīd* [*kiĭkkìD*], *lõpsnād* [*lǫĕpsnàD*], *uskūd* [*uškùD*], *lāistad* [*làistaD*], *kūondad* [*kùondaD*], *lūoikõd* [*lùoikkə̂D*].[4] As coda is light or absent in weak-grade forms, the "free" amount of energy has been applied for producing (a) long vowels of the subset

[4] There has been some disagreement between Lauri Kettunen and Lauri Posti concerning the phonetic essence of intervocalic fortis obstruents as in *kikīld*, *liepād*. According to L. Kettunen's phonetic transcription such stops and sibilants are regarded as geminates with a half-short initial component, e.g. [*ĕkk*] and [*ĕpp*], cf. Kettunen 1938; 1947; according to L. Posti (1943), in such cases intervocalic obstruents are half-long single consonants, e.g. [*k̀*] and [*p̀*]. In the framework of Livonian orthography, a non-initial syllable begins with a consonant if there occurs one, cf. *ki-kīd*, *li-epād*, *rūoi-kõb*.

V_{lu} in the nucleus of the second syllable for words that have a coda filled by an obstruent of the set C_F or stød in their strong-grade forms and (b) long vowels of the class V_u in the nucleus of the first syllable of words that have a coda filled by a vowel or a resonant in a syllable with the plain tone in their strong-grade forms. Table 1 displays the precise structure of weak-grade nominative plural forms and the strong grade partitive and nominative singular forms of the 18 nominals listed in the introductory section, cf. Table 1. The broken tone is indicated together with the nuclei.

Table 1

Syllabic mechanism of Livonian gradation

	WEAK GRADE							STRONG GRADE										
	Disyllabic word							Disyllabic word							Monosyllable			
	1st syllable				2nd syllable			1st syllable				2nd syllable			1st syllable			
	O	N	C	T	O	N	T	O	N	C	T	O	N	T	O	N	C	T
(1)	*k*	*a*			*l*	*à*	D	*k*	*a'*	*l*		*l*	*õ*					
(2)	*k*	*u*			*ŕ*	*è*	D	*k*	*u'*	*ŕ*		*ŕ*	*õ*					
(3)	*p*	*i*			*ń*	*ì*	D	*p*	*i'*	*ń*		*ń*	*õ*		*p*	*i'*	*ǹ*	
(4)	*t*	*ie*			*g*	*ù*	D	*t*	*ie'*	*g*		*g*	*õ*		*t*	*ie'*	*g*	G
(5)		*a*	*ĭ*		*g*	*à*	D		*a'*	*i*		*g*	*õ*					
(6)	*k*	*uo*	*ĭ*		*g*	*ì*	D	*k*	*uo'*	*i*		*g*	*õ*		*k*	*uo'*	*i*	G
(7)	*j*	*o*	*ŭ*		*g*	*ù*	D	*j*	*o'*	*u*		*g*	*õ*		*j*	*o'*	*u*	G
(8)	*l*	*ie*	*p̆*		*p*	*à*	D	*l*	*ie*	*p̀*		*p*	*õ*					
(9)	*k*	*i*	*k̆*		*k*	*ì*	D	*k*	*i*	*k̀*		*k*	*õ*		*k*	*i*	*k̄*	
(10)	*l*	*e̯*	*p̆*	*s*	*n*	*à*	D	*l*	*õ*	*p̄*	*s*	*n*	*õ*					
(11)		*u*	*š*		*k*	*ū*	D		*u*	*s̄*		*k*	*õ*			*u*	*s̄*	*k*
(12)	*s*	*o̯*			*r*	*a*	D	*s*	*a*	*r̀*		*r*	*õ*					
(13)	*l*	*ī*			*l*	*õ*	D	*l*	*i*	*l̀*		*l*	*õ*		*l*	*i*	*l̄*	
(14)	*l*	*ē*			*b*	*a*	D	*l*	*e*	*ì*		*b*	*õ*					
(15)		*ō*		*k*	*k*	*õ*	D		*o*	*ù*	*k*	*k*	*õ*			*o*	*ù*	*k̀*
(16)	*l*	*à*	*ĭ*	*s*	*t*	*a*	D	*l*	*a*	*ì*	*s*	*t*	*õ*					
(17)	*k*	*ùo*	*ň*		*d*	*a*	D	*k*	*uo*	*n̄*		*d*	*õ*					
(18)	*l*	*ùo*	*ĭ*	*k*	*k*	*õ*	D	*l*	*uo*	*ì*	*k*	*k*	*õ*		*l*	*uo*	*ì*	*k̀*

Notes. 1. Items in the table are presented in FUPA.
2. Lengthened nuclei and codas and are shaded.

On the basis of Table 1 one can establish three structural types of Livonian gradation:
(i) weak-grade stems where the post-tonic syllable contains an intervocalic resonant or a lenis obstruent followed by a long vowel alternate with strong-grade stems with the broken tone, see items (1) — (6);
(ii) weak-grade stems with an intervocalic fortis obstruent or a cluster beginning with a fortis obstruent followed by a long vowel alternate with strong-grade stems with the plain tone, see items (7) — (11);

(iii) weak-grade stems where the first syllable contains a long nuclear vowel and the post-tonic syllable a short vowel alternate with strong-grade stems with the plain tone and a heavy coda consisting of a vowel or a resonant consonant in the stressed syllable, see items (12) — (18).

In disyllabic stems, two kinds of disproportion occur: (1) if the first syllable is long, the second syllable is short, and vice versa: if the first syllable is long, the second syllable is long, i.e. the vocalic nucleus of the second syllable is long; (2) for type (iii), in long first syllables either the coda is light and the nuclear vowel long, or the coda is heavy and the nuclear vowel is short. At the same time, to keep the articulary effort equal, the duration of syllables with the broken tone is smaller than that of syllables with the plain tone.

3. The morphological classification of Livonian gradation

3.1. Weak- and strong-grade stems in inflectional paradigms

Section 1 established a difference in the distribution of words with disyllabic weak-grade stems ending in high and non-high vowels. Below, the distribution of all weak- and strong-grade stem types will be studied more closely.

Table 2

Distribution of strong- and weak-grade stems in verbal paradigms

	a-stem	*ā*-stems		*ū*-stems		*õ*-stem	*ā*- ~ *ū*-/C-stems
Pr1Sg	*ānda|b*	*jelā|b*	*võtā|b*	*siegū|b*	*akū|b*	*tūndõ|b*	*tulā|b ~ tulū|b*
Pr2Sg	*ānda|d*	*jelā|d*	*võtā|d*	*siegū|d*	*akū|d*	*tūndõ|d*	*tulā|d ~ tulū|d*
Pr3Sg	*ānda|b*	*jelā|b*	*võtā|b*	*siegū|b*	*akū|b*	*tūndõ|b*	*tulā|b ~ tulū|b*
Pr1Pl	*ānda|m*	*jelā|m*	*võtā|m*	*sie'gg|õm*	*akk|õm*	*tund|õm*	*tu'l|mõ*
Pr2Pl	*ānda|t*	*jelā|t*	*võtā|t*	*sie'gg|õt*	*akk|õt*	*tund|õt*	*tu'l|tõ*
Pr3Pl	*ānda|bõd*	*jelā|bõd*	*võtā|bõd*	*sie'gg|õbõd*	*akk|õbõd*	*tund|õbõd*	*tu'l|bõd*
Ipf1Sg	*ānd|iz*	*jel|īz*	*võt|īz*	*sieg|īz*	*ak|īz*	*tūnd|iz*	*tu'ļ*
Ipf2Sg	*ānd|izt*	*jel|īzt*	*võt|īzt*	*sieg|īzt*	*ak|īzt*	*tūnd|izt*	*tu'ļ|d*
Ipf3Sg	*ānd|iz*	*jel|īz*	*võt|īz*	*sieg|īz*	*ak|īz*	*tūnd|iz*	*tu'ļ*
Ipf1Pl	*ānd|izmõ*	*jel|īzmõ*	*võt|īzmõ*	*sieg|īzmõ*	*ak|īzmõ*	*tūnd|izmõ*	*tuļ|mõ*
Ipf2Pl	*ānd|iztõ*	*jel|īztõ*	*võt|īztõ*	*sieg|īztõ*	*ak|īztõ*	*tūnd|iztõ*	*tu'ļ|tõ*
Ipf3Pl	*ānd|iztõ*	*jel|īztõ*	*võt|īztõ*	*sieg|īztõ*	*ak|īztõ*	*tūnd|iztõ*	*tu'ļ|tõ*
Cnd3Sg	*ānda|ks*	*jelā|ks*	*võtā|ks*	*sie'gg|õks*	*akk|õks*	*tund|õks*	*tul|ks*
Quo3Sg	*ānda|ji*	*jelā|ji*	*võtā|ji*	*sie'gg|iji*	*akk|iji*	*tund|iji*	*tuļ|i*
Imp2Sg	*ānda*	*jelā*	*võtā*	*sie'g*	*ak*	*tund*	*tu'l*
Imp1Sg	*ānda|gõm*	*jelā|gõm*	*võtā|gõm*	*sie'gg|õgõm*	*akk|õgõm*	*tund|õgõm*	*tu'l|gõm*
Imp2Pl	*ānda|gid*	*jelā|gid*	*võtā|gid*	*sie'gg|õgid*	*akk|õgid*	*tund|õgid*	*tu'l|gid*
Inf	*and|õ*	*je'll|õ*	*võtt|õ*	*sie'gg|õ*	*akk|õ*	*tund|õ*	*tūl|da*
APPle	*and|õn*	*je'll|õn*	*võt|tõn*	*sie'gg|õn*	*akk|õn*	*tund|õn*	*tu|nd*
Gloss	to give	to live	to take	to mix	to catch	to feel	to come

Note. Strong-grade forms are shadowed.

Table 2 lists all weak- and strong-grade distribution types in verbal paradigms. All indicative forms together with a selection of other forms either proving the difference or presenting a characteristic distribution of strong- and weak-grade forms are presented. All conditional and quotative mood forms share the same grade and mood marker. Jussive mood forms share both the mood marker and grade with the imperative 1st person plural form. The imperative 2nd person singular form is morphologically unmarked.

On the basis of the distribution of strong- and weak-grade stems in paradigms, gradational verbs can be divided into three groups: (a) *a*- and *ā*-stem verbs have the weak-grade *a*- or *ā*-stem in all present indicative forms, in all conditional and quotative and imperative mood forms; (b) *ū*- and *õ*-stem verbs have, respectively, the weak-grade *ū*- and *õ*-stem in the present indicative singular forms; (c) a series of three verbs has (i) a monosyllabic weak-grade infinitive with a lengthened nuclear vowel (*tūl|da* 'to come', *pān|da* 'to put', *vōl|da* 'to be'), (ii) a monosyllabic strong-grade stem with the broken tone and a stem final palatalized resonant, (iii) strong-grade plain-tone consonantal stems in conditional forms and (iv) consonant-initial plural personal endings even in the present indicative plural forms. The first two verbs, depending on the area, usually have a weak-grade *ā*-stem in singular forms of the present indicative, but in Vaid and partly in Sikrõg a weak-grade *ū*-stem. (In this type, the *ū*-stem is a norm in Īra and West Livonian). The verb *vōlda* has suppletive present indicative forms. Both groups (a) and (b) have weak-grade stems in past indicative forms and there exists a problem of segmentation, namely (i) whether to explain the vowels *i* and *ī* as belonging to the past tense marker (cf. *ānd|iz* and *jel|īz*) or to postulate special past tense *i*- and *ī*-stems (*āndi|z* and *jelī|z*). Here the first solution is preferred.

For nominals, the number of different distribution types of weak- and strong-grade stems, including those with monosyllabic stems in weak-grade forms, is still larger. In order to better reflect the differences in Table 3 the *ī*-, *ū*, and *õ*-stems are represented by one single nominal, *ā*- and *a*-stems by two nouns representing two different types of distribution in plural cases. Obviously weak-grade plural partitive, illative, inessive, and elative forms are partially conditioned by the need to avoid certain geminates and consonant clusters on the stem and suffix boundary, cf. *ladīdi*, *ladīž*, *ladīs*, *ladīst* instead of †*la'ḑ|ḑi*, †*la'ḑ|ži*, †*la'ḑ|ši*, †*la'ḑ|šťi* for *ladā* 'top (of a plant)'. Sometimes the original reason of the traditional usage is unknown, cf. the partitive plural forms *tikīdi*, *kēranikīdi* and *sukṭi* of *tikā* 'goat', *kēranikā* 'writer' and *sukā* 'stocking'.

In Table 3, five types of nominals with either a monosyllabic or disyllabic weak-grade stem in partitive singular (*kä|tā*, *tūl|da*, *nāiz|ta*,[5] *tuḷīz|t*, *kīraz|t*) are added to nominals with a disyllabic vocalic weak-grade stem and a monosyllabic consonantal strong-grade stem. Note that for disyllabic weak-grade stems longer and older partitive singular forms *tuḷīz|tõ*, *kīraz|tõ* also can be used. Two types out of the five types have disyllabic strong-grade stems (*tu'ļļi* and *tu'ļļiz*, *kirrõ*). In one of the series, the partitive singular form is the single weak-grade form, cf. *nāiz|ta* (in addition

[5] The letters *b*, *d*, *ḑ*, *g*, *z*, *ž* stand for half-voiced obstruents if followed by a suffix beginning in *t*, *s*, or *š*.

Table 3

Distribution of strong and weak grade stem allomorphs in nominal paradigms

	ī-stems	*ā*-stems		*ž*-/*d*-stems	C-stems	*i*-stems		*az*-stems
N	*kik*	*kalā*	*ladā*	*ke'ž*	*tu'ļ*	*tu'ļļi*	*nai*	*kīraz*
G	*kik*	*kalā*	*ladā*	*kä'd*	*tu'l*	*tuļīz*	*naiz*	*kirrõ*
P	*kikk|õ*	*ka'll|õ*	*la'dd|õ*	*käl|tā*	*tūl|da*	*tuļīz|t*	*nāiz|ta*	*kīraz|t*
D	*kikk|õn*	*kalā|n*	*ladā|n*	*kä'dd|õn*	*tu'll|õn*	*tuļīz|õn*	*naiz|õn*	*kirrõ|n*
Ins	*kikk|õks*	*kalā|ks*	*ladā|ks*	*kä'd|kõks*	*tu'l|kõks*	*tuļīz|õks*	*naiz|õks*	*kirrõ|ks*
Ill	*kikk|õ*	*ka'll|õ*	*la'dd|õ*	*kä'dd|õ*	*tu'll|õ*	*tuļīz|õ*	*naiz|õ*	*kirrõ|z*
Ine	*kik|sõ*	*kalā|s*	*ladā|s*	*kä'd|sõ*	*tu'l|sõ*	*tuļīz|õs*	*naiz|õs*	*kirrõ|s*
Ela	*kik|stõ*	*kalā|st*	*ladā|st*	*kä'd|stõ*	*tu'l|stõ*	*tuļīz|õst*	*naiz|õst*	*kirrõ|st*
Plural								
N	*kikī|d*	*kalā|d*	*ladā|d*	*kädū|d*	*tu'l|d*	*tu'ļļiz|t*	*naiz|t*	*kirrõ|d*
G	*kikī|d*	*kalā|d*	*ladā|d*	*kädū|d*	*tu'l|d*	*tu'ļļiz|t*	*naiz|t*	*kirrõ|d*
P	*kikl|īdi*	*ka'ļ|ļdi*	*ladl|īdi*	*ke'žž|i*	*tu'ļ|ļdi*	*tuļīž|i*	*naiž|i*	*kirr|idi*
D	*kikī|dõn*	*kalā|dõn*	*ladā|dõn*	*kädū|dõn*	*tu'l|dõn*	*tu'ļļiz|tõn*	*naiz|tõn*	*kirrõ|dõn*
Ins	*kikī|dõks*	*kalā|dõks*	*ladā|dõks*	*kädū|dõks*	*tu'l|dkõks*	*tu'ļļiz|tõks*	*naiz|tkõks*	*kirrõ|dõks*
Ill	*kikl|īž*	*ka'ļ|zi*	*ladl|īž*	*kežl|īz*	*tuļ|īž*	*tuļīž|iz*	*naiž|iz*	*kirr|iž*
Ine	*kikl|īs*	*ka'ļ|ši*	*ladl|īs*	*kežl|īs*	*tu'ļ|ši*	*tuļīž|is*	*naiž|is*	*kirr|is*
Ela	*kikl|īst*	*ka'ļ|šti*	*ladl|īst*	*kežl|īst*	*tu'ļ|šti*	*tuļīž|ist*	*naiž|ist*	*kirr|ist*
Gloss	rooster	fish	top	hand	fire	hot	woman	ax

Note. Strong-grade forms are shadowed.

there exists one-word series with the similar distribution of weak- and strong-grade stems, cf. NGSg *võrgõ* 'net', PSg *vȭr\|ta*, NGPl *võrgõ\|d*). In one type of paradigms, minimal pairs of weak- and strong-grade forms have arisen, cf. PSg *tuļīz\|t* and NGPl *tu'ļļiz\|t*.

The fact that the strengthening of the coda in stressed syllables of strong-grade forms occurs in combination both with the plain tone and with the broken tone but the lengthening of the nuclear vowel occurs either in stressed syllables or in post-tonic syllables of weak-grade forms, means that the codas and nuclei serve as foci of different processes. The monosyllabic weak-grade infinitive forms with the suffix *-da* (e.g. *tūlda*), as well as the weak-grade partitive singular forms with suffixes *-da*, *-tā*, *-ta*, however, point that the weak grade of such infinitive forms is not solely the property of stems but rather conditioned by the structure of the FOOT.

3.3. Main types of stem alternation in gradational paradigms

In order to get a first morphological classification of Livonian gradation in nominal and verbal paradigms, here the genitive and partitive case singular and genitive plural forms of nominals and the 3rd person singular form of the indicative mood, the 2nd person singular form of the imperative mood, and the infinitive form of verbs will be used.

Examples of the main types of distribution of the strong-grade and weak-grade stems cf. Tables 2 and 3. Nominative and genitive singular forms and the 2nd person singular form of the imperative mood contain no affixes, i.e. they represent pure stems. Partitive singular forms, nominative and genitive plural forms as well as the 3rd person singular and infinitive forms contain suffixes that do not cause assimilative changes in preceding stems. In Livonian, nominative and genitive singular forms are mostly homonymic. In plural, the nominative and genitive forms differ only for pronouns. Still in an inflectional paradigm, it is the genitive form that usually serves as the base of most case forms. The 3rd person singular form and the 1st person singular forms are homonymic; here only the 3rd person is referred to as in many cases a verb is never used in the 1st person form.

Table 4 classifies gradational words into 13 main types depending on the number and place of the pure weak-grade stems in inflectional paradigms. Some of the main types have been divided into subtypes according to the stem-vowel of disyllabic weak-grade stems, nuclear-vowel lengthening in monosyllabic consonantal stems, or interrelation with the corresponding strong-grade stem for disyllabic consonantal stems.[6]

4. Typology of inflectional paradigms on the basis of stem alternations

In order to get (a) a better overview of the co-occurrence of different strong- and weak-grade stems in inflectional paradigms and (b) a typology of paradigms based on the co-occurrence of stems, at first a formal typology of Livonian stems is needed.

Obviously, both strong-grade stems and weak-grade stems are either monosyllabic or disyllabic. Monosyllabic strong-grade stems end in a consonant. Disyllabic strong-grade stems end in a vowel. Both monosyllabic and disyllabic strong-grade stems have either the broken or plain tone. Stems with the plain tone are divided into stems with a fortis consonant as the coda and stems with a vowel or a resonant consonant as the coda.

Both monosyllabic and disyllabic weak-grade stems are either vocalic or consonantal. Vocalic monosyllabic weak-grade stems end in a short nuclear vowel. Monosyllabic and disyllabic consonantal stems contain either a short nuclear vowel or a long nuclear vowel depending on the coda in the corresponding weak-grade form. Disyllabic vocalic weak-grade stems end in *ū*, *ī*, *õ*, *ē*, *ā*, or *a*. Among disyllabic vocalic stems, *ā*-, *ē*-, *ī*-, and *ū*-stems have a short nuclear vowel in the initial syllable, while *a*- and *õ*-stems have a long nuclear vowel. Otherwise *ū*-, *ī*-, *õ*-stems on the one hand and *ē*-, *ā*-, *a*-stems on the other hand behave in a different way in their respective paradigms.

In Table 5 this typology of stems is applied to the data in Table 4. Note that only type or subtype numbers are presented in the table. The total number of main types of gradational paradigms defined on the basis of co-occurrence of different strong-grade and weak-grade stem types is 21.

[6] Note that Table 5 also includes Livonian gradational derivational suffixes *-ļikki* and *-nikā*, cf. e.g. *pāvaļikki* 'sun', *kēranikā*, cf. types 12b and 10b.

Table 4

Main types of weak-grade stems and their strong-grade counterparts

Disyllabic vocalic weak-grade stem		Consonantal weak-grade stem		Tone in strong grade
ū-, ī-, õ-stems	*ē-, ā-, a*-stems	Monosyllabic	Disyllabic	
Monosyllabic strong-grade stem			Disyllabic strong-grade stem	
1a. *lugū|b* : *lu'gg|õ*$_1$	**2a.** *kuŗē* : *ku'ŗŗ|õ*$_6$	**3a.** *tūl|da* : *tu'l*$_9$**!**	**4a.** *azūm* : *a'zmõ*$_{11}$	Broken tone
jougū|d : *jo'ug|õ*$_2$	**2b.** *kalā* : *ka'll|õ*$_7$	**3b.** *võl|da* : *vȯ'l*$_{10}$**!**	**4b.** *maigāz* : *ma'igõ*$_{12}$	
1b. *samū|d* : *sa'm|tõ*$_3$	*aigā* : *a'ig|õ*$_8$		**4c.** *käbrāz* : *kä'brõ*$_{13}$	
1c. *piņī|d* : *pi'ņ*$_4$			**4d.** *aigīz* : *a'igi*$_{14}$	
kuoigī|d : *kuo'ig*$_5$			**4e.** *tuļīz* : *tu'ļļi*$_{15}$	
		5. *kuz|tā* : *ku'z*$_{16}$**!**		
6a. *kuodū|d*		**6a.** *kuo|tā* : *kuo'd*$_{17}$		
6b. *kädū|d*		**6b.** *kä|tā* : *kä'd*$_{18}$**!**		
	7. *minā,*	*mīn|da* : *mi'n*$_{19}$		
8. *tulū|b* ~ *tulā|b,*		*tūl|da* : *tu'l*$_{20}$**!**		
9a. *patū|d* : *patt|õ*$_{21}$	**10a.** *vitska* : *vits|õ*$_{28}$**!**	**11a.** *laps | tā* : *laps*$_{34}$**!**	**12a.** *võţīm* : *võţmõ*$_{36}$	Plain tone
uskū|b : *usk|õ*$_{22}$	**10b.** *sukā* : *sukk|õ*$_{29}$	11b. *nāiz|ta* : *naiz*$_{35}$**!**	**12b.** *kukīz* : *kukki*$_{37}$	
9b. *kikī|d* : *kik*$_{23}$	*oksā* : *oks|õ*$_{30}$		**12c.** *õpkāz* : *õpkõ*$_{38}$	
lutšī|d : *lutš*$_{24}$	**10c.** *jālga* : *jalg|õ*$_{31}$**!**		**12d.** *kǭņim* : *kaņmõ*$_{39}$	
9c. *tǭmõ|d* : *tam*$_{25}$**!**	**10d.** *pīla* : *pill|õ*$_{32}$		**12e.** *kīraz* : *kirrõ*$_{40}$	
9d. *āigõ|d* : *aig*$_{26}$	*āiga* : *aig|õ*$_{33}$		**12f.** *āigiz* : *aigi*$_{41}$	
tūndõ|b : *tund|õ*$_{27}$				
		13. *vȭr|ta* :	*võrgõ*$_{42}$	
14a. *vȭrdõ|d,*		*vȭr|ta* : *vȱrd*$_{43}$**!**		
14b. *kīlgõ|d,*		*kīl|ta* : *kilg*$_{44}$		

Glosses: 1 to read (3Sg : Inf), 2 river (NGPl : PSg), 3 step (NGPl : PSg); 4 dog (NGPl : NGSg), 5 ship (NGPl : NGSg), 6 devil (NGSg : PSg), 7 fish (NGSg : PSg), 8 edge (NGSg : PSg), 9 fire (PSg : GSg), 10 to be (Inf : Imp2Sg), 11 place (NSg : GSg), 12 having a sweet tooth (NSg : GSg), 13 nimble (GSg : NSg), 14 being located on the edge or coast (GSg : NSg, adj.), 15 hot (GSg : NSg), 16 piss (PSg : GSg), 17 home (PSg, NGPl : NGSg), 18 hand (PSg : GSg, 19 I (NSg, PSg : GSg), 20 to come (3Sg, Inf : Imp2Sg), 21 sin (NGPl : PSg), 22 believe (3Sg : Inf), 23 rooster (NGPl : NGSg), 24 eelpout (NGPl : NGSg), 25 oak (NGPl : GSg), 26 pike (NGPl : NGSg), 27 to feel (3Sg : Inf), 28 rod; wicker (NGSg : PSg), 29 stocking (NGSg : PSg), 30 branch (NGSg : PSg), 31 cloud (NGSg : PSg), 32 foot (NGSg : PSg), 33 time (NGSg : PSg), 34 child (PSg : GSg), 35 woman (PSg : GSg), 36 net (PSg : NGSg), 37 key (NSg : PSg), 38 insect (GSg : NSg), 39 boar (NSg : GSg), 40 handle for carrying (NSg : GSg), 41 ax (NSg : GSg), 42 of the time of (adj.; GSg : NSg), 43 roost (NPl, PSg : GSg, NSg), 44 side (NGPl, PSg : NSg).

The existence of another monosyllabic strong-grade stem is indicated by means of the exclamation mark **!**.

Table 5

Main types of gradational paradigms defined on the basis of co-occurrence of strong-grade and weak-grade stem types

Grade		Weak									
	TYPE	*ū*	*ī*	*õ̃*	*ē*	*ā*	*a*	MC_S	MC_L	DC_S	DC_L
Strong	MB	**1a-b**	**1c**		**2a**	**2b**		**5**	**3a-b**		
		6a-b				7		6a-b	7		
		8				8			8		
	MP_F	**9a**	**9b**			**10a-b**		**11a**			
	MP_R			**9c-d**			**10c-d**		**11b**		
				14a-b					14a-b		
	DB									**4a-e**	
	DP_F									**12a-c**	
	DP_R								**13**		**12d-f**

Key: DB disyllabic syllable with broken tone, $\mathbf{DC_L}$ disyllabic consonantal stem with lengthened nucleus in the stressed syllable, $\mathbf{DC_S}$ disyllabic consonantal stem with short nucleus in the stressed syllable, **DP** disyllabic stem with plain tone, **MB** monosyllabic syllable with broken tone, $\mathbf{MC_S}$ monosyllabic consonantal stem with short nucleus, $\mathbf{MC_L}$ monosyllabic consonantal stem with lengthened nucleus, $\mathbf{MP_F}$ monosyllabic stem with plain tone and a fortis obstruent as the coda consonant, $\mathbf{MP_R}$ monosyllabic stem with plain tone and a vocalic or resonantal coda consonant, **MV** monosyllabic vocalic stem.

5. Main conditions of the emergence of gradation

5.1. Preconditions of the emergence of gradation in comparison with other Finnic languages

Gradation or grade alternation is a result of different context-sensitive changes which were applied to inflectional paradigms having stems with a short vowel in the initial syllable. As one set of changes was responsible for the creation and modification of weak-grade forms and another for the creation and modification of strong-grade forms on the way to modern forms, there are also numerous cases of weak- and strong-grade forms that do not participate in gradation because there was no possibility in the paradigm for developing a form of another grade. There are also numerous cases where either a strong- or weak-grade stem was replaced by the opposite grade stem to reduce the number of stems in the paradigm and to simplify inflection.

Modern Livonian gradation is unique in the Finnic area. Unlike the weak grade in the framework of the so-called radical gradation of other Finnic languages, the weak grade in Livonian was not triggered by closed post-tonic syllables.[7] Livonian gradation is restricted to words, which orig-

[7] It is probable that there exist even in Livonian some traces of theformer gradation of the Estonian-Votic-Ingrian-Finnish-Karelian type. Mostly they do not cause paradigmatic stem alternation, cf. *jȭlõ̃ks* 'runner of a sledge' < **jālõ̃ks* < **jāl̆lõ̃ks* < **jal̆laks* < **jalᵍaks* < **jalgaks* from **jalga* (> *jālga* 'foot'); *kǭn̦im* 'handle for carrying sth' < **kān̦im* < **kānim* < **kān̆nim* < **kan̆nim* < **kanᵈim* << **kandaim* from *kanda-*

inally had in their stem-initial syllable a short vowel or a short polyphthong ending in *i* or *u*, and it takes into account the quality of stem vowels and the inherent sonority of resonant consonants and voiced obstruents.

As in Livonian there is no contrast of single and geminate intervocalic fortis obstruents in weak-grade forms, there is no ground for deciding whether the intervocalic obstruents e.g. in *kikīld* 'roosters', *patūld* 'sins', *liepāld* 'alders', *tasūd* 'cups', *kaššīd* 'cats' are single or geminate obstruents and whether the geminate obstruents in the corresponding strong-grade partitive singular forms such as *kikk|õ*, *patt|õ*, *liepp|õ*, *tass|õ*, and *kašš|õ* represent original geminates or result from gemination in the framework of gradation. Here, nevertheless, underlying intervocalic geminate fortis obstruents are postulated for all homomorphemic non-initial single and geminate fortis obstruents occurring in voiced environments. They are postulated on the basis of the occurrence of geminates of two contrastive quantities in similar cases in most Estonian dialects.

In Livonian, the loss of intervocalic **d* and **h* in the onset of the third syllable opened the way to the gemination of the intervocalic consonants in the onset of the second syllable.

The Livonian gradation of originally long syllables resembles that in Estonian stems with a short vowel or a diphthong, as in both languges in strong-grade forms the heavy weight of the syllable is achieved by lengthening the first consonant or vowel following the nucleus (still the Estonian stems with the sequence vowel + resonant/vowel + geminate obstruent are different as there it is the geminate that has the weight carrying function).

Despite unsolved problems it is possible to observe some general trends of grade formation of the main sound patterns. While doing this, it will be taken as granted that (1) Livonian had no long vowels in non-initial syllables before the development of gradation and (2) Livonian does not need the reconstruction of more than four vowels **a*, **i*, **e*, and **u* in non-initial syllables of the very first stage,[8] (3) in the early stages of grada-

'to carry'; *kǭ'tõ-* 'to lose' < **kā'tõ-* < *kāhutõ-* < **kahuta-* << **ka^{d}utta-* < **kadutta-*; *lä'd* 'you (2Sg) go' << **lähed* < **läh^{d}ed* < **lähded*, cf. Inf *lä'dõ* < **lähte^{d}a* < **lähteda* < **läkteda* and *lekš* '(s)he went' << **läkći* < **läkti*; *nād* 'you (2Sg) see' < **näged* < **näged*, cf. Inf *nādõ* << **nähda* << **näkta*; *tīed* 'you (2Sg) make' << **te^{g}ed* << **teged*, cf. Inf *tī'edõ* << **tehda* << **tekta*.

[8] The four vowels **a*, **i*, **õ*, and **u* of non-initial syllables of the oldest stage of Livonian have the following correspondences with the vowels oldest stage of other Finnic languages: (1) **a* corresponds to **a* and **ä*, (2) **i* corresponds to **i*, (3) **e* corresponds to **e* in the 3rd to 5th syllable, (4) **u* corresponds to **u*, **ü*, **o*, **e*. The vowel **a* later underwent a drift to the modern high vowel *õ* (a) in the second syllable if preceded by an originally long initial syllable (**pūda* > **pūdõ* 'tree (PSg)', **kaŗŗalen* > *kaŗŗõl* 'to [keep] herd (adv. AllSg)', **kuralen* > *ku'rrõl* 'to the left' (adv. AllSg)'), and (b) in the third to fifth syllable (**salandabad* > **salandõbõd* > *salāndõbõd* 'they steal'). In East Livonian also the vowel **u* changed to *õ* in the second syllable when preceded by a long syllable (**kandud* > *kāndud* > *kāndõd* 'stumps' from *kand* 'stump') and in several affixes. The development of **e* is most complicated. In disyllabic stems with a short initial syllable, **e* changed to **u* (**käded* > *kädūd*); in trisyllabic forms **e* changed to *õ* (**mägelen* > *mä'ggõl* 'uphill (adv. AllSg)'). As in Īra and West Livonian, **e* has changed to *u* the second syllable even if there was a long vowel in the first syllable, it is not sure whether in East Livonian **e* in words with an original long vowel in the first syllable changed to *õ* directly or via **u* (cf. **kānded* > *kǭndõd* 'covers; lids' and **kīnded* >> *kīndõd* 'nails, claws' from *kāņtš* > *kǭņtš* 'covers; lids' and *kīntš* 'nail, claw').

tion in Livonian, the word-final **-n* was still retained at least in genitive singular, but had been lost (a) at the end of the third syllable in illative and allative endings, and (b) at the end of the underlying form of the suffix *i* from the Proto-Finnic suffix **-inen* if the second **n* in that suffix is not a relatively late innovation;[9] (4) **-g* (Proto-Finnic **-k*) had already been lost, except (a) in nominal stems that had added the analogical **-az* > *õz* (*mõtkõz* 'thought'); (5) in clusters *C_Lj both components fused to yield a single palatalized obstruent (**padja* > *paḍā* 'pillow', **azja* > **aźā* (> *ažā*), **agja* > **aǵā* 'edge'), in clusters *C_Rj to yield a palatalized geminate resonant (**purjahed* > *puŗŗõd* 'sails (NPl)'); in a cluster *C_Lv the consonant **v* was lost (**ladva* > *ladā* 'top of a tree') and in a cluster *C_Rv, **v* assimilated to the resonant (**kirvahed* > *kirrõd* 'axes (NPl)').

5.2. The emergence of strong-grade forms

Section 2 (see Table 1) showed that strong-grade forms have characteristically a heavy coda in the first syllable and short nuclear vowels both in the first and second syllable if there is a second syllable. The weak-grade forms have characteristically a long nuclear vowel in the long first syllable or, if the first syllable is short, then in the second syllable; in both cases the first syllable has either a light coda or no coda.

In the first syllable of strong-grade forms, the heavy coda appeared as a result of adding weight to the existing coda or of creating a coda of the required weight by gemination of the onset consonant of the second syllable. As a rule, it took place as a consequence of the following changes:
(1) the emergence of a long vowel or diphthong in the second syllable after the contraction of the former second and third syllables, which became possible after the loss of the intervocalic **d* at the beginning of open third syllables (**tubada* > **tuba^{d}a* > **tuba.a* > **tubā* > **tu'bbā* > **tu'bba* > *tu'bbõ* 'room (PSg)'; **suguda* >**sugu^{d}a* > **sugu.a* > **sugua* > **su'ggua* > **su'ggu*[10] > *su'ggõ* 'relative (PSg)'; **kikkida* > **kikki^{d}a* > **kikki.a* > **kikkia* >

[9] Actually the underlying form **-ine* of the nominative case allomorph of the possibly suppletive derivational suffix is vast preferable to **-inen*. In that case the wide regional variation of its allomorphs in Finnic can be explained as different ways to avoid the early Finnic word-final change **-e* > **-i* which would have increased the dissimilarity between the allomorph and the corresponding pre-inflectional allomorphs, cf. **-is* in the partitive singular case forms and **-ise-* in other singular case forms. Some dialects added the consonant *-n* and achieved the best rhyme for the genitive singular form, cf. **-inen* : **-ise|n*, whereas in other dialects, e.g. Votic and Ingrian, **-e* was lost, cf. *-in* : *-is(e)-*. Similarly, in Livonian, the modern nominative forms of, for instance, adjectives *tu'ļļi* 'hot', *ra'zzi* 'fat, greasy', *karri* 'hairy', *u'ddi* 'foggy', *ouki* 'full of holes', derived from nouns **tuļi* > *tu'ļ* 'fire', **raza* > *razā* 'fat, grease', **karra* > *kǭra* 'hair', **udu* > *u'd* 'fog', **oukku* > *ouk* 'hole', can at best be traced back to the underlying forms **tuļīn*, **razain*, **karrain*, **uduin*, **oukkuin*, cf. (**tuļi|in* >) **tuļīn* > **tu'ļļīn* > **tu'ļļin* > *tu'ļļi*. The earlier explanations of E. N. Setälä (1891 : 379), cf. **nainen* > **naine* > **nain* > *nai* 'woman', and Lauri Posti (1942 : 280), which produces a stage with final **-nn*, maybe cf. **nainen* > **nainn* > **nain* > *nai*, both postulate the loss of final **-n* twice, where **nn* is in a way supported by **naized* > *naizt* 'women', cf. also Posti 1942 : 83 and critics in Zeps 1974.

[10] This solution is based on the analogy of Estonian where both in partitive and illative singular forms the former vowel of the second syllable has been retained and the vowel of the former third syllable has been assimilated after the contraction at least in geminated forms, cf. North Estonian NSg *sugu* [*suɢù*] : PSg *sugu* :

**kiȁkkia >> kikkõ* 'rooster (PSg)', **lugudag*[11] *> *lugu^{d}a > *lugu.a > *lugua > *lu'ggua >> lu'ggõ* 'to read (Inf)');
(2) the loss of the intervocalic **h* at the beginning of both open and closed 3rd syllables (**tubahen >> *tubaha > *tuba^{h}a > *tuba.a > *tubā > *tu'bbā > *tu'bba > tu'bbõ* 'room (IllSg)'; **rikkahed > *rikkahad > *rikka^{h}ad > *rikka.ad > *rikkād > *riȁkkād >*riȁkkad > rikkõd* 'rich (NPl)', **rikkahehen > *rikkahahan >> rikkõ* 'rich (IllPl)';
(3) the syncopation of **i* and **u* in the open second syllable preceding a closed 3rd syllable (**pimudan > *pi'mdan > *pi'mda > pi'mdõ*[12] 'dark (GSg)'; **sogudad > *sog$_0$udad > *so'g$_0$dad >> so'ugdõd*[13] 'blind (NPl)'; **korgudan > *korgdan >> kuordõ* 'high (GSg)'; **kangudad >> kangtõd* 'stiff (NPl)'; **azumõd > a'zmõd* 'place (NPl)', cf. NSg *azūm*; **võt't'imed >> võṭmõd* 'keys (NPl)', cf. NSg *võṭīm*);
(4) the syncopation of **e* in the open second syllable of a former trisyllabic **a-* or **e*-stem (**sadela > *sa'dla >*sa'dlõ > *sa'dl > sa'ddõl* 'saddle', **vodeled > *vo'dled >> vȯ'dlõd* 'you are waiting (2Sg)');

IllSg *sukku* [*sukku*] and South Estonian NSg *sugu* [*suɔ̆ù*] : PSg *suku* [*sukkù*]: IllSg *sukku* [*sukku*], both from **suku* : **sukuta* : **sukuhen*. Marilyn M. Vihman (1971 : 159) has proposed a different development, cf. **suguda > sugua > suguə > sugə > su'gə > su'g·ə* where *ə = õ* and *su'g·ə = su'ggõ*. In principle, yet neither solution can be proved wrong.

[11] The infinitive suffix in other Finnic languages ended in a stop, reconstructed as **k* on the basis of East Votic, Hevaha Ingrian and a part of Savo Finnish, cf. East Votic *lukkõag* 'to read'. Livonian probably lost **-g* before gemination.

[12] In Livonian, genitive singular forms, such as *pi'mdõ*, *sa'gdõ* 'tight', *so'ugdõ* 'blind', *kuordõ* 'high', *kangtõ* 'stiff' etc., replaced the expected but non-attested nominative singular forms, (actually: stems) *†pi'mmõ*, *†sa'ggõ*, *†so'ugõ*, *†kuorgõ*, *†kangõ* etc. in order to reduce stem alternation. Note that in the framework of the abandoned alternation *†pi'mmõ* : *pi'mdõ*, *†sa'ggõ* : *sa'gdõ* Livonian applied for **d* the same restriction for the so-called suffixal gradation that was attested by Paul Ariste (1956 : 15) for North Estonian words with a short initial syllable, cf. *pime* 'dark; blind' : *pimeda*, *sage* : *sageda*, *sõge* 'benighted': *sõgeda*, namely that the intervocalic stop was lost after an unstressed syllable at the beginning of an open third syllable and retained at the beginning of a closed syllable (cf. also Viitso 2003 : 169). As in Livonian the vowel of the second syllable is syncopated while the consonant *d* (*t*) is retained even in similar adjectives with a long initial syllable, cf. *kuordõ* 'high', *sieldõ* 'clear', *kangtõ* 'strong; stiff', whereas both Finnish and Estonian have lost the stop throughout the paradigm, cf. Finnish *korkea*, *selkeä*, *kankea* and Estonian quantity 3 forms *kange*, *selge*, *kange*, it is highly possible that the rule attested by P. Ariste reflects the oldest stage of the suffixal gradation in Finnic. The later development occurred in the direction of eliminating the relatively rare paradigmatic alternation. Anyway, these adjectives show that in a trisyllabic foot, the last syllable is not superfluous but may affect the preceding syllable.

[13] The sequence *ug* after *o* results from the fission of the former labialized stop **g$_{ᵒ}$*. This stop developed from *g* under the assimilative influence of the following **u* (cf. Posti 1942 : 122; Kettunen 1947 : 33). After the apocopation of **u*, cf. **jogun > *jogu > *jo'g$_{ᵒ}$ > jo'ug* 'river (GSg)', *u* in the sequence *ug* is the only witness of **u* in the former second syllable in a series of nominals, mostly adjectives, ending in *dõ*. L. Posti actually speaks about velarization of *g* and epenthesis of *u*; it is reflected also in his and L. Kettunen's reconstruction of the development. Although velarized consonants triggered the replacement of the former **e* by **u* in Livonian non-initial syllables (the labial **u* was the only possible non-high back or "velar" vowel in non-initial syllables), the further development of the stop **g* was already labialization to **g$_{ᵒ}$* under the influence of the following labial vowel in a "velar" sequence (note that the stop *g* was considered **palatal** by creators of the Finno-Ugric Phonetic Alphabet but **velar** by the International Phonetic Association).

(5) the apocopation of **i*, **u*, in the open second syllable (**tuļi* > *tu'ļ* 'fire', **kodu* >> *kuo'd* 'home', (**kädun* >) **kädu* > *kä'd* 'hand (GSg)', **tämmi* > *täm* 'oak');
(6) the change of **a* to **õ* in the second syllable when preceded by a consonant cluster containing a lenis stop and a resonant (**adra* > **adrõ* > *a'drõ* > *a'dr* > *a'ddõr* > *a'ddõrz* 'plow', **nõgla* > **nõglõ* > *nõ'glõ* > *nõ'gl* > *nõ'ggõl* > *nõ'ggõlz* 'needle').

Hence the strong grade came into being, either as a counterbalance to the long vowel or diphthong in the second syllable or as a compensation for a lost vowel of the second syllable.

5.3. The emergence of weak-grade forms

In Livonian, the weak grade occurs mostly in disyllabic or longer forms, where there were no necessary conditions for consonant gemination, and vowel syncopation and apocopation. Thus all former disyllabic and trisyllabic stems and inflectional forms with the vowel **a* in the second syllable, not followed by **da* or **ha*(C) in the third syllable, are in the weak grade and preserved the quality of **a* even if the vowel of the former 3rd syllable was apocopated (**jumala* > *jumāl* 'god', **madala* > *madāl* 'low, non-high', **kainala* > *kāinal* 'armpit'. Still, there are cases of former trisyllabic *a*-stems which despite the loss of the vowels **i* or **u* in the second syllable still remained *a*-stems and are now inflected as disyllabic *a*-stems, cf. *kāndla* 'Finnic harp' (< **kandula*): PSg *kandlõ*, *katļā* 'boiler' (< **kaťťila*) : PSg *katļõ*, *pāļštab* 'she hems' (< **paļļista|b*[14]) : Inf *paļštõ*.

Although it is not proven, the lengthened first diphthongs tend to be shorter than the first components in another group of diphthongs whose initial components represent originally long monophthongs and second components result from the fission of former palatalized consonants, so e.g. in *tūima* 'insensitive', NPl *tūimad*, *āigõd* 'pikes (NPl)' (cf. NSg *aig*), *ūikõb* '(s)he compels' (Inf *uikõ*) vs. *rūim* 'room (NSg)', NPl *rūimõd*; *krǭig* 'collar', NPl *krǭigõd*, *brūikõb* '(s)he uses', Inf *brūikõ*. The first components in diphthongs of the latter group were sometimes marked as full-long by Lauri Kettunen, cf. *rūim* in Kettunen 1938, sub *rùi̯m*. The second components in diphthongs of the latter group result from the fission of former palatalized consonants: *rūim* < **rūḿ* < **rūmi*; *krǭig* < *krāig* < **krāǵ* < **krāgi*, *brūik-* < **brūk'-* < **brūki-*; such diphthongs occur in loanwords from Middle Low German (or, partially, from Old Nordic) and Latvian. Similarly, words with lengthened monophthongs such as e.g. *kūlda* 'gold' (PSg *kuldõ*) probably represent a quantity pattern different from the pattern of words with an original long vowel such as e.g. *kūldõ* 'to listen (Inf)'; the words with lengthened monophthongs are audibly closest to Estonian words of quantity 2 such as e.g. *kaardi* 'card (GSg)', *poordi* 'ship's board (GSg); border of a fabric or rug (GSg)', cf. Viitso 2003 : 16.

The loss of vocalic codas, that is, the last components of diphthongs and triphthongs in the weak grade has parallels in Estonian dialects.

[14] This underlying form was proposed by M. M. Vihman (1974 : 108) following the etymology by L. Kettunen (1938 : 278). As all the three Livonian *a*-stems are produced by exceptional syncopation, even the stem **palista-*, cf. the Estonian stem *palista-* 'to hem', can be considered a candidate of the underlying form.

Table 6

Variation between strong- and weak-grade stems for nuclear vowel lengthening in the first syllable of weak-grade stems

	Variation		Nominals			Verbs		
	SG	WG	SG	WG	Gloss	SG	WG	Gloss
(1)	***a***	***ā***	*randl\õ*	*rānda*	coast	*andl\õ*	*ānda\b*	to give
	ai	*āi*	*aig\õ*	*āiga*	time	*paikõ*	*pāikõ\b*	to patch
	aint	*āin*	*laint, laint\õ*	*lāinõ\d*	wave			
	aisk	*āšk*	*laisk\õ*	*lāška*	lasy			
	aij	*lo͡j*	*laij\õ*	*lo͡ja*	boat			
	*a*RR	*o͡*R	*sarr\õ*	*so͡ra*	horn	*pallõ*	*po͡la\b*	to ask, pray
(2)	***ä***	***ǟ***	*pärn\õ*	*pǟrna*	linden	*mängõ*	*mǟnga\b*	to play
	äu	*ǟ*	*päuv\õ*	*pǟva*	day	*täutõ*	*tǟta\b*	to fill
(3)	***e***	***ē***	*kerr\õ*	*kēra*	script	*teḷḷõ*	*tēḷõ\b*	to arrange
	ei	*ē*	*leib\õ*	*lēba*	bread	*eitõ*	*ēta\b*	to throw, cast
(4)	***i***	***ī***	*lindl\õ*	*līndõ\d*	bird	*lindõ*	*līnda\b*	to fly
	iu	*īu*	*piuk, piuk\õ*	*pīukõ\d*	beep, peep	*kiunõ*	*kīunõ\b*	to yelp
(5)	*ou*	*ō*	*loul, loul\õ*	*lōlõ\d*	song	*poukõ*	*pōkõ\b*	to burst
(6)	***o̡***	***ō̡***	*vo̡ṛž, vo̡rd*	*vō̡irdõ\d*	roost			
	o̡	*ūo*	*po̡ll\õ*	*pūola*	knee			
	o̡i	*ō̡i*				*vo̡ig\õ*	*vō̡igõ\b*	to swim
	o̡i	*ūo*	*po̡ig\õ*	*pūoga*	son			
	o̡is	*ūos*	*po̡is, po̡is\õ*	*pūošõ\d*	boy	*mo̡ist\õ*	*mūošta\b*	to understand
	o̡rz	*ūor*	*po̡rzõ* (GSg)	*pūoraz*	pig			
(7)	***õ***	***ō̡̄***	*tõrr\õ*	*tō̡ra*	tar	*tõmbõ*	*tō̡mbõ\b*	to pull
	õi	*ō̡i*	*kõidõ* (GSg)	*kō̡idaz*	shuttle	*sõidl\õ*	*sō̡ida\b*	to row
	õu	*ō̡*	*mõuk\õ*	*mō̡ka*	sausage			
(8)	***u***	***ū***	*kuḷ, kuḷḷ\õ*	*kūḷõ\d*	hawk	*murdl\õ*	*mūrda\b*	to break
	ui	*ūi*	*tuiml\õ*	*tūima*	insensitive	*uigl\õ*	*ūigõ\b*	to be shy
	uij	*ūj*	*nuij\õ*	*nūja*	club, mace	*kuij\õ*	*kūjõ\b*	to dry
	uisk	*ūšk*	*uisk\õ*	*ūška*	adder			
(9)	***ie***	***īe***	*kiell\õ*	*kīela*	bell			
	ieu	*īe*	*kieuž, kieud*	*kīedõ\d*	rope	*tieudl\õ*	*tīeda\b*	to know
(10)	***uo***	***ūo***	*kuonn\õ*	*kūona*	frog	*kuoṛṛ\õ*	*kūoṛõ\b*	to gather
	uoi	*ūoi*	*luoiml\õ*	*lūoima*	warp	*ruoikl\õ*	*rūoikõ\b*	to hurry
	uoij	*ūoj*	*kuoij\õ*	*kūoja*	moth			

Key: Examples of variation include, if not otherwise indicated, (1) in the strong grade (SG) either (a) both nominative and genitive singular forms (neither form has inflectional suffixes), (b) both the nominative singular and the partitive singular form, or (c) only the partitive singular form for nominals, and the infinitive form for verbs and (2) in the weak grade (WG) either the nominative singular form or the nominative plural form for nominals and the 3rd person singular form for verbs. In examples, all partitive singular and infinitive forms end in the suffix *-õ*, nominative plural forms in *-d*, and the 3rd person singular forms in *-d*.

5.4. Changes complementary to gradation

Together with the development of gradation or later there were some changes the results of which altered either the stems with weak-grade lengthening or the corresponding strong-grade stems to produce more complicated variation between strong- and weak-grade stems, cf. Table 6.

In addition to the characteristic nuclear vowel lengthening either in the long initial syllable or in the second syllable four additional changes have taken place in Livonian weak-grade forms if the first syllable was originally short: (1) coda of the first syllable is lost via degemination of pre-gradational geminates (**kērra* > *kēra*) or (b) coda of the first syllable is lost via simplification of polyphthongs (**päuva* > *päva*, **lēiba* > *lēba*), (c) the quality of the lengthened nuclear vowel **ā* of the first syllable is changed to *ǭ* (**lājja* >> *lǭja*, **sārra* >> *sǭra*), (d) together with the loss of **i*, the following **s* is palatalized to *š* [ś] (**lāiska* > *lāška*). As the East Livonian change **ā* > *ǭ* occurred also for original long **ā*, the lengthening **a* > *ā* either occurred before geminates earlier than before consonant clusters and in diphthongs, cf. **jalga* > *jālga*, **aiga* > *āiga* (cf. Kettunen 1938 : xxiii; 1960 : 131—132), or it is a late change that occurred only before a single intervocalic consonant in a word with the plain tone (the change has not touched words like *tā'gižž* 'back (adv.)', and *vā'gižž* 'quiet, silent').

Strong-grade forms reveal no attestable characteristic change after the coda lengthening, except the change **uo* > *o̰* after initial labial consonants *p*, *m*, *v*. As in the corresponding weak-grade forms mostly *ūo* occurs, the long vowel *ō* in weak-grade forms has probably risen through analogy. Probably also reduction of **a* and maybe also of **u* to *õ* has occurred in the framework of already existing strong-grade forms; Marilyn M. Vihman (1974 : 159), in contrary, has ordered the change **a* > *ə*, where *ə* = *õ*, before the rise of broken tone and gemination of single intervocalic consonants.

Abbreviations of inflectional forms

adj — adjective, **adv** — adverb, **All** — allative, **G** — genitive, **D** — dative, **Ela** — elative, **Ill** — illative, **Ine** — inessive, **Inl** — instrumental, **N** — nominative, **P** — partitive, **Pl** — plural, **Sg** — singular.
1Pl — 1st person plural, **1Sg** — 1st person singular, **2Pl** — 2nd person plural, **2Sg** — 2nd person singular, **3Pl** — 3rd person plural, **3Sg** — 3rd person singular, **APtPle** — active past participle, **Cnd** — conditional mood, **Imp** — imperative mood, **Ind** — indicative mood, **Inf** — infinitive, **Ipf** — imperfect tense, **PasPrPle** — passive present participle, **PasPtPle** — passive past participle, **Pr** — present tense, **Quo** — quotative mood.

Abbreviations make compounds.

REFERENCES

Ariste, P. 1956, Läänemeresoome keelte kujunemine ja vanem arenemisjärk. — Eesti rahva etnilisest ajaloost. Artiklite kogumik, Tallinn, 5—23.

Karma, T. 1998, Lībiešu valodas normēšanas pamati. — Latvijas Zinātņu Akadēmijas Vēstis A 52.3, 41—45.

Kettunen, L. 1938, Livisches Wörterbuch mit grammatischer Einleitung, Helsinki (LSFU V).

—— 1947, Hauptzüge der livischen Laut- und Formengeschichte, Helsinki.

Kreinin, L. 1995, Esimene liivi kirjakeele konverents. — KK, 855—856.

P o s t i, Lauri 1942, Grundzüge der livischen Lautgeschichte, Helsinki (MSFOu 85).
S e t ä l ä, E. N. 1896, Yhteissuomalainen äänehistoria, Helsinki.
V i h m a n, M. M. 1971, Livonian Phonology, with an Appendix on Stød in Danish and Livonian. Dissertation submitted in partial satisfaction of the requirements for the degree of Doctor of Philosophy in Linguistics in the Graduate Division of the University of the University of California, Berkeley (MS).
V i i t s o, T.-R. 2003, Rise and Development of the Estonian Language. — Estonian language (Linguistica Uralica Supplementary Series / Volume 1), 130—230.
Z e p s, V. J. 1974, A Misleading Example from Livonian. — International Journal of American Linguistics 40, 140—141.

ТИЙТ-РЕЙН ВИЙТСО (Тарту)

ЛИВСКОЕ ЧЕРЕДОВАНИЕ СТУПЕНЕЙ: ТИПЫ И ГЕНЕЗИС

Чередование ступеней представляет собой регулярные чередования сильной и слабой ступеней ударных слогов (и соответствующих основ и слов) при изменении слова. В ливском языке чередованию ступеней подвергаются слова, имеющие в первом слоге своих словоформ сильной ступени ядро с кратким гласным и тяжелую коду. Первый слог в сильной ступени имеет либо сломанный тон либо коду с фонетически полудолгим гласным или полудолгим или долгим согласным и ровный тон. Начальный слог в формах слабой ступени имеет ровный тон, кода отсутствует или является легкой; формы слабой ступени имеют либо долгий гласный в ядре первого слога и краткий гласный в ядре второго слога либо краткий гласный в ядре первого слога и долгий гласный в ядре второго слога. Формы слабой ступени в парадигмах с чередованием ступеней состоят по меньшей мере из двух слогов. На основе совместной встречаемости в парадигме 11 типов основ слабой ступени и 6 типов основ сильной ступени выделен 21 основной тип парадигм с чередованием ступеней. Возникновение чередования ступеней в ливском языке обусловлено главным образом усилением или появлением коды в начальных слогах в противовес долгому гласному или дифтонгам во втором слоге или как компенсация синкопы и апокопы гласных во втором слоге.