The Structural Patterns of Lithuanian Affixes
Lietuvių kalbos afikșų struktūra

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Abstract

The aim of this research is to identify the main structural patterns of affixes of Lithuanian inflective words, their productivity and frequency. We present a survey of the structural diversity and productivity of these morphemes rendered in The Dictionary of Modern Lithuanian and in The Grammar of Modern Lithuanian. The frequency data was collected from The Database of the Morphemics of the Lithuanian Language.

The morpheme analysis revealed the following tendencies: 1) while prefixes are always monosyllabic, suffixes and flexions can vary from non-syllabic to trisyllabic, and 2) within these morphemes, consonant clusters are not frequent.

Prefixes in Lithuanian can have $C_{0-2}V_{0-2}$ structure. The most productive and frequent pattern is $C_1V$. Suffixes have structures $C_{1-2}$, $C_{0-2}(W)C_{0-3}$ and $C_{0-1}V_{1-2}V_{0-2}$. The most productive are $VC_1$ of nominal words and $C_1V_{0-1}$ verbal suffixes. In usage, $VC_1$ suffixes of nominal words and $V, C_1$ as well as $VC_1$ verb patterns dominate. Flexions can have the following structures: $C_1, VC_{0-2}, VC_{0-1}$ or $VC_{1}V_{0-1}$. The most productive pattern is simple $VC_{0-1}$, which also dominates the usage.

The analysis revealed the influence of a root on the structure of other morphemes. The most typical root structure $C_{1-2}V_{1-2}$ entails a $C_1V$ structure prefix on the one side, while a suffix or a flexion with $VC_{0-1}$ structure on the other. The result of such a combination is quite a consistent chain a consonant + a vowel + a consonant (+ a consonant) + a vowel + a consonant (+ a consonant) + a vowel (+ a consonant): $C_1V + C_{1-2}V_{1-2} + VC_{0-1}$.

KEYWORDS: morpheme, prefix, suffix, flexion, vowel, consonant.

Introduction
of this area; meanwhile, nowadays a particular focus in the research of phonotactics is placed
namely on typological regularities of the morphemic structure of languages of the world.

The Lithuanian language has the following affixes: a prefix (a derivational affix preceding a
root, e.g., perskaito ‘he completes reading, has read’), a flexion (a derivational or inflectional
affix, following a root or a suffix and showing morphological characteristics of a word: gender,
number, case, etc., e.g., skaito ‘he reads/they read’ – Pres 3 Sg or Pl2), a suffix (a derivational or
inflectional affix following a root or the other suffix, e.g., skaitomos ‘reading’, skaitomas
‘being read’), a connecting vowel (a derivational affix in some compounds that joins two roots,
e.g., darbotvarkė ‘agenda’) and a reflexive affix (it follows a flexion in non-prefix words, e.g.,
prausiasi ‘he washes himself’, in prefixed words – between a prefix and a root, e.g., nesipraus-
sia ‘does not wash himself’).

In this article, we provide a survey of the structural diversity of affixes rendered in The Dic-
tionary of Modern Lithuanian (DML) and in The Grammar of Modern Lithuanian (GML), thereby
establishing the productivity of structural patterns. Then we analyse and discuss the results
of real usage. The frequency data for the study were collected from The Database of the Mor-
phemics of the Lithuanian Language (DbML) (for more about the material and its preparation,
see Kazlauskienė & Čivilkaitė, 2018); here we would like to draw attention only to several
aspects of the research data.

The structure of morphemes investigated in this article is based on morphemic rather than
derivational analysis of words. Thus, a word is divided into the maximum number of mor-
phemes that can be identified. For this reason, for example, when discussing the structure
of prefixes, we focus on all prefixes, not only on words of prefixation, e.g., the noun parašas
‘a signature’ derives from the verb parašyti, parašo, parašė ‘to write, he writes, he wrote’. In
derivational analysis, the word parašas cannot be included into the list of prefixed nouns,
because it is a derivative of the flexion -as; however, it is necessary to single out a prefix in
the morphemic analysis, and it was done so in this study.

The focus of this study is structural analysis; therefore, the issue of affix variability (allo-
morphs) is not discussed here, as it relates to the meaning rather than to the structure. For
instance, Lithuanian sq-, san-, sam- are variants of the same affix. Their choice depends
on the beginning of a root: before root labials b and p, sam- is used, e.g., sambūris ‘a rally’,
samprata ‘a conception’; san- is used before dental t and d, e.g., santykis ‘a relation’, sandara
‘a junction’, while in other cases sq- is used, e.g., sqrašas ‘a list’ or sqmokslas ‘conspiracy’.
Thus, the research data contain structurally twofold prefixes: a consonant + a vowel (sq-)
and a consonant + a vowel + a consonant (san-, sam-). Other prefixes also have variants, e.g.,
apy- (ap-, api-), at- (ata-, ato-) and už- (užu-, užuo-), although they are not as frequent in
standard Lithuanian.

During the preparation of the data for the research, we tried to follow the synchronic principle.
Due to this decision, the historical stem-final in nominal words and verbs was not considered as
an individual morpheme and was attributed to flexions and suffixes (for more, see Valeckienė,
1998). For example, stalams ‘for tables’ Pl Dat is divided into the root stal- and the flexion -ams
(although from the historical viewpoint, here we have a root + a stem-final + a flexion: stal-a-rm).
During the formation of other word forms, the stem-final and the flexion change (e.g., stalo Sg Gen, stalų Sg Dat, stalai Pl Nom); thus, the flexion in this work is treated synchronically: it is a morpheme that changes in different word forms and indicates grammatical features thereof.

Prefixes

In the Lithuanian language, nouns, adjectives and verbs can have prefixes. Numerals and pronouns rarely have a prefix, which then is usually the negation ne-, only in exceptional cases written together with a word, i.e., in the position of a prefix, e.g., nekoks ‘poor, bad’, nesavas ‘strange’, cf. ne pirmas ‘not first’, ne aš ‘not me’, ne kiekvienas ‘not everybody’, etc.

There are not many structural patterns of prefixes in the Lithuanian language. They can be grouped into 8 patterns:

- **V** – įkalnė ‘uphill’ (1; ~180), įžvalgus ‘penetrating’ (1; ~45), įnešti ‘to bring in’;
- **VC1** – atspalvis ‘a shade’ (4; ~120), atSiaurus ‘stark’ (4; ~40), atnešti ‘to fetch’;
- **C1V** – nelaimė ‘a disaster’ (8; ~710), negražus ‘ugly’ (7; ~200), nenešti ‘not to carry’;
- **C1VC1** – pertvarka ‘reconstruction’ (4; ~75), permainingas ‘changeable’, pernešti ‘to carry over’;
- **VC2** – antakis ‘an eyebrow’ (1; ~95), antžeminis ‘overground’;
- **C2V** – pravardė ‘a nickname’ (4; ~50), prakaulus ‘scraggy’ (4; ~15), pranešti ‘to report’;
- **VC3** – apyvarta ‘turnover’ (5; ~60), apykreivis ‘somewhat crooked’ (4; ~100), apipilti ‘to slop’;
- **C2VC1** – priešpriečiai ‘lunch’ (1; ~30), priešprietinis ‘related to lunch’, prieštarauti ‘to object’.

Almost all prefixes, except for pattern VC,V4, which is made up of unproductive prefixes, are monosyllabic.

It is difficult to cover the productivity of prefixes, i.e., how many words with specific prefixes are provided in dictionaries. This is not only because of their huge number in the dictionary (verbs with prefixes number in hundreds), but also because not all words with prefixes, especially with the negation ne-, are recorded in dictionaries. For this reason, although the data presented in this article clearly shows regularities, it may contain some errors.

Based on the data from the dictionary, we can assume that prefixes VC1 and C1V will dominate the usage, as prefixes of such a structure are the most abundant.

The research data of connected speech contained examples of almost all Lithuanian prefixes (there were no adjectives with prefixes pro-, už- and užu-). As we can see from Table 1, almost three-fourths of all prefixes in connected speech are binomials of a very simple structure: C1V and VC1.

Not only is this abundance due to the largest number of prefixes with such a pattern, but also because this group includes the negation ne-, surpassing the other prefixes by its occurrence frequency. C1V pattern is especially frequent and makes up approximately 60% of all prefix examples in the DbML. Prefixes of a reverse pattern, i.e., binomials starting with a vowel VC1, are slightly rarer (on average, 16% in each group).

\[1\] In brackets, the first number indicates the quantity of different prefixes, while the second number shows the approximate quantity of words in the DML. Examples with ne- were not included into the number, because this prefix can be added to any word and not all of them are provided in the DML. Here we do not provide the number of adjectives with suffixes -in- and -ing-, because they are very productive and can be made from any noun; thus, they also take prefixes of those nouns, e.g., sąmata – sąmatinis ‘an estimate – estimated’. The noun derivatives -im- were not counted for the same reason, as they can be made from any verb and, consequently, take prefixes of those verbs, e.g., ištirti – ištirimas ‘to bind – binding’, surudinti – surūdimas ‘to fasten – fastening’. Due to the large number, the quantity of verbs with prefixes is not provided, either. From the diachronic perspective, the prefix i- derives from in-. Without this historical phenomenon, there would be no monophonic prefixes in the Lithuanian language.

\[2\] Prefixes with this structure are allomorphs of C1V: ap-, api-, api-; at- ato-, ata; už-, užu-, užuo-.
### Table 1
The distribution of structural patterns of prefixes in the DbML (%)

| Structural patterns | Usage instances | Examples |
|---------------------|-----------------|----------|
|                     | Nouns | Adjectives | Verbs |
| C1V                | 54.4 | 64.9 | 59.4 | pasaulio 'a world' Gen Sg Masc, pagrindinis ‘main’ Masc Nom Sg, padeda ‘he helps’ 3 Pres Sg |
| VC1                | 16.4 | 14.0 | 17.1 | apsaugas ‘protection’ Gen Sg Fem, atskiru ‘separate’ Gen Pl Fem, išejo ‘he/they left’ 3 Pst Sg/Pl |
| V                  | 14.7 | 16.2 | 11.5 | jmonės ‘an enterprise’ Gen Sg Fem, javirų ‘various’ Gen Pl Fem, įvertinti ‘to assess’ Inf |
| C2V                | 7.5  | 1.9  | 7.3  | priemonių ‘means’ Gen Pl Fem, pridėtinės ‘additional’ Nom Pl Fem, priklauso ‘he belongs’ 3 Pres Sg |
| C1VC1              | 5.3  | 1.7  | 2.0  | perdavimo ‘a transfer’ Gen Sg Masc, perkeltinės ‘figurative’ Gen Sg Fem, parduoti ‘to sell’ Inf |
| VC1V               | 1.2  | 0.6  | 1.1  | apylinkės ‘surroundings’ Nom Pl Fem, apytiksliai ‘approximate’ Ins Pl Masc, atitinka ‘he matches’ 3 Pres Sg |
| VC2                | 0.3  | 0.1  |      | antakius ‘eyebrows’ Acc Pl Masc, antgaminės ‘supernatural’ Ins Pl Masc |
| C2VC1              | 0.2  | 0.7  | 0.1  | priesčaravimų ‘objections’ Gen Pl Masc, priesčaringos ‘contradictory’ Nom Pl Fem, priesčarauja ‘he objects’ 3 Pres Sg |
| C1                 | -    | -    | 1.5  | nėra ‘he is not’ 3 Pres Sg |

### Suffixes

In Lithuanian, all inflective parts of speech can have a suffix. Nominal words usually have derivational suffixes, except synthetic forms of adjective degrees expressed with suffixes -esn-, -iaus- (pronounced as [-ɛʊs-], e.g., geras – gerësnis – gerausias ‘good – better – the best’). Verbs have quite a lot of inflectional suffixes. Notwithstanding, such a classification is not relevant for the morphemic analysis; thus, all suffixes are discussed together.

In total, 446 suffixes of nominal words were selected from the GML for the research. Lithuanian suffixes of nominal words can be classified into 10 common patterns: 8

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5. For the sake of text economy, we provide only he in the translations, although she and it are equally possible.

6. Verb prefixes of C₁₂ structure deserve separate mentioning: n- (e.g., nesate ‘you are not’), b- (e.g.,ubesate ‘you still are’), which are shortened from ne- and be-. The omission of a vowel is not common to the Lithuanian language; thus, here we have one of the few examples of this phenomenon.

7. In some cases, suffixes are not difficult to recognise, especially the syllabic ones, e.g., ėjimas ‘walking’, berniukas ‘a boy’. Problems arise only when a suffix is non-syllabic, e.g., pyktis ‘anger’, mokstas ‘science’. The analysis of suffixes is aggravated by the different treatment of segments between a root and a suffix. GML (2006) regards the endings of adjectives -las, -lus, -mas, -mus, -sčias, -ščias, -štas, -štus as flexions with consonant formants without a derivational meaning. In this article, we consistently hold to the synchronic point of view about flexions, and said consonant segments are treated as suffixes respectively -l-, -m-, -sč-, -šč-, -št-.

8. This list does not include complex diminutive suffixes, e.g., sveikutėlytis ‘healthy’ Dim, balutėliais ‘snowy’ (-ut-+-ėl-+-yt-/-ait-). According to the GML and the DML, their diversity is impossible to cover, because there are almost no examples in dictionaries. Such derivatives appear only in spontaneous speech. During a morphemic analysis, they can be separated into individual suffixes, because in the present usage, there are examples without one or the other component, e.g., sveikutis, sveikutėlis ‘healthy’ Dim.
- C₁ – pyktis ‘anger’ (54; ~550), baltas ‘white’ (17; ~190);
- C₂ – mokstas ‘science’ (27; ~200), tikslus ‘precise’ (11; ~40);
- V(W)C₁ – senelis ‘a grandfather’ (163; ~2550), stiklinis ‘glass’ (40; ~2650);
- V(W)C₂ – mokykla ‘a school’ (35; ~660), laimingas ‘happy’ (8; ~1050);
- V(W)C₃ – upokšnis ‘a rivulet’ (11; ~40), perynkštis ‘of last year’ (5; ~30);
- C₁VC₁ – degtukas ‘a match’ (21; ~1270), atsikiktinis ‘random’ (~140);
- C₂VC₁ – balzoganas ‘whitish’ (5);
- VC₃VC₁ – visuomenė ‘society’ (12; ~60), pusėtinas ‘mediocre’ (28; ~20);
- V(W)VC₂ – mokslininkas ‘a scientist’ (~670), savotiškas ‘oddish’;
- VC₃VC₁ – vienintelis ‘the only’ (9).

Suffixes of nominal words can be non-syllabic (23%), mostly monosyllabic (67%) and disyllabic (10%). All suffixes end on a consonant. Syllabic suffixes start on a vowel more often, and only C₁VC₁ and the unproductive C₂VC₁ pattern (the adjective suffix -zgan-) start on a consonant. V(W)C₂ and V(W)C₃ patterns are the most productive. Their suffixes show rich diversity; too, the DML provides numerous examples of their derivatives. Thus, we can infer that the suffixes of these patterns will dominate the real usage.

Suffixes of numerals and pronouns are represented by only three patterns: C₁ (6 suffixes, e.g., ketvirtas ‘fourth’), V(W)C₂ (5 suffixes, e.g., abej ‘both’) and V(W)C₃ (2 suffixes, e.g., mūsiškis ‘ours’).

We can find examples of all patterns in the DbML (Table 2). However, their usage frequencies vary very different. As expected, the most recurrent are suffixes with the V(W)C pattern (almost 60% of examples of both nouns and adjectives); pattern C is also frequent, as well as the suffix pattern VC for adjectives. Noun suffixes of V(W)C₁ and C₁ patterns make up 79% of all examples. There are examples of this pattern among numerals and pronouns, too. Numerals and pronouns are parts of speech that have almost no borrowings; therefore, we can conclude that this structural pattern is quite old. All three mentioned adjective suffixes amount to even nine-tenths of all suffixes.

The GML (1994, pp. 394–395) counts up to 80 suffixes. In Lithuanian, suffixal verbs are made with 9 verbal derivational suffixes: {-e/-éj}, {-in}, {-y/-ij}, {-o/-oj}, {-uo/-uoj/-av}, {-au/-auj/-av}, {-en}, {-inė/-inėj}₁². {-tele/-telėj}⁻. Suffixes can be expanded by one or two sounds or even a syllable, e.g., pasakoti ‘to narrate’, keiksnoti ‘to curse’, vingiuoti ‘to snake’, vingiuojuoti ‘to snake’, vingiuojuoti ‘to snake’. In the spoken language, the derivatives of suffixes {-tele/-telėj}⁻ are sometimes shortened, e.g., kilstelėti ‘to lift’, kilstelėja ‘he lifts’, kilstelėjo ‘he lifted’ and kilstelėti ‘to lift’, kilsteli ‘he lifts’, kilstelėjo ‘he lifted’.

Thus, the suffixes in this group can have the following structures:
- V(W)-V(W)C₁,-V(W)C₁ – dalyt, dalija, dalijo ‘to divide, he divides, he divided’; grybauti, grybauja, grybavo ‘to mushroom, he mushrooms, he mushroomed’;

In this list, next to the examples of suffixes, the number of different suffixes is provided in brackets (based on the data from the GML. The second number indicates how many derivatives with such suffixes are provided in the DML.

In the Lithuanian language, numerals signifying a large quantity are borrowings: milijonas ‘million’, bilijonas ‘billion’, milijardas ‘miliard’.

Many suffixes have more than one allomorph. This is related to the aim to avoid the hiatus in present and past tense forms by inserting j, e.g., planėj-t, planėjo-a, planėjo-o ‘to thin, he thins, he thinned’. This list contains allomorphs in curly brackets () separated by slashes.

This is a complex suffix made of a suffix -in- and -e-. It used to be considered as an expanded suffix -e-. However, due to the difference in meaning of the derivatives, -e- and -inė- are understood as two distinct suffixes.
### Table 2
The distribution of structural patterns of suffixes of nominal words in the DbML (%)

| Structural patterns | Usage instances | Examples |
|---------------------|-----------------|----------|
|                     | Nouns | Adjectives | Numerals | Pronouns |                      |
| VC1V                | 61.8  | 59.8       | 46.8     | 85.3     | *gyvenimo* ‘a life’ Gen Sg Masc, *didelis* ‘large’ Nom Sg Masc, *dviejus* ‘two’ Acc Masc, *tokia* ‘such’ Nom Sg Fem |
| C1                  | 17.3  | 15.6       | 53.2     | 13.8     | *moisto* ‘food’ Gen Sg Masc, *baltas* ‘white’ Nom Sg Masc, *ketvirtas* ‘fourth’ Nom Sg Masc, *viskas* ‘everything’ Nom |
| C1VC1               | 5.6   | 1.1        | -        | -        | *darbojotų* ‘employees’ Gen Pl Masc/Fem, *perkelintes* ‘figurative’ Gen Sg Fem |
| C2                  | 3.3   | 4.6        | -        | -        | *mokslo* ‘science’ Gen Sg Masc, *mokslinį* ‘scientific’ Gen Pl Fem/Masc |
| VC2                 | 3.3   | 15.9       | -        | 0.9      | *specialistai* ‘specialists’ Nom Pl Masc, *relaimingu* ‘unhappy’ Gen Pl Fem/Masc, *kelintą* ‘which’ Acc Sg Fem/Pl |
| V(W)                | 2.1   | 0.1        | -        | -        | *pinmininkas* ‘a chairman’ Nom Sg Masc, *puslaidininkiniai* ‘semiconductor’ Nom Pl Masc |
| VC1VC2              | 0.7   | 2.0        | -        | -        | *visuomenės* ‘a society’ Gen Sg Fem, *paskutinis* ‘last’ Nom Sg Masc, |
| C1V                 | 0.4   | -          | -        | -        | *šaldytuva* ‘a fridge’ Gen Sg Masc, |
| C2V                 | 0.1   | -          | -        | -        | *destytojas* ‘a lecturer’ Nom Sg Masc, |
| V(W)C3              | 0.05  | 0.1        | -        | -        | *vaikutūkštį* ‘a nipper’ Acc Sg Masc, *pemykščių* ‘of last year’ Sg Pl Fem/Masc |
| VC1V                | 0.04  | -          | -        | -        | *tyrinėtojų* ‘researchers’ Gen Pl Fem/Masc |
| C1VC1VC1            | 0.02  | -          | -        | -        | *stabdėjimas* ‘a pause’ Nom Sg Masc |
| WC1VC2              | 0.01  | -          | -        | -        | *baudžiauninkai* ‘villeins’ Nom Sg Masc |
| C2VC1               | 0.003 | 0.01       | -        | -        | *verkšlenotojas* ‘a whimperer’ Nom Sg Masc, *bolzgano* ‘whitish’ Nom Sg Masc |
| WCC                 | 0.002 | 0.04       | -        | -        | *miegustumas* ‘drowse’ Nom Sg Masc, *liguistas* ‘weakly’ Nom Sg Masc |
| VC2VC1              | -     | 0.4        | -        | -        | *aukštelinkas* ‘supine’ Nom Sg Masc |

- VC₁⁻VC₁⁻VC₁ – *gyventi,  gyvena, gyveno* ‘to live, he lives, he lived’;
- VC₁,V(W)⁻VC₁⁻VC₁⁻VC₁⁻VC₅⁻VC – *lūkurioti, lūkuriuojai, lūkuriavai* ‘to tarry, he tarries, he tarried’;
- *mainikauti, mainikauja, mainikavo* ‘to barter, he barters, he bartered’;
The structural diversity of inflectional suffixes is poor; they can be generalised into 5 patterns: past tense, the suffixes of the present and past tenses always have a coda, i.e., they end on a consonant, the suffixes of verbs in present tense forms can have V(W)C and C, some in the past tense forms, suffixes of the same structure remain; however, there are no suffixes with diphthongs (Pres suffix -auj- turns into -ov- in Pst) - VC, CVC, VCV, CV, VC, VC, V and C, C, V. Suffixes can start with a consonant or a vowel. Only two suffixes in the infinitive end on a consonant (-in- and -en-). The only consonant cluster that occurs in a suffix of mixed verbs is -sty- (ST type). The suffixes of verbs in present tense forms can have V(W)C, C, V(V)C, VC, V(W)C, C, VC, VC, and VC, VC, VC, structural patterns. In past tense forms, suffixes of the same structure remain; however, there are no suffixes with diphthongs (Pres suffix -auj- turns into -ov- in Pst) - VC, CVC, VCV, CV, VC, VC, V and CVC, VCVC. There can be no suffix (Ø) in mixed verbs in the present tense or there are just consonants expanding a suffix (C and C structure). The structure of suffixes in the past tense can be C - C - VCVC, CVC. It is important to mention that the suffixes of the present and past tenses always have a coda, i.e., they end on a consonant, because the hiatus disappears in all cases (the same process takes place at the juncture of a root and a flexion), in present tense the consonant j is added before a vowel of a flexion, in past tense, j is inserted (in case of a vowel e or o) or v is added (if a vowel is a).

The structural diversity of inflectional suffixes is poor; they can be generalised into 5 patterns:
C₁ – Ind Fut:\textsuperscript{14} eisiu 'I will go', Sbjv: eičiau 'I would go', Imp: eik 'you go', Pass Pst Ptcp: eitas 'he who was gone';

V(W)C₁ – Act Pst Ptcp: ėjusio 'he who went' Gen, Pass Pres Ptcp: einamas 'he who is gone', Pst Ger: ėjus 'having gone', Sup (Pass Ptcp): mylimiausias 'the most loved' Masc;

VC₂ – Act Pres Ptcp: einantis 'he who goes', Comp (Pass Ptcp): mylimesnis 'more loved' Masc, Pres Ger: einant 'while going';

C₁VC₁ – Ind Pst Freq: eidavęs 'he who used to go', Ptcp Necess: eitinas 'he who should be gone', Half Ptcp: eidamas 'while going'.

However, some forms can be formed by connecting several suffixes:\textsuperscript{16}

- C₁VC₁+ / C₁VC₁+VC₁ – Act Pst Freq Ptcp: eidavęs 'he who used to go', eidavusi 'she who used to go', Pst Freq Ger: eidavus 'having been going';
- C₁+VC₂ – Act Fut Ptcp: eisiantis 'he who will go', Fut Ger: eisiant 'to be going';
- C₁+VC₁ – Pass Fut Ptcp: eisimas 'he who will be gone'.

It should be noted that the only suffix of the infinitive -ti does not have a coda (this is the only suffix that is also the end of a word, there is no flexion after it); all the other suffixes end on consonants.

### Table 3

| Structural patterns | Usage instances | Examples |
|---------------------|-----------------|----------|
| V(W)C₁              | 31.8            | turėjo 'he had' Pst 3 |
| C₁                 | 22.9            | trukdo 'he disturbs' Pres 3 |
| C₁V                | 16.6            | atidėlioti 'to procrastinate' Inf |
| V(W)                | 15.1            | turėty 'he would have' Sbjv 3 |
| VC₂                | 6.0             | opgalėstavo 'he regretted' Pst 3 |
| C₁VC₁              | 4.8             | įgyvendinti 'to implement' Inf |
| C₂                 | 1.5             | skirtomi 'are distributed' Pass Ptcp 3 Nom Pl Masc |
| VC₁C₁              | 0.3             | nagrūšėja 'he analyses' Pres 3 |
| C₂V                | 0.3             | suskirstyti 'to classify' Inf |
| C₁VC₁VC₁           | 0.3             | linktelėjo 'he nodded' Pst 3 |
| VC₁V               | 0.2             | nagrūšėti 'to analyse' Inf |
| C₁VC₁V             | 0.1             | spragtelėkite 'click' Imp 2 Pl |
| VC₁VC₁V            | 0.04            | ūkininkauti 'to farm' Inf |
| VC₁VC₂             | 0.01            | tapšnoji 'you tap' Pres 2 Sg |
| C₂VC₁              | 0.004           | žilstelėjusio 'grizzled' Pst Ptcp Gen Sg Masc |

\textsuperscript{14} In most cases, we provide only singular nominative masculine of declinable forms and Sg 1 or 2 of conjugated forms.

\textsuperscript{15} The interpretation of suffixes for subjunctive and imperative is debatable. In this article, we hold that suffixes -t- and -č- pertain to the subjunctive mood, while suffix -k- to the imperative, e.g., dirbtį 'he would work', rškite 'you tie' Pl (cf. the other view originating from the identification of a stem-final: GML, pp. 342–343; Valeckienė, 1998: 377–380).

\textsuperscript{16} Some forms have two inflectional suffixes: the first means the past frequentative or the future tense, the second means a participle or a gerund; in such cases, + is added.
15 structural patterns of verb suffixes were found in the DbML (Table 3). The most frequent pattern is V(W)C, (slightly less than a half of all used verbs with derivational suffixes). This is not a surprising result because even 7 suffixes of past tense forms and 5 suffixes of the present tense have this structure, and these forms are quite frequent in coherent texts. Among these examples, there are 6% of suffixes originating from an underlying word, e.g., dalyvauti (← dalyvis ← dalis), ‘to participate (← a participant ← a part)’, vadovauti (← vadovas ← vadus) ‘to lead (← a head ← a leader)’. There are also quite a lot of monomial suffixes. The quantity of V(W) structure depends on the fact that many verb forms are made from an infinitive where a suffix is just one vowel which remains in derivative forms, too, e.g., važiuoti ‘to go’ → važiuotę ‘he would go’ Sbjv, važiuodžiu ‘I would go’ Sbjv, važiuodavo ‘he used to go’ Pst Freq, važiuos ‘he will go’ Fut, etc. This group contains examples only of verbal derivational suffixes. There are no suffixes deriving from a base stem.

C₁ structure suffixes make up 22.9%, and half of them originate from an underlying word. There are especially many examples made from adjectives, e.g., gyvas: gyventi, gyveno ‘alive, to live, he lived’ and others. However, as discussed in the introductory section, the identification of this suffix is a debatable question.

The structure of other suffixes found in the DbML is diverse: the suffixes may be monosyllabic or disyllabic, with an onset and without it, with a coda and without one. The DbML did not provide examples of trisyllabic suffixes.

In Lithuanian, flexions can be derivational (new words are formed, e.g., bėga ‘he runs’ → bėgis ‘a rail’, puodas ‘a pot’ → puodžius ‘a potter’) and inflectional morphemes (they express grammatical categories of case, gender, number, tense, person, mood, etc., e.g., Nom Sg puodas, Gen Sg puodo, Dat Sg puodui, etc., Pres 1 Sg eina ‘I go’, Pres 2 Sg eini ‘you go’). Thus, every derivational flexion naturally becomes inflectional. Lithuanian flexions are polysemous: in a word, a flexion shows grammatical categories inherent to a specific part of speech (number, gender, a case, etc.). Therefore, a flexion is a compulsory attribute of every inflective word.

Lithuanian nominal words are inflected for 7 cases, number (Sg and Pl), gender (adjectives, some numerals and pronouns); while nouns have one grammatical gender, and only gender-related nouns can be inflected, e.g., šokėjas “vyras” ‘a dancer (man)’ – šokėja “moteris” ‘a dancer (woman)’

17 Adjectives can be inflected for degree (this grammatical category is expressed with a suffix and was described in the section on suffixes); adjectives, numerals and pronouns may also have pronominal forms that are expressed with flexions and will be discussed in this section.

18 Here we do not present all flexions of a particular case and provide only examples. The translation of nouns is provided only after the first mention.
• V(W) – Nom Sg\(^16\): ranka ‘a hand’, Gen Sg: namo ‘a house’, Dat Sg: namui, Acc Sg: namq, Ins Sg: namu, Loc Sg: name, Voc Sg: name, sūnau ‘a son’, Nom Pl/Voc: namai, tie ‘those’, Gen Pl: namų;

• V(W)C\(_1\) – Nom Sg: namas, Gen Sg: rankos ‘a hand’, Dat Sg: aukštam ‘tall’, Nom/Voc Pl: sūnūs ‘sons’, Acc Pl: namus, Ins Pl: namais;

• VC, V – Ins Sg: sūnumi ‘a son’, Loc Sg: aukštame ‘tall’, Gen Pl: trijų ‘three’, Loc Pl: namuose;

• VC – Dat Pl: namams;

• VC, VC, V – Loc Pl: trijuose;

• C\(_1\) – Nom Sg: pats ‘himself’, Gen Sg: sesers ‘a sister’.

As seen, the most polysemantic pattern is V, which can signify all singular cases except dative.

A flexion almost always starts with a vowel or a diphthong (except for a very rare pattern C\(_1\), e.g., pats ‘himself’, vandens ‘water’ Gen Sg, sesers ‘a sister’ Gen Sg, akmens ‘a stone’ Gen Sg). Thus, a root has to end on a consonant, because in Lithuanian there is no hiatus between a root and a flexion (neither is there between a root and a suffix). Another interpretation is also possible: since a root always ends on a consonant, flexions may start on a vowel, too.

The list of patterns shows that there are monosyllabic, disyllabic and even trisyllabic flexions. Polysyllabic flexions in spoken language (especially in informal communication) are shortened by omitting the last syllable, e.g., rankos ‘a hand’ Loc Sg, širdyje ‘a heart’ Loc Sg, aukštame ‘tall’ Loc Sg, sūnumis ‘sons’ Ins Pl, rankomis ‘hands’ Ins Pl, trijus ‘three’ Loc Pl → rankoj, širdyji or širdy, aukštą, sūnumą, ranką, trijus. This led to in real use, analogy is maintained and monosyllabic flexions are kept in all cases, because in the paradigm disyllabic flexions are considerably rarer than monosyllabic flexions.

A consonant cluster is possible only in Dat Pl. However, this flexion is secondary, deriving from longer –amus, –ėmus and –ėmus (the generalised pattern VC,VC, e.g., geriemus ‘good’, žmonėmus ‘people’ Dat Pl), which were recorded in the old Lithuanian writings published in the XVI c.

It is obvious that the usage frequency of a certain flexion (and the respective structural pattern) depends on the usage frequency of cases. Since the most common Lithuanian cases are Gen Sg, Nom Sg, Gen Pl and Acc Sg (Rimkutė, 2006), one might presume that the flexions of these cases prevail in the DbML, especially patterns V(W) and VC.

The structural patterns of conjugated verb flexions are not numerous; there are 3 patterns:

• V(W) – Pres\(^16\): rašo ‘he writes’, rašau ‘I write’, Pst: kėlė ‘he lifted’, kėlei ‘you lifted’ Sg, Pst Freq: rinkdavo ‘he used to pick’, rinkdavau ‘I used to pick’, Fut: rinksiu ‘I will pick’, Sbjv: rinktių ‘he would pick’, Imp: rašyki ‘write’ Sg 2;

• VC, V(W) – Pres: rašome ‘we write’, Pst: rinkome ‘we picked’, Pst Freq: rinkdavome ‘we used to pick’, Fut: rinksimė ‘we will pick’, Sbjv: rinktume ‘we would pick’, rinktumeisi ‘you would choose’ Sg, Imp: rašykime ‘let’s write’;

• VC, VC, V – Sbjv: rinktumėme ‘we would pick’.

These patterns are used to express 24 different sets of grammatical features of indicative (4\(_{\text{tense}}\) x 2\(_{\text{numbers}}\) x 3\(_{\text{persons}}\)), 6 sets of subjunctive (2\(_{\text{numbers}}\) x 3\(_{\text{persons}}\)) and 3 forms of imperative mood. The verb flexion always starts with a vowel or a diphthong. Consequently, a root morpheme needs a coda.

\(^16\) From the perspective of the phonemic structure, shortened Ins Sg and Pl overlap with Dat Sg and Pl; however, they differ in the syllable accent: Dat rankam; Ins rankām.

\(^17\) Here we do not provide all forms and give examples only of different flexions.
Verb flexions can be monosyllabic or disyllabic. The same remark could be repeated concerning disyllabic flexions: in spoken language, they are usually shortened, e.g., einame, einate 'we go, you go' → einam, einat. This shortening is blocked by the reflexive particle, e.g., renkamės, renkatės 'we gather, you gather' are not shortened; in this case, the reflexive particle itself is shortened from -si.

The flexions of declinable verb forms (participles, half-participles) coincide with 5 most common flexion patterns of nominal words:

- **V(W)** – Nom Sg: einanti\(^1\), Fem; Gen Sg: einančio; Dat Sg: einančiai, Fem; Acc Sg: einanti; Ins Sg: einančiu; Nom Pl: einą; Gen Pl: einančius;
- **V(W)C\(_1\)** – Nom Sg: einantis; Gen Sg: einančios, Fem; Dat Sg: einančiam; Nom Pl: einantys; Acc Pl: einančius; Ins Pl: einančiais;
- **VC\(_1\)** – Loc Sg: einančame; Loc Pl: einančiuose;
- **VC\(_2\)** – Dat Pl: einantiems;
- **VC\(_1\)VC\(_1\)** – Ins Pl: einančiamis, Fem.

These patterns are used to express 24 different sets of grammatical features (6 cases \(\times\) 2 numbers \(\times\) 2 genders). As can be seen, patterns V and VC\(_1\) dominate.

The flexions of nominal words in the DbML form 6 patterns (Table 4). We found examples of all the discussed patterns in the DbML, except VC\(_1\)VC\(_1\)V, typical of some numerals and pronouns in locative, which is not a frequent case, especially in case of numerals and pronouns (trijuose 'three' Loc, mumyse 'us' Loc). The assumption was correct: pattern V(W) prevails (even half of all nominal words); pattern V(W)C\(_1\) is frequent, too (one-third of the nominal words).

| Structural patterns | Nominal words | Verbs | Examples |
|---------------------|---------------|-------|----------|
| V(W)                | 57.7          | 82.2  | darbo ‘work’ Gen Sg Masc, yra ‘he is’ Pres 3 |
| V(W)C\(_1\)         | 35.0          | 14.4  | žmogus ‘a human’ Nom Sg Masc, igaliotąs ‘authorised’ Nom Sg Fem |
| VC\(_1\)V           | 4.2           | 2.9   | pasauliške ‘a world’ Loc Sg Masc, turime ‘we have’ Pres 1 Pl |
| VC\(_2\)            | 1.7           | 0.4   | vaikams ‘children’ Dat Pl Masc, dirbančiam ‘working’ Pres Ptcp Dat Pl Masc/Fem |
| VC\(_1\)VC\(_1\)    | 0.8           | 0.2   | sąlygomis ‘conditions’ Dat Pl Fem, nustatytomis ‘established’ Pass Ptcp Ins Pl Fem |
| C\(_1\)             | 0.7           | -     | vandens ‘water’ Gen Sg Masc |
| VC\(_1\)VC\(_1\)V   | -             | 0.01  | galėtumėte ‘you could’ Sbjv 2 Pl |

The flexions of verbs in the DbML are also of 6 patterns. There are quite a lot of monomial flexions (even three-fourths of such flexions in the DbML). Since in Lithuanian Pres and Pst 3 are the most frequent forms (Rimkutė, 2006), one might expect that the DbML will be dominated by V(W) pattern covering the 3rd person of all tenses. Pattern V(W)C\(_1\) is quite frequent among some forms of participles and half-participles, and a diphthong is common to 1st and 2nd person flexions. Flexions of these patterns make up even 96% of all verbs used in the DbML.

\(^1\) The forms of the same participle einantis, einanti ‘the one who goes’ Sg Masc, Sg Fem are given, thus, translations are not provided. If gender is not indicated, the example illustrates a masculine form.
In Lithuanian, some adjectives, numerals, pronouns and participles can have pronominal forms which are used to emphasise or to distinguish a thing regarding a certain feature, e.g., *raudona suknelė* ‘a red dress, any dress of a red colour’ and *raudonoji suknelė* ‘the red dress, only one dress, that particular dress both interlocutors are aware of’.

From a diachronic perspective, pronominal flexions are formed from a flexion and a postpositionally adjoining pronoun *jis, ji* in a respective case (*raudona+ji*). However, synchronically these flexions are not separated (Keinys, 2009). It is obvious that all flexions of pronominal participles are disyllabic or polysyllabic and start with a vowel, except Nom Sg flexion -sai, which only occurs with pronouns and derives from a shortened simple form flexion: from *tokis* into *toks* (‘such’):

- VC,V(W) – Nom Sg: *jisai* ‘he’; Gen Sg: *gerojo* ‘the one who is good’<sup>22</sup>; Dat Sg: *gerajai*, Fem; Acc Sg: *gera*; Ins Sg: *geruoj*; Nom Pl: *gerieji*; Gen Pl: *geruj*;
- V(W)C, V(W)C1 – Nom Sg: *gerasis*; Gen Sg: *gerosios*; Dat Sg: *gerajam*; Nom Sg: *gerosios*; Acc Pl: *gerusiosis*; Ins Pl: *geraisiais*;
- VC,VC, V – Loc Sg: *gerajame*; Loc Pl: *gerusiuose*;
- VC,VC2 – Dat Pl: *geriesiems*;
- VC,VC,VC1 – Ins Pl: *gerosiamis*, Fem;
- W – Nom Sg: *toksai* ‘such’.

The structure of pronominal flexions is not complex; it is a shorter or a longer chain of a vowel (a diphthong) and a consonant (as if a doubled flexion of a nominal word, in some forms, with an eliminated second syllable of the first disyllabic flexion): VC,V (e.g., *geruoj* → *geruoj* ‘good’ Gen Pl Masc/Fem), VC,VC1 (e.g., *gerasis* → *geras* ‘good’ Nom Sg Masc), VC,VC,V (e.g., *gerajame* → *gerajame* ‘good’ Loc Sg Masc), VC,VC,VC1 (e.g., *gerosiamis* → *gero+osiamis* ‘good’ Ins Pl Fem), etc. Consonant clusters occur only in dative flexions VC,VC2 (e.g., *geriesiems*, *gerosiamis*).

The dominance of patterns VC,V(W), V(W)C, V(W)C1 and VC,VC,V in texts (90%), therefore, is natural, as it reflects the tendency of the Lithuanian language towards open C,V type syllables (Table 5).

| Structural patterns | Nominal words | Participles | Examples |
|---------------------|---------------|-------------|----------|
| VC1(V(W))           | 58.3          | 61.5        | *didžiojo* ‘the great one’ Gen Sg Masc, *taikomųju* ‘the applied ones’ Gen Pl Masc/Fem |
| V(W)C1(V(W)C1)      | 31.1          | 33.3        | *naujosios* ‘the new ones’ Gen Sg Fem, *šnekamosios* ‘the spoken one’ Gen Sg Fem |
| VC1VC1              | 5.2           | 2.2         | *didžiojo* ‘the great one’ Loc Sg Fem, *šnekamunojo* ‘the spoken one’ Loc Sg Fem |
| VCVCC               | 1.3           | 2.5         | *artimiesiems* ‘the near ones’ Dat Pl Masc, *trišiamiesiems* ‘the researched ones’ Dat Pl Masc |
| CW                  | 0.8           | -           | *toksai* ‘such’ Nom Sg Masc |
| VCVCC               | 0.3           | 0.5         | *pastarosiamis* ‘the recent ones’ Ins Pl Fem, *sėjamosiamis* ‘the sowed ones’ Ins Pl Fem |

<sup>22</sup> Further examples contain other forms of the same words; thus, translations are not provided.
In summary, we can say that a flexion does not have an onset. A coda of declinable words may contain from 1 to 2 consonants; flexions of conjugated verb forms always end only on a vowel. In usage, simple V(W)C_{1} patterns of non-pronominal flexions and VC_{1}V(W) patterns of pronominal flexions prevail and make up around 80% of flexions of nominal words and 90% of verb flexions.

The Reflexive Affix

The reflexive affix is used to express reflexive verbs; it is also transferred to nouns formed from these verbs, e.g., Pres 3 prausia – prausiasi ‘washes – washes him/herself’, a noun prausimas ‘a wash’. This affix is added to the end of verbs with prefixes: a) if a verb ends on a vowel, -si is used, e.g., Pres 1 Sg prausiuosi ‘I am washing myself’, and b) if a word ends on a consonant, -s is added, e.g., Pres 1 Pl prausiamės ‘we are washing ourselves’. In verbs with prefixes, the affix -si- is inserted between a prefix and a root, e.g., Pres 1 Sg nesiprausi ‘I am not washing myself’. The same rules apply to nouns, e.g., Nom Sg prausimasis ‘a wash’, Gen Sg nesiprausimas ‘a non-wash’, etc.

The choice of a reflexive allomorph {-si-, -is, -s} depends on its position in a word, while the usage frequency in texts is determined by the frequency of word forms. In our data, the most frequent allomorph had the C_{1}V structure (96% of reflexive nominal words and 87% of reflexive verbs). The monophonemic C_{1} was used (10%) only in forms of reflexive verbs, e.g., elgtis ‘to behave’, renkamės ‘we are gathering’, laikykis ‘hold on’, etc. VC_{1} allomorph is considerably less frequent (4% of reflexive nominal words and 3% of reflexive verbs).

The productivity and frequency analysis of structural patterns of affixes in inflective words allows drawing the following generalisations.

1. 26 prefixes can be grouped into 8 structural patterns and the ratio of the different prefixes and the patterns is 3^{23}. Prefixes in Lithuanian can have C_{0-2}VC_{0-2} structure. The most productive and frequent pattern is C_{1}V (9 out of 29 prefixes, on the average 60% of all DbML words with prefixes).

2. 446 suffixes of nominal words can be classified into 10 patterns (the ratio is 45). 80 derivational suffixes of verbs can be classified into 16 patterns and 18 inflectional suffixes of verbs can be classified into 5 patterns (the ratio is respectively 5 and 4). The relative structural diversity of suffixes of verbs is higher than that of nominal words nearly ninefold and it is almost similar to the diversity of prefixes. Suffixes have structures C_{1-2}, C_{0-2}V(W)C_{0-3}, C_{0-3}V(W)C_{1-2}, VC_{1-3}VC_{0-2}. The most productive suffixes are VC_{1} in nominal words (47% of different suffixes), derivational VC_{1}, in verbs (32% of different suffixes) and inflectional suffixes C_{1}, VC_{1} (40% of different suffixes). In usage, VC_{1} suffixes of nominal words (on the average 64%) and V, C, as well as VC_{1} verb patterns (57%) dominate.

3. 87 flexions of nominal words can be classified into 10 patterns (the ratio is 12), 65 of the conjugated forms of verbs can be classified into 3 patterns (the ratio is 22) and 32 of the declinable forms of verbs can be classified into 5 patterns (the ratio is 6). The relative diversity of flexions of the declinable forms of verbs is higher than the relative diversity of flexions of nominal words and the conjugated forms of verbs. Flexions usually begin with a vowel. The generalised patterns for flexion structure are as follows: C_{1}, VC_{0-3}, VC_{1}VC_{0-1} and VC_{1}V(W)VC_{0-1}. The most productive patterns are simple VC_{0-1}, which also dominate the usage (93% of usage instances of nominal words and 97% of verbs).

4. The reflexive affix can have C_{1}, C_{0}V or VC_{1} structure. The most frequent pattern is C_{1}V (96%).

Conclusion

23 Here and further in the text, the ratio is calculated in the following way: the number of different morpheme examples is divided by the number of patterns, i.e., 26/8=3. This means that one pattern covers 8 different roots of prefixes.
In conclusion, it should be said that the structural variety of affixes is quite rich. According to the number of different patterns, they are in the following descending order: derivational suffixes of verbs – suffixes of nominal words – prefixes – flexions of nominal words – inflexional suffixes of verbs – flexions of the declinable forms of verbs – flexions of the conjugated forms of verbs. However, according to the relative diversity (i.e., how many different examples are covered by one pattern), affixes can be arranged in the descending order: prefixes – inflexional suffixes of verbs – derivational suffixes of verbs – flexions of the declinable forms of verbs – flexions of nominal words – flexions of the conjugated forms of verbs – suffixes of nominal words.

Affixes with a simple structure are productive and frequent in usage. The analysis revealed an obvious and crucial influence of the root on the structure of other morphemes. The most typical \(C_{1,2}VC_{1,2}\) structure root entails a \(C_1V\) structure prefix on the one side, while a suffix or a flexion with \(VC_{0,1}\) structure on the other. The result of such a combination is quite a consistent chain \(a\) consonant + a vowel + a consonant (+ a consonant) + a vowel + a consonant (+ a consonant): \(C_1V + C_{1,2}VC_{1,2} + VC_{0,1}\).

In this article, we discussed only a part of the results of the complex study of the Lithuanian morpheme structure as well as consonant clusters within morphemes and at junctures of morphemes. A further analysis would concentrate on regularities and limitations of consonant clusters at junctures of morphemes in more detail.

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Asta Kazlauskienė, Jurgita Civilikaitė–Mačiulskienė. Lietuvių kalbos afiksų struktūra

Šio tyrinio tikslas – nustatyti lietuvių kalbos kaitomųjų žodžių afiksų strukturinius modelius, jų produktyvumą ir dažnumą. Remiantis Dabartinės lietuvių kalbos gramatika ir Dabartinės lietuvių kalbos žodynu, analizuojama struktūrinė šių morfemų įvairovė, nustatomas modelių produktyvumas. Vartostenos dažnumo tyrinimui naudota Lietuvių kalbos morfemikos duomenų bazė.

Afiksu struktūros analizė leidžia daryti tokias išvadas:
1 priesagos ir galūnės gali būti neskiemeninės ir nuo vieno iki trijų skiemenų, priešdėliai visada yra tik vienkiemeniai;
2 priebalčių samplaikos nėra dažnos šių morfemų viduje.

Priešdėliai gali būti \( C_{0,1}V C_{0,2} \) struktūros. Produktyviausias ir dažniausias yra \( C_1V \) modelis. Priesagos gali būti \( C_{1,2}, C_{0,2}V(W)C_{0,3}, C_{0,1}V C_{1,2}, V C_{0,2} \). Produktyviausius yra vardaių JC, veiksmojaždžių JC ir VC, modeliai. Šie modeliai yra ir dažniausiai. Tarp dažniausių yra veiksmojažodių VC modelis. Galūnės gali būti \( C_1, VC_{0,2}, VC_{1,1}, VC_{1,2}, VC_{1,3} \). Produktyviausias ir dažniausias yra VC, modelis.

Išryškėjo šaknies struktūros įtaka kitų morfemų strukturiniams modeliams. Prie tipiškiausių \( C_{0,1}V C_{1,2} \) struktūros šaknies iš vienos pusės šliejasi \( C_1V \) struktūros priesadėlis, iš kitos pusės VC, struktūros priesaga arba galūnė. Tokios kombinacijos rezultatas – gana nuosekli prie balcis + balcis + balcis (+ prie balcis) + balcis + prie balcis (+ prie balcis) + balcis (+ prie balcis) grandinė: \( C_1V + C_{1,3}VC_{1,2} + VC_{0,1} \).