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PRODUCTIVITY OF DENOMINAL AND DEADJECTIVAL SUFFIXAL NOUNS IN THE JOINT CORPUS OF LITHUANIAN*

Abstract. We explore the derivational productivity of the following salient suffixes of Lithuanian denominal and deadjectival nouns on the basis of the Joint Corpus of Lithuanian (1.3 billion tokens): *-um-as*, *-yb-ė*, *-yst-ė*, *-izm-as*, *-ininк-as (-ė)*, *-uol-is (-ė)*, *-ist-as (-ė)*, *-el-is (-ė)*, *-ėl-is (-ė)*, *-(i)uk-as (-ė)*. We estimate realized, expanding, and potential productivity (Baayen 1992; 1993) and compare our results to the productivity rankings found in the major grammars and the studies of neologisms. Our focus is on the most productive suffixes of the following categories: quality nouns, status nouns, personal nouns, and diminutives. The analysis demonstrates that in a number of cases the productivity ranking of the investigated suffixes differs from the one presented in the major grammars. Our findings are in part supported by the recent studies of neologisms and other analyses based on corpus data.
Keywords: Lithuanian; denominal nouns; deadjectival nouns; suffixal nouns; derivational productivity; realized productivity; expanding productivity; potential productivity; corpus linguistics.

1. Introduction

1.1. Object of the study and previous research

We aim to measure the derivational productivity of a number of salient deadjectival and denominal noun suffixes in modern Lithuanian, i.e., quality

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nouns in *-um-as*, *-yb-ė*; status nouns in *-yst-ė*, *-izm-as*; personal nouns in *-ininк-as (-ė)*, *-uol-is (-ė)*, *-ist-as (-ė)*[1]; and diminutives in *-el-is (-ė)*, *-ėl-is (-ė)*, *-(i)uk-as (-ė)*. Our data are taken from the Joint Corpus of Lithuanian (1.3 billion tokens), and we measure realized, expanding, and potential productivity, see more details in Section 2.

Previous data on the productivity of denominal and deadjectival nouns in Lithuanian are rather limited. As will become evident in later sections focusing on specific categories, the main grammars (Urbutis 1965; 2006) provide very few quantificational notes on productivity, and only general observations and the rankings of the suffixes allow us to distinguish the most productive types. More quantitative data can be found in recent studies of the Database of Lithuanian Neologisms (Miliūnaitė, Aleksaitė 2011), see Murmulaitytė (2016; 2021), Aleksaitė (2018; 2022). Some data on earlier neologisms are discussed in Mikelionienė (2000) on the basis of the Lithuanian media corpus of 1991–1996. The realized productivity (defined in Section 1.2) of nominal diminutives found in the Corpus of Modern Lithuanian (CML)[2] is discussed in Macienė (2005, 28–35). The formation of nouns with borrowed neoclassical roots in Lithuanian on the basis of the CML is discussed in Inčiuraitė-Noreikienė (2017). New coinages found in poetry and fiction also reveal certain productivity trends, see Vaskelienė (2003; 2007; 2011; 2012; 2017).

1.2. Measuring derivational productivity in corpora

We use the following measures of derivational productivity that are based on corpus data: realized, expanding, and potential. Realized productivity simply reflects the number of derived words with a given affix (Baayen 2009, 901–902, 904–905) and can also be used to estimate derivational productivity from dictionary data. The problem with realized productivity is that it does not allow us to distinguish the processes that were productive in the past (but may no longer be productive) from the processes that are highly productive

[1] Suffixes are presented here and below followed by the nominative singular endings that cumulatively mark case and number and also serve as indicators of declensions. When masculine and feminine formations are possible, masculine endings are followed by the feminine ones separated by commas or placed in brackets, e.g., *-el-is* [m.], *-ė* [f.], *-ininк-as* [m.], *-ė* [f.]

[2] 141M tokens, http://tekstynas.vdu.lt/tekstynas/index.jsp (last accessed on 9 December 2024).

at present. To this end, measures involving hapaxes, i.e., the lexemes that occur in the corpus only once, were introduced. The rationale here is that if a corpus is sufficiently large, a significant proportion of the hapaxes in it are potentially new words. The counts of hapaxes that contain derivational affixes are used in the following estimates of derivational productivity: expanding and potential.

Expanding productivity is measured by dividing the counts of hapaxes with a given affix by the total count of hapaxes in a certain corpus; when derivational processes are compared within the same corpus, the absolute numbers of hapaxes may also be used, as is done in the present study (Baayen 1993; 2009, 902, 905–906). In the case of potential productivity, hapax counts with a given affix are divided by the total frequency of all derivatives with that affix (Baayen 1992; 2009, 902, 906). This measure is problematic due to cases when affixes with rather low total frequencies become overestimated (van Marle 1992; Gaeta, Ricca 2006), and we discuss our results of potential productivity bearing this issue in mind; see also critical remarks with regard to potential productivity in ten Hacken and Panocová (2013). In future studies, we hope to improve the measures of potential productivity either by employing the variable-corpus approach (Gaeta, Ricca 2006) or by using Large Number of Rare Events (LNRE) models (Evert, Baroni 2007), as done by, e.g., Štichauer (2009) and Varvara (2019).

1.3. Our corpus and data extraction

We use an open access word and lemma list of the Joint Corpus of Lithuanian (JCL) (Dadurkevičius 2020a; 2020b)[3], which consists of three subcorpora: Lithuanian internet texts collected in 2014, legal texts of the Seimas (the Parliament) of the Republic of Lithuania (2011), and the Balanced Corpus of Modern Lithuanian (2008) (Dadurkevičius, Petrauskaitė 2020, 123–124). The last two corpora are available online, while the first was provided by its developers as a plain text file for the use of this study. The initial lemmatization was done with the help of a lemmatizer based on the Hunspell platform (Dadurkevičius 2017). It has a built-in dictionary, which limits the number of recognized lemmas, and we had to perform additional

[3] The token list is found in the file JCLtypesvsDML6.txt from Dadurkevičius (2020b).

semi-automatic lemmatization by filtering tokens according to the pattern SUFFIX + (all possible) ENDINGS and grouping the forms into potential lemmas. The resulting lists were then manually reviewed to exclude derivationally non-transparent items.

It needs to be mentioned that alongside the native suffixes, we studied some borrowed ones, namely the status noun suffix *-izm-as* (= German *-ismus*, English *-ism*, etc.) and personal noun suffix *-ist-as, -ė* (= German *-ist,* English *-ist*, etc.). In the majority of cases, such nouns were borrowed into Lithuanian together with their bases, and their derivation, as a historical process, did not occur in Lithuanian, but a synchronic link between the two words may be seen, e.g., *despot-izm-as* 'despotism' ← *despot-as* 'despot'[4], *kapital-ist-as*, *-ė* 'capitalist (n.)' ← *kapital-as* 'capital'. In rare cases, the suffixes *-izm-as* and *-ist-as*, *-ė* can also be added to native and other borrowed non-neoclassical bases, e.g., *rašliav-ist-as* 'the one producing low-quality texts' ← *rašliav-a* 'low quality texts' (native; our corpus data), *popier-izm-as* 'paperwork, burdensome bureaucratic procedure' ← *popier-ius*[5] 'paper' (borrowed; Urbutis 1965, 315).

Our results for each salient category of denominal noun are discussed in the following sections: quality and status nouns (Section 2), personal nouns (Section 3), and diminutives (Section 4).

2. Quality and status nouns

2.1. We studied the productivity of the following four suffixes of quality and status nouns: three native (*-um-as*, *-yb-ė*, *-yst-ė*) and one borrowed (*-izm-as*), e.g., *saug-um-as* 'safety' ← *saug-us*, *-i* 'safe', *kantr-yb-ė* 'patience' ← *kantr-us*, *-i* 'patient', *krikščion-yb-ė* 'Christianity' ← *krikščion-is* 'Christian (n.)', *nar-yst-ė* 'membership' ← *nar-ys* 'member', *plokščiapad-yst-ė* 'flat-footedness' ← *plokščiapad-is*, *-ė* 'flat-footed', *individual-izm-as* 'individualism' ← *individual-us*, *-i* 'individual (adj.)', *kapital-izm-as* 'capitalism' ← *kapital-as* 'capital' (as mentioned above, formations in *-izm-as*

[4] The base adjectives and nouns are presented here and below in nominative singular and with masculine and feminine endings for the adjectives, e.g., [nom. sg.] *despot-as* 'despot', [nom. sg. m.] *saug-us*, [nom. sg. f.] *-i* 'safe'.

[5] The letter <i> in the nom. sg. ending *-ius* marks palatalization of the preceding consonant. A phonologically and morphologically preferrable segmentation is *popieri-us*, but for the sake of graphical uniformity of the base, we segment *popier-ius*, so that the base in the derivative *popier-(izmas)* graphically equals the stem of *popier-(ius)*.

are mostly direct borrowings, and their derivational relations in Lithuanian may only be seen from a synchronic point of view). Here, we follow the descriptive tradition of Lithuanian grammars (Urbutis 1965; 2006), which do not distinguish quality and status nouns, but see Stundžia (2016, 3095–3096) where these categories are presented separately. For the category of status nouns, see Luschützky (2015); for the problem of delimiting the category of quality nouns from other categories of derived abstract nouns, see Rainer (2015, 1269–1270).

The most productive of the four Lithuanian suffixes examined in our study is *-um-as*, which can be used to derive abstract nouns from all gradable adjectives and sometimes even from non-gradable ones. As the number of derivatives is virtually unlimited (all gradable newly coined and borrowed adjectives are potential bases), the grammars do not provide any quantitative data on the productivity of *-um-as* (Urbutis 1965, 306–307; 2006, 100–101). The suffix *-yb-ė* is seen as less productive and is listed second in the grammars, followed by *-yst-ė*, which notably differs from both *-um-as* and *-yst-ė* in that it usually takes person-denoting nouns as bases rather than adjectives. For this reason, the suffix *-yst-ė* is a prototypical suffix of status nouns, while *-um-as* and *-yb-ė* mostly derive quality nouns. Grammars note that *-yb-ė* may denote a somewhat more intensive shade of quality, cf.: *gaus-us*, *-i* 'abundant' → *gaus-um-as* 'abundancy' (neutral) vs. *gaus-yb-ė* 'idem' (with some emphasis) (Urbutis 1965, 308; 2006, 101). The borrowed suffix *-izm-as* is comparable to *-yst-ė* as it typically takes nouns as bases while deadjectival derivation is less common. Grammars do not quantify the productivity of *-yst-ė*, *-yb-ė*, and *-izmas*, and it is only mentioned that the number of formations in *-izm-as* is similar to that of formations in *-yst-ė* (Urbutis 1965, 307–312, 314; 2006, 101–103).

As for the neologism studies, it is worth noting that the most productive suffix appears to be *-yst-ė*, which, as seen above, ranks only third in the grammars. The suffix *-yst-ė* is then followed by *-um-as* and *-izm-as*, which are of the same productivity according to neologism counts in Aleksaitė (2022, 49–55); see also Aleksaitė (2018) where the counts of neologisms in *-izm-as* supersede the ones in *-um-as* due to an earlier sampling of the data. The suffix *-yb-ė* comes only third (when *-um-as* equals *-izm-*as in productivity) or fourth (when *-izm-as* supersedes *-um-as*) in the abovementioned studies. The suffixes *-um-as*, *-yb-ė*, and *-yst-ė* are also commonly found in formations coined by poetry and fiction authors (Vaskelienė 2017, 3).

As for derivational transparency, we excluded the formations that no longer have clear synchronic bases (e.g., *skirt-um-as* and *skirt-yb-ė* 'difference' historically derived from *skirt-as, -a* 'different') or when the bases are only potential but not attested in the sources available to us, e.g., *deficitišk-um-as* 'deficiency' is potentially derived from **deficit-išk-as*, *-a* 'deficient', but only non-gradable *defict-in-is* 'deficient' (with the suffix *-in-*) is attested, see also Inčiuraitė-Noreikienė (2022, 157). We also did not include parasynthetic compounds based on phrases, e.g., *per brang-us* 'too expensive' → *perbrang-um-as* 'the quality of being too expensive', *be stil-iaus* 'without style' → *bestil-yb-ė* 'the quality of (performing something) without (the sense of) style', *nieko neveikti* 'to do nothing' → *niekoneveik-izm-as* 'the state of doing nothing', see Inčiuraitė-Noreikienė (2017, 121) and Aleksaitė (2018, 12; 2022, 54) on this type of formation.

We also had to make certain decisions in the case of the formations in *-izm-as*. Our approach was conservative, and we only accepted the bases where no base truncation had to be assumed, i.e., we marked *ideal-izm-as* 'idealism' ← *ideal-as* 'ideal (n.)' or *ideal-us*, *-i* 'ideal (adj.)', *liberal-izm-as* 'liberalism' ← *liberal-us*, *-i* 'liberal (adj.)' or *liberal-as*, *-ė* 'liberal (n.)', *stalin-izm-as* 'Stalinism' ← *Stalin-as* 'Stalin', etc. as derivationally transparent and having a clear direction of derivation, whereas such cases as *binar-izm-as* 'binarism' alongside *binar-in-is*, *-ė* (*-išk-as*, *-a*) 'binary', *akadem-izm-as* 'academicity' alongside *akadem-ij-a* 'academy', *akadem-ik-as* 'academician', *akadem-in-is*, *-ė* (*-išk-as*, *-a*) 'academic (adj.)', etc., were marked as derivationally non-transparent.

2.2. The productivity measures of quality and status noun suffixes are presented in Table 1, where the suffixes are ranked according to the type counts.

Table 1. **Productivity measures of quality and status noun suffixes**

Suffix	Types	Hapaxes	Total frequency	Potential productivity (*10^3)
-um-as	6,180	1,419	4,028,813	0.3522
-yst-ė	1,135	364	826,407	0.4405
-izm-as	1,049	327	196,467	1.6644
-yb-ė	769	214	7,844,994	0.0273

The ranking according to realized and expanding productivity (type and hapax counts, respectively) shows that formations in *-um-as* are dominant just as expected, but the grammars appear to overestimate the productivity of *-yb-ė* by placing it second, while our study ranks this suffix only fourth. It is unclear why the grammars list *-yb-ė* so high, and we may only guess that this ranking may be based on certain lexicographic data that were collected by the author of the corresponding chapters of the grammars, Vincas Urbutis, in the early 1960s.

Our findings are partly in line with the observations presented in the studies of neologisms where formations in *-yst-ė* are also found to be more productive than *-yb-ė*. The quality nouns in *-um-as*, however, have surprisingly lower counts than *-yst-ė* in these studies; this is probably because formations in *-um-as* are highly regular and are less likely to be reported to the database used for these studies. Consider some hapaxes from our corpus: *braziliš-um-as* 'quality of being Brazilian-like' ← *braziliš-as*, *-a* 'Brazilian-like', *disneilendiš-um-as* 'quality of being Disneyland-like' ← *disneilendiš-as*, *-a* 'Disneyland-like', *pliuralistiš-um-as* 'pluralisticity' ← *pliuralistiš-as*, *-a* 'pluralistic'.

Formations with the borrowed suffix *-izm-as* rank third in our study and are only slightly less productive than *-yst-ė*. Some of them, used in colloquial style, are based on native or other non-neoclassical bases, including surnames, as already observed in earlier studies (Inčiuraitė-Noreikienė 2017, 120–121; Aleksaitė 2018, 11; 2022, 53–54), e.g., *avigalv-izm-as* 'foolishness' ← *avigalv-is* 'fool', *bediev-izm-as* 'atheism' ← *bediev-is* 'godless, atheist', *adamk-izm-as* 'views and policies (allegedly) related to the presidency of Adamkus' ← *Adamkus* (former president of Republic of Lithuania). Despite this fact, it is evident that the productivity of *-izm-as* formations is still limited by the number of potential bases, which are mostly neoclassical.

As for potential productivity, we should acknowledge that the differences in the total frequencies of the derivatives are large, and this measure of productivity needs to be assessed in the future using either the variable-corpus approach or LNRE models, as mentioned earlier.

3. Personal nouns

3.1. We studied three personal noun suffixes: two native (*-ininк-as*, *-ė*; *-uol-is*, *-ė*) and one borrowed (*-ist-as*, *-ė*). Personal nouns in Lithuanian can be masculine or feminine and their gender is related to certain declensions, in

our case, nom. sg. *-as* and *-is* represent masculine nouns, while *-ė* is feminine, e.g., *men-inink-as* m., *meninink-ė* f. 'artist' ← *men-as* 'art', *blaiv-inink-as* m., *blaiv-inink-ė* f. 'abstainer' ← *blaiv-us*, *-i* 'sober', *jaun-uol-is* m., *jaun-uol-ė* f. 'young person' ← *jaun-as*, *-a* 'young', *turt-uol-is* m., *turt-uol-ė* f. 'wealthy person' ← *turt-as* 'wealth', *gitar-ist-as* m., *gitar-ist-ė* f. 'guitar player' ← *gitar-a* 'guitar', *real-ist-as* m., *real-ist-ė* 'realist' ← *real-us*, *-i* 'real' (as mentioned before, nouns with the borrowed suffix *-ist-as*, *-ė* are mostly borrowings but may be seen as derivatives from a synchronic point of view). Traditionally, masculine and feminine formations are discussed together, but we measured their productivity separately in order to demonstrate significant differences, see data and comments in Section 3.2.

The grammars list *-inink-as*, *-ė* as the most productive suffix that derives personal nouns mostly from abstract nouns and much less frequently from adjectives. The suffix *-uol-is*, *-ė* is also seen as very productive, but, differently from *-inink-as*, *-ė*, it is typically used to derive personal nouns from adjectives, while denominal formations are rare. The data on productivity are not provided in the grammars, and only the fact that the suffix *-inink-as*, *-ė* is listed first shows that *-uol-is*, *-ė* is seen as less productive[6]. In the group of borrowed personal noun suffixes, *-ist-as*, *-ė* is listed first. It is typically found in denominal formations and only occasionally in deadjectival derivatives. In addition, we should note that the suffix *-inink-as*, *-ė* immediately followed by the suffix *-ist-as*, *-ė* are listed by the main grammars as markers of the category of professions and occupations. This category is treated separately from the general category of *nomina attributiva* in Lithuanian grammatical tradition, but we decided to unite them into a common category of personal nouns both for the sake of simplicity and for future comparability with data from other languages where a category of personal nouns is recognized, see, e.g., Stundžia (2016, 3095–3096) where the said distinction is also not made in order to achieve comparability with other languages. The

[6] Two more suffixes, *-in-ė* and *-in-is (-ys)*, are actually listed after *-inink-as*, *-ė* and before *-uol-is*, *-ė* because Lithuanian grammars treat the derivatives typically referring to persons (in *-inink-as*, *-ė*, *-uol-is*, *-ė*) and to non-animate referents (in *-in-ė*, *-in-is* (*-ys*)) together under the label of *nomina attributiva*, i.e., denominal and deadjectival nouns denoting bearers of quality. We initially planned to measure the productivity of *-in-ė* and *-in-is (-ys)*, but the amount of data requiring manual review was too large given our time constraints. We also mention the problem of some formations in *-uol-is*, *-ė* that do not refer to persons below.

professions in *-ist-as*, *-ė* are interesting in that the grammars finally provide an approximate number of the formations, which is up to 50. More details on the abovementioned suffixes can be found in Urbutis (1965, 340–343, 346, 409; 2006, 114–117, 123, 137–138), and Stundžia (2016, 3094–3096).

The studies of neologisms note the productivity of *-inink-as*, *-ė* and, most importantly, provide quantitative estimates demonstrating that the suffix *-uol-is*, *-ė* is significantly less productive; for example, in Murmulaitytė (2016, 16), 81 formations in *-inink-as*, *-ė* and 22 formations in *-uol-is*, *-ė* are reported, see also Murmulaitytė (2021, 151–156) and Aleksaitė (2022, 64–69, 85). The suffix *-ist-as*, *-ė* is seen as having low productivity (13 types) in the database of neologisms compared to other suffixes (Aleksaitė 2022, 65, 70, 86). According to the latest data (as of October 2024), Miliūnaitė (2024, 188) reports that there are 30 formations derived with *-ist-as*, *-ė* in that database. Following the view accepted in the present paper, there could be even more of these formations; for example, *dron-ist-as* 'drone operator' is used alongside *dron-as* 'drone' and can be seen as derived, whereas Miliūnaitė (2024, 187) counts it only as a borrowing. All three abovementioned suffixes are also found among coinages of poetry and fiction authors (Vaskelienė 2017, 6).

As for derivational annotation, the following issues should be mentioned. In the majority of cases, formations in *-uol-is*, *-ė* refer to persons, but there are also some derivatives that refer to non-animates, e.g., *med-uol-is* 'honey cake, cookie' ← *med-us* 'honey', *saus-uol-is* 'dead tree' ← *saus-as*, *-a* 'dry', etc. In our dataset, we found 8 such formations and excluded them from the counts presented in Table 2 below. For the formations in *-ist-as*, *-ė*, we needed to decide whether truncated bases can be accepted. Just as in the case of *-izm-as* discussed above, we adopted a conservative approach and only the cases without the truncation of the base were marked as derived, e.g., *saksofon-ist-as*, *-ė* 'saxophonist' ← *saksofon-as* 'saxophone', *žurnal-ist-as*, *-ė* 'journalist' ← *žurnal-as* 'journal'[7], *bud-ist-as*, *-ė* 'Buddhist' ← *Bud-a* 'Buddha', etc. If truncation of the base had to be assumed, we marked such cases as non-derived, e.g., *pian-ist-as*, *-ė* 'pianist' alonside *pian-in-as* 'piano', *komparatyv-ist-as*, *-ė* 'comparativist' alongside *komparatyv-in-is*, *-ė* 'comparative', *pragmat-ist-as*, *-ė* 'pragmatist' alongside *pragmat-ik-a* 'pragmatics', *pragmat-in-is*, *-ė* (*-išk-as*, *-a*)

[7] We acknowledge that the derivational relation of this formation to the base is already weakened due to the extended meaning of the derivative.

'pragmatic (adj.)', etc. The suffix *-ininkas*, *-ė* was found in some parasynthetic compounds, which were also excluded from our counts as they represent a different word-formation process, e.g., *žali-a-kort-ininkas* 'Green Card holder' ← *žali-oji (žali-a) kort-a* 'the Green Card', *penkt-a-kolon-ininkas*, *-ė* 'member of "the fifth column", i.e., the one who is in favor of an external enemy' ← *penkt-oji* (*penkt-a*) *kolon-a* 'the fifth column', *sauli-a-vėj-ininkas* 'the one who uses, profits from electricity from wind and Sun' ← *saul-ė* 'Sun', *vėj-as* 'wind'; see also Murmulaitytė (2016, 16; 2021, 151) and Aleksaitė (2022, 141) on this type of formation.

3.2. The data on the productivity of personal nouns are presented in Table 3, where the suffixes are ranked according to the sum of the types of masculine and feminine formations.

Table 2. **Productivity measures of personal noun suffixes**

Suffix	Types	Hapaxes	Total frequency	Potential productivity (*10^3)
-ininkas m.	2,655	693	4,461,507	0.1553
-ininkė f.	699	137	481,475	0.2845
-istas m.	994	339	638,646	0.5308
-istė f.	253	68	75,878	0.8962
-uolis m.	270	66	281,322	0.2346
-uolė f.	155	34	115,766	0.2937

The formations in *-ininkas*, *-ė* top the table, as predicted by the grammars. A rather surprising finding of our study is that the borrowed suffix *-istas*, *-ė* is quite productive and ranks second as seen from both the type and the hapax counts; we still need to determine whether such productivity stems from specific text types (and certain subcorpora) included in our corpus.

As observed in earlier studies (Inčiuraitė-Noreikienė 2017, 122–123; Aleksaitė 2022, 70; Miliūnaitė 2024), some formations with the suffix *-istas*, *-ė* are based on native or non-neoclassical stems and surnames, but they are not very numerous, e.g., *pliurpal-istas* 'the one talks rubbish' ← *pliurpal-as* 'rubbish talk', *raid-istas* 'letterist (member of Letterism, a French avant-garde movement)' ← *raid-ė* 'letter', *andriukait-istas* 'supporters of Andriukaitis' ← *Andriukait-is* (prominent Lithuanian politician)'.

Differently from the approach of the grammars and other studies, we measured the productivity of masculine and feminine formations separately. Our data show that the formation of masculine derivatives is significantly more productive. More detailed study is needed, but it is likely that the difference can at least partly be explained by the use of masculine nouns as generic terms. We should also mention that the type counts with regard to gender are a little imprecise due to homographic case forms. In the case of *-inink-as*, *-ė* and *-ist-as*, *-ė*, the homographic forms are the locative and vocative singular of masculine nouns (*-e*) and the instrumental and vocative singular of feminine nouns (*-e*). Due to large amounts of data, manual disambiguation was performed only for the hapaxes. There were 19 hapaxes ending in *-inink-e* in our corpus, and after manual disambiguation, only four forms were left that could be interpreted as masculine or feminine due to the lack of context. For the suffix *-ist-as*, *-ė*, we found 11 hapaxes ending in *-ist-e*, and only two of them could not be strictly disambiguated for gender. In the case of the suffix *-uol-is*, *-ė*, the genitive plural form *-uol-ių* is homographic, and we found 11 hapaxes with this ending. After manual disambiguation, six cases remained that could be interpreted as either masculine or feminine. All in all, we conclude that the homographic forms of personal noun suffixes included in our study affect the hapax counts much less than in the case of the agent nouns in *-toj-as*, *-a* and *-ėj-as*, *-a*, see Pakerys et al. (2024).

4. Diminutives

4.1. We investigated the productivity of three of the most productive suffixes of diminutives: *-el-is*, *-ė*; *-ėl-is*, *-ė*; and *-(i)uk-as*, *-ė*. The suffixes *-el-is*, *-ė* and *-ėl-is*, *-ė* have a complementary distribution: *-el-is*, *-ė* attaches only to the bases that are one syllable long (without the ending), while *-ėl-is*, *-ė* is used for all other bases[8]. The suffix *-(i)uk-as*, *-ė* is insensitive to base length and optionally palatalizes the last consonant of the base[9]. The derivatives inherit the gender of their bases in the majority of cases, and formations in

[8] Due to their complementary distribution, one may treat *-el-is*, *-ė* and *-ėl-is*, *-ė* as variants of the same suffix (Jakaitienė et al. 1976, 11; Urbutis 2006, 90).

[9] Optional palatalization induced by the suffix is graphically indicated by putting the palatalization mark (letter <i>) in brackets. As a result of that palatalization, the consonants /t/ and /d/ are affricatized to /ʧʲ/ and /ʤʲ/.

the nom. sg. *-as* and *-is* are masculine, while formations in the nom. sg. *-ė* are feminine[10], e.g., *vaik-el-is* m. 'small child' ← *vaik-as* m. 'child' (monosyllabic base, <ai> [ɐɪ] is a diphthong), *rank-el-ė* f. 'small hand' ← *rank-a* f. 'hand' (monosyllabic base), *ežer-ėl-is* m. 'small lake' ← *ežer-as* m. 'lake' (disyllabic base), *parduotuv-ėl-ė* f. 'small shop' ← *parduotuv-ė* f. 'shop' (trisyllabic base), *rat-uk-as* m. 'small wheel' ← *rat-as* m. 'wheel', *kavin-uk-ė* f. 'small cafe' ← *kavin-ė* 'cafe' f., *gali-uk-as* m. 'tip' ← *gal-as* m. 'end (point)'. The grammars estimate that the suffix *-ėl-is*, *-ė* is around two times less frequent than *-el-is*, but it is noted that in some texts, *-ėl-is*, *-ė* may be superseded by the suffix *-(i)uk-as*, *-ė* (Urbutis 1965, 254–265; 2006, 88–90; Stundžia 2016, 3095).

The studies of neologisms note a surprising scarcity of diminutive formations (Aleksaitė 2022, 41–42). This can be explained by some highly productive derivatives not being reported to the database; this is also true for action nominals in *-ym-as*, agents in *-ėj-*, etc., cf. Aleksaitė (2022, 44). Of the limited available data of neologisms, it is still interesting to note that the majority of diminutives included in that database are derived with the suffix *-(i)uk-as*, *-ė* (Aleksaitė 2022, 42–43).

One study based on the CML (included as one of the subcorpora in our joint corpus) reports the following data: *-ėl-is, -ė* is the most productive (1,101 types), closely trailed by *-(i)uk-as, -ė* (1,052 types), and then followed by *-el-is, -ė* (863 types) (Macienė 2005, 28). Another study of diminutives derived from neoclassical and some other borrowed stems in the CML demonstrates that formations in *-(i)uk-as*, *-ė* prevail (412 types), followed by *-ėl-is*, *-ė* (328 types), and then *-el-is*, *-ė* (only 48 types) (Inčiuraitė-Noreikienė 2017, 94).

As for the annotation of the data, we decided to not exclude a number of formations that have idiomatic specialized meanings (Urbutis 1965, 260, 264; 2006, 90), e.g., *lent-el-ė* f. 'table' ← *lent-a* f. 'plank', *žiog-el-is* m. 'safety pin' ← *žiog-as* m. 'grasshopper', *vadov-ėl-is* m. 'textbook' ← *vadov-as* m. 'leader, guide (also about books)'. The problem here is that our suffixes are quite productive, and it is hard to exclude the possibility that a true diminutive

[10] As one of the exceptions, consider *up-el-is* m. 'stream, rivulet' m. ← *up-ė* f. 'river' (Urbutis 1965, 260–261; 2006, 90). One should bear in mind, however, that *up-el-ė* f. is also occasionally used (Urbutis 1965, 261) and that *up-is* m. is attested in the dialects (see LKŽ). From our dataset, consider the gender-altering formations *apkep-ėl-ė* f. 'casserole' ← *apkep-as* m. 'bake', *užtep-ėl-ė* f. 'spread (with diminutive shade)' ← *užtep-as* m. 'spread' (rare).

with the same suffix exists in our data. For example, for the cases cited above, one should look through the vast number of occurrences to make sure that *lent-el-ė*, *žiog-el-is*, and *vadov-ėl-is* are not used in reference to small planks, grasshoppers, and leaders (and we actually found true diminutives for the first two bases in a limited review of the concordance lines). Due to the large amount of data requiring manual review, we also excluded diminutives derived from proper nouns. It is likely that the inclusion of such derivatives would increase the productivity measures, and we hope to estimate the share of diminutives based on proper nouns in our future studies.

4.2. Productivity measures of the diminutive suffixes are presented in Table 3 where the suffixes are arranged by the sums of the type counts of masculine and feminine formations.

Table 3. **Productivity measures of diminutives**

Suffix	Types	Hapaxes	Total frequency	Potential productivity (*10^3)
-(i)uk-as m.	3,598	950	687,339	1.3821
-(i)uk-ė f.	686	209	24,372	8.5754
-ėl-is m.	1,899	565	376,210	1.5018
-ėl-ė f.	1,026	257	203,848	1.2607
-el-is m.	755	74	1,354,266	0.0546
-el-ė f.	644	64	1,098,361	0.0583

The suffix *-(i)uk-as*, *-ė* stands out as the most productive when the type and hapax counts of the masculine and feminine formations are summed up, followed by *-ėl-is*, *-ė* and *-el-is*, *-ė*. If the masculine and feminine formations are compared separately, the suffix *-ėl-ė* (f.) is more productive than *-(i)uk-ė* (f.) according to the type and hapax numbers. It still needs to be determined which data sources prompted the grammars to list *-el-is*, *-ė* first because the productivity of this suffix is clearly limited by its niche of monosyllabic bases, as already observed in Inčiuraitė-Noreikienė (2017, 94). Compared to other studies, the order of productivity we arrived at (*-(i)uk-* > *-ėl-* > *-el-*) coincides only with that of Inčiuraitė-Noreikienė (2017, 94). As mentioned earlier, the study based on one of our subcorpora (the CML) shows a different ordering according to the type counts: *-ėl-is*, *-ė* and *-(i)uk-as*, *-ė* are of similar productivity, followed by *-el-is*, *-ė* (Macienė 2005,

28). Just as in the case of the other categories, we postpone the interpretation of potential productivity measures to future studies.

Similar to the study of personal nouns, we made a distinction between the masculine and feminine derivatives. In the case of *-(i)uk-as*, *-ė* and *-ėl-is*, *-ė*, the masculine variant of the suffix is significantly more productive, but not so for *-el-is*, *-ė*. One of the reasons for the higher productivity of masculine nouns referring to persons and other gendered referents could be their use as generic terms. In the case of diminutives, however, we need to be very cautious because only part of such formations refers to gendered referents. A further study is needed to separate diminutives that are available for both genders and to determine the factors influencing the formation of the derivatives.

It should also be mentioned that diminutive suffixes that derive formations for both genders have some homographic forms that may affect the type and hapax counts. Just as in the case of personal nouns, we manually reviewed only the hapaxes. For the suffix *-(i)uk-as*, *-ė*, the locative and vocative singular of masculine nouns (*-e*) coincides with the instrumental and vocative singular of feminine nouns (*-e*). In total, our corpus contains 14 hapaxes ending in *-(i)uk-e*, and all of them were successfully disambiguated for gender. For the suffixes *-ėl-is*, *-ė* and *-el-is*, *-ė*, the genitive plural is the same for nouns of both genders (*-ių*). We had 85 hapaxes ending in *-ėl-ių*, and ten of them could not be disambiguated. For *-el-is*, *-ė*, 12 hapaxes ending in *-el-ių* were found, and only one of them could not be disambiguated. This shows that only for the suffix *-ėl-is*, *-ė* do the results of the manual disambiguation of hapaxes appear to be somewhat more significant.

5. Conclusion

Our corpus study revealed a number of significant productivity differences for denominal nouns compared to previous rankings found in the major grammars. Some of our results are in line with the earlier studies of neologisms.

For quality and status nouns, our data allowed ranking the suffixes according to their realized and expanding productivity as follows: *-um-as* > *-yst-ė* > *-izm-as* > *-yb-ė*. Our ranking differs from the grammars where the quality suffix *-yb-ė* is listed before the status suffix *-yst-ė*. The productivity of *-yst-ė* is confirmed in the study of neologisms where it is ranked first, perhaps due to the omission of regular formations in *-um-as* in the database. The borrowed suffix *-izm-as* is seen as quite productive both in our study

and in the analyses of neologisms and was found not only in formations with neoclassical bases, but also in derivatives from the native and other borrowed bases.

Among personal nouns, the ranking of the suffixes according to realized and expanding productivity was *-inink-as*, *-ė* > *-ist-as*, *-ė* > *-uol-is*, *-ė*. An interesting finding was the high productivity of the borrowed suffix *-ist-as*, *-ė*, but further studies are needed to determine whether a particular subcorpus (or specific texts) may have influenced such an outcome. The masculine variants of all suffixes were found to be more productive than the feminine ones, and we hypothesize that one of the explanations for this result is the generic use of masculine formations, but this needs to be checked in further study.

In the case of diminutive suffixes, our study demonstrates that the suffix *-(i)uk-as*, *-ė* is the most productive, followed by *-ėl-is*, *-ė* and *-el-is*, *-ė*. This ranking differs from the one presented in the grammars where *-el-is*, *-ė* is listed first and *-ėl-is*, *-ė* or *-(i)uk-as*, *-ė* comes second. Our results also differ from the study of Macienė (2005), where formations in *-ėl-is*, *-ė* and *-(i)uk-as*, *-ė* are of similar realized productivity, followed by *-el-is*, *-ė*. We also noted that the masculine diminutive formations are significantly more productive than the feminine ones in the case of *-(i)uk-as*, *-ė* and *-ėl-is*, *-ė*, but not in the case of *-el-is*, *-ė*.

We estimated the potential productivity for all abovementioned suffixes, but in the majority of cases, the differences in total frequencies were too large to consider potential productivity without overestimating suffixes that have significantly less frequent derivatives.

PRIESAGINIŲ VARDAŽODINIŲ DAIKTAVARDŽIŲ PRODUKTYVUMAS JUNGTINIO LIETUVIŲ KALBOS TEKSTYNO DUOMENIMIS

Santrauka

Straipsnyje tiriamas svarbesnių lietuvių kalbos vardažodinių daiktavardžių priesagų produktyvumas remiantis tekstyno duomenimis. Tam reikalui pasitelktà XX a. paskutiniame dešimtmetyje išpopuliarėjusi darybinio produktyvumo metodika (Baayen 1992; 1993; 2009) ir Jungtinis lietuvių kalbos tekstynas, kuriame yra 1,3 mlrd. žodžių pavar-

tojimų (Dadurkevičius 2020a; 2020b). Pagrindiniai tyrimo rezultatai remiasi realizuotuoju ir plėtros produktyvumu, o potencinio produktyvumo duomenimis dėl didelių bendrojo vedinių dažnio skirtumų kliautis nebuvo galima, nes yra pastebėta, kad tokie skirtumai gali nepagrįstai iškelti gerokai mažesnį bendrąjį vedinių dažnį turinčių priesagų produktyvumą (van Marle 1992; Gaeta, Ricca 2006).

Tyrimui buvo atrinktos produktyviausios priesagos, nurodomos pagrindinėse lietuvių kalbos gramatikose (Urbutis 1965; 2006), kartu buvo atsižvelgiama į ribotas rankinės didelių duomenų peržiūros galimybes, todėl daugiau priesagų ištirti nesiekta. Gautì rezultatai lyginti su ankstesniais tekstynų medžiaga grįstais tyrimais (Inčiuraitė-Noreikienė 2017; Macienė 2005) ir naujadarų analizės duomenimis (Aleksaitė 2018; 2022; Murmulaitytė 2016; 2021; Vaskelienė 2017).

Tyrimo metu paaiškėjo keletas reikšmingų priesagų produktyvumo rikiuotės skirtumų lyginant su gramatikų duomenimis. Kai kuriais atvejais gauti rezultatai patvirtino ir ką tik minėtų naujausių tyrimų įžvalgas.

Vardažodžių abstraktų priesagos pagal realizuotąjį ir plėtros produktyvumą išsirikiavo tokia eile: *-um-as* > *-yst-ė* > *-izm-as* > *-yb-ė*. Gramatikose eilė kitokia: priesaga *-yb-ė* nurodoma kaip produktyvesnė už *-yst-ė*. Mūsų tyrimo rezultatai iš dalies dera su naujažodžių studijomis, kur priesaga *-yst-ė* irgi produktyvesnė už *-yb-ė*, bet, kita vertus, skiriasi tuo, kad tose studijose priesaga *-um-as* už *-yst-ė* vis dėlto nėra daresnė – tikėtina, kad taip yra todėl, kad niekuo neišsiskiriantys *-um-as* vediniai tiesiog rečiau pasiūlomi įtraukti į Lietuvių kalbos naujažodžių duomenyną. Priesaga *-izm-as* mūsų medžiagoje darumu nedaug teatsilieka nuo *-yst-ė* ir, kaip jau pastebėta ir kituose tyrimuose, kartais yra jungiama prie indigenių kamienų.

Vardažodinės ypatybės turėtojų tyrimą apribojome tik asmenų pavadinimais, sudaromais su trimis priesagomis, kurių rikiuotė pagal realizuotąjį ir plėtros produktyvumą buvo nustatyta tokia: *-ininkas*, *-ė* > *-ist-as*, *-ė* > *-uol-is*, *-ė*. Įdomu ir kiek netikėta tai, kad skolinta priesaga *-ist-as*, *-ė* pasirodė kaip gana produktyvi. Turime pabrėžti, kad savo studijoje sinchroniškai skaidžiais laikėme ir skolinius, kurie lietuvių kalboje tiesiog turi atitinkamus skolintus pamatus, bet šiaip tų žodžių daryba istoriškai yra įvykusi kitose kalbose. Savo medžiagoje taip pat radome ir iš indigenių kamienų sudarytų priesagos *-ist-as*, *-ė* vedinių – tokia daryba minima ir naujažodžių studijose. Gramatikose *-ist-as*, *-ė* vieta kitų neskolintų priesagų atžvilgiu nenurodyta, o naujažodžių tyrimuose pastebėta, kad šios priesagos produktyvumas labai mažas. Manome, kad reikėtų papildomo tyrimo, kuris galėtų parodyti, ar priesagos *-ist-as*, *-ė* produktyvumą mūsų korpuse galėjo nulemti tam tikrų į jį įtrauktų tekstų pobūdis ir apimtis. Tolėsnės studijos taip pat galėtų detaliau atsakyti į klausimą, kodėl vyriškosios giminės vardažodinės ypatybės turėtojų (nusakančių asmenis) vedinių produktyvumas gerokai lenkia moteriškosios giminės vedinius –

tikėtina, kad taip yra dėl dalies vyriškosios giminės vedinių vartosenos apibendrintąja reikšme.

Iš deminutyvinių priesagų tirtos šios trys: *-el-is*, *-ė*, *-ėl-is*, *-ė* ir *-(i)uk-as*, *-ė*. Realizuotasis ir plėtros produktyvumas rodo, kad iš jų akivaizdžiai produktyviausia yra *-(i)uk-as*, *-ė*, jei lyginsime vyriškosios ir moteriškosios giminės vedinių sumas arba vien vyriškosios giminės lemų skaičius. Tik priesagos *-ėl-* moteriškosios giminės variantas *-ėl-ė* realizuotuoju ir plėtros produktyvumu lenkia priesagos *-(i)uk-* moteriškąjį atitikmenį *-(i)uk-ė*. Gramatikose produktyviausia laikoma priesaga *-el-is*, *-ė* mūsų tyrime kitoms dviem nusileidžia tiek realizuotuoju, tiek plėtros produktyvumu. Tai, kad *-ėl-is*, *-ė* yra daresnė už *-el-is*, *-ė*, rodo ir Macienės (2005) realizuotojo produktyvumo tyrimas, tik jame priesaga *-(i)uk-as*, *-ė* yra panašaus darumo kaip ir *-ėl-is*, *-ė*, tad ne tokia dari kaip mūsų duomenimis. Panašiai kaip ir vardažodinės ypatybės turėtojų atveju, pastebėjome, kad vyriškosios giminės priesagų *-(i)uk*-as ir *-ėl-is* deminutyvai gerokai produktyvesni už moteriškosios giminės *-ėl-ė* vedinius, o štai priesagos *-el-is*, *-ė* atveju tokio didelio skirtumo nebuvo. Kodėl taip yra, kol kas paaiškinti negalėjome.

ABBREVIATIONS

ADJ – adjective

CML – Corpus of Modern Lithuanian, http://tekstynas.vdu.lt/tekstynas/index.jsp (last accessed on 9 December 2024)

F – feminine

M – masculine

N – noun

NOM – nominative

SG – singular

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