

Feminine Personal Nouns in Ukrainian: Dynamics in a Corpus

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Abstract

The paper discusses the dynamics of Ukrainian feminine personal nouns in 2000-2022 based on corpus data. The GRAC corpus is used as the source of language material with a focus on the language of the press. The authors show that there has been a dramatic increase in the frequency and diversity of Ukrainian feminine nouns starting from 2015-2016 and that they are predominantly used as neutral terms. Several large groups of feminine derivatives and specific cases are analyzed. The most probable causes for the observed rises and falls in their use are identified, and conclusions are made about the role and stylistic range of feminine derivatives in Modern Ukrainian.

Keywords

Feminine personal noun, feminine derivative, feminine term, Ukrainian, Ukrainian corpus, General Regionally Annotated Corpus of Ukrainian, GRAC.

1. Introduction

Feminine personal nouns have been an important object of study in the research community. The number of studies on their formation, usage, and codification in Slavic languages has significantly increased over the past years [2, 4, 7, 10, 15, 16, 19-22, 24, 41]. There has also been a growing interest in comparative studies between different languages [3, 5, 17, 27, 33, 49]. Feminine personal nouns are studied in the context of gender-fair language [8, 11-13], political correctness [27], language codification [18], and language processing in the brain [43]. An active area of research focuses on new feminine personal nouns that appear in languages and are not recorded in dictionaries [26, 37, 42].

Feminine personal nouns include a wide range of nominations denoting profession, office, type of activity, type of action performed (*nomina agentis*), ideological convictions or religious beliefs, membership in certain communities, territory of residence, and other features. Derivation of such names by way of suffixation is a systemic-structural and typological feature of Ukrainian [48, p. 377].

The mass media are a key vehicle for expanding the stock of feminine nouns in Ukrainian. This includes printed and online media outlets, television, cinema, and social networks. As journalism is fastest in reacting to social change and reflecting the growing public and professional role of women in Ukrainian society, linguists turn to these texts in order to study feminine nouns [36]. By exerting tremendous influence on society, particularly in terms of how people speak and what they consider to be the norm, the modern media industry has largely supplanted fiction in this role [38, p. 129]. Thus, the language of the media has started to take over some of the functions of the language of literature, including its norm-defining function.

Despite a growing number of studies on Ukrainian feminine personal nouns, the vast majority of them are based on hand-selected examples from texts. The Ukrainian language has undergone significant changes in the past couple of years, which need to be studied and described. Thus, there is a perceptible lack of large-scale statistical analyses performed on consistent corpus data, particularly quantitative research into the dynamics of these lexical items over the past two decades. The present study is aimed specifically at filling this gap.

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2. Related Works

A number of researchers emphasize that feminization is a phenomenon inherent to the Ukrainian language [4, 36, 44, 48], while Oleksandr Styshov characterizes it as “a revival of the identity and originality of Ukrainian” [36, p. 132]. Studies of Ukrainian feminine personal nouns focus mainly on the structural semantic analysis of such nouns both in diachrony and synchrony [15]. In Ukrainian, feminine personal nouns are derived from the respective masculine nouns with the addition of special feminizing suffixes [48] or, less frequently, endings, as in *свідок* [svidok] (male witness) — *свідка* [svidka] (female witness). However, some linguists suggest that at least certain feminine and masculine nouns are co-derived in parallel from the same basis, such as *українка* [ukrayinka] (female Ukrainian) and *українець* [ukrayinets] (male Ukrainian) from *Україна* [Ukrayina] (Ukraine) [44, p. 89].

In an important token of recognition, feminine personal nouns were codified in the revised official orthography rules for Ukrainian in 2019. Point 4 of §32 mentions four suffixes for their derivation (-*иц(я)* [-yts(ia)], -*ин(я)* [-yn(ia)], -*к(а)* [-k(a)], and -*ес(а)* [-es(a)]) but indicates derivational models only for their first pair [46]. In 2021, the National Commission for the Standards of Ukrainian published two sets of recommendations regarding the formation of feminine derivatives in diplomacy and medicine, respectively [28, 29]. These official dictums are a watershed moment for the status of feminine personal nouns in Ukrainian, but their real use in text requires much more extensive and rigorous study, especially in the most recent period.

Ukrainian researchers point to the dynamics of feminine nouns in time: new feminine forms appear gradually and unevenly as women enter more professions, take certain offices, and social demand for such forms grows in various domains [48, p. 381]. While the reference to the social landscape is valid, it needs to be added that its cause lies in a system of social inequality reflected in the language.

The dynamic nature of feminine nouns in modern Ukrainian is most vividly represented in their variety, particularly the use of several variant forms obtained from the same derivational basis: *військовичка* [viyskovychka] and *військовиця* [viyskovytsia] (servicewoman); *мовознавиця* [movoznavytsia], *мовознавчиня* [movoznavchynia], and *мовознавка* [movoznavka] (female linguist); *політикеса* [politykesa], *політикиня* [politykynia], *політичка* [politychka], and *політкиня* [politkynia] (female politician), and others. This variability is a testament that the language community is looking for an apt nomination by testing out various derivational models.

Ukrainian linguists disagree on the stylistic range of feminine derivatives. Some hold the radical position that they are superfluous and can only function as colloquialisms [2, pp. 96-97, 103-104], while others postulate that they have a “perceptible colloquial tinge” [36]. These conclusions are often drawn by pure introspection, without thorough studies of feminine nouns in texts of different styles. Similar observations about the dominance of one type of form or other similarly lack reliance on extensive corpus data and risk being biased.

Other linguists argue that Ukrainian feminine personal nouns are characterized by stylistic differentiation. For example, a group of Ukrainian linguists upholds the view that feminine derivatives with the suffixes -*к(а)* [-k(a)] and -*иц(я)* [-yts(ia)] are stylistically neutral (with the exception of occasional, ad hoc, and emotionally colored uses) can be qualified as “conforming to the norms of the literary language” [48, p. 385] and that single-word feminine derivatives can be used in all styles except the formal one [48, p. 388]. Likewise, a number of researchers argue that feminine -*к(а)* [-k(a)] derivatives are perceived as stylistically neutral and are characteristic of not only journalism and colloquial speech but also of professional communication. In contrast, -*иц(я)* [-sh(a)] derivatives are commonly perceived as carrying overtones of disdain and gravitate toward stylistically low registers.

There exists a certain (now generally decreasing) level of resistance to new feminine nouns in Ukrainian society. Various authors attribute it to a bias against them caused by their perception as unusual or ad hoc coinages. Other reasons cited in scholarly publications and voiced by speakers at different fora include their non-codified status (absence in dictionaries); difficulties with deriving the right form (the need to choose from among various devices rather than employing one standard formula as, for example, in German); perception of such nouns as jarring to the ear or aesthetically unappealing; their perception as being offensive (some women find them unacceptable, insisting on the masculine forms to be applied to them); historical reasons (newly coined and not found earlier in the history of the language). Another significant factor, which was often unnoticed or unacknowledged until the Russian

invasion of Ukraine in February 2022, is the influence of Russian. In the Russian language, such forms are generally relegated to the colloquial register and are rejected by the literary norm. This stands in sharp contrast to West Slavic languages, which allow for much wider and more regular formation of such nouns.

To sum up, feminine derivatives appear to be a subsystem in the making in Ukrainian. It is at the stage of formation and experimentation with a plethora of variant forms competing for supremacy. Uncertainty in Ukrainian society and the linguistic community as to the status and stylistic differentiation of these nouns can be greatly reduced if extensive, relevant, and up-to-date corpus data is subjected to thorough analysis.

3. Methods and Materials

We have employed quantitative and qualitative corpus analysis to study the dynamics of Ukrainian feminine personal nouns. Corpus data have been successfully used in broad studies of feminine derivatives, such as research on feminine personal nouns in a Swiss corpus and the German COSMAS II corpus [9], in a large monitoring corpus of Polish [25], and in the corpus of 50 years' worth of textbooks of Dutch as a foreign language [14].

3.1. Corpus selection

The number of Ukrainian corpora is constantly growing, and multiple larger corpora of Ukrainian are now available for research purposes, including some in the range from 1.2 to over 3 billion tokens. All such resources are either web corpora (scraped exclusively from the web, such as [1]) or mixed corpora (for example, the Zvidusil corpus [50] mixes scraped data with some fiction and textbooks). Some of these corpora [45, 50] have not been updated in a long time and do not include the most recent texts. Even more inconveniently, these corpora make it very difficult or even impossible to study language dynamics as they contain little to no metadata on when the texts were written (rather than scraped).

The corpus that best meets our research needs is the General Regionally Annotated Corpus of Ukrainian (GRAC) [32]. In contrast to other Ukrainian corpora, GRAC has the most extensive and detailed metadata and is composed of a great variety of sources and texts. It has recently been updated to version 16, which covers the period from 1816 until 2022, contains over 130,000 texts of various genres written by some 30,000 authors. The overall size of the corpus is nearly 1.9 billion tokens, or 1.5 billion words. The latest version of the corpus contains a significant addition of mass media texts, especially for 2021–2022. Many more media outlets are now covered with some media archives going back 10–15 years. This makes GRAC an indispensable resource for chronological studies. Crucially, GRAC is highly parametrized as all its texts are assigned multiple metadata values. These values can be selected and combined to restrict text types either for a specific search via a web interface or for constructing a subcorpus within GRAC as illustrated in Fig. 1 below.

doc.author	doc.translator	doc.authTrans
doc.born	doc.sex	doc.title
doc.date	doc.source	doc.mediaType
doc.mediaName	doc.locCode	doc.country
doc.macrorregion	doc.region	doc.original
doc.style	doc.branch	doc.thema
doc.genre	doc.publicationCity	doc.publisher
doc.publicationYear	doc.publication	doc.orthography
doc.uri	doc.wordcount	

Figure 1: Types of metadata in GRAC.

As has been noted above, mass media outlets are key to the study of changing trends in word usage. Newspaper and journal publications have been the most frequently used source of information for such studies of Ukrainian female personal nouns. We have decided to conduct our corpus analysis on the material of newspaper texts from 2000 until 2022. To this end, a subcorpus of journalistic texts was built for each year in the period, using the metadata attributes `doc.style=JOU` and `doc.date=[respective year]`. As a result, we constructed 23 subcorpora, from `JOU_2000` to `JOU_2023`, each covering all the newspaper texts in GRAC for a given year. Their sizes increase with time, starting from 2.3 million tokens in 2000, gradually reaching 11.6 million tokens in 2006 after which the rate of growth increased to 5-10 million per year until making a leap in 2022 with 255 million tokens (see Fig. 2).

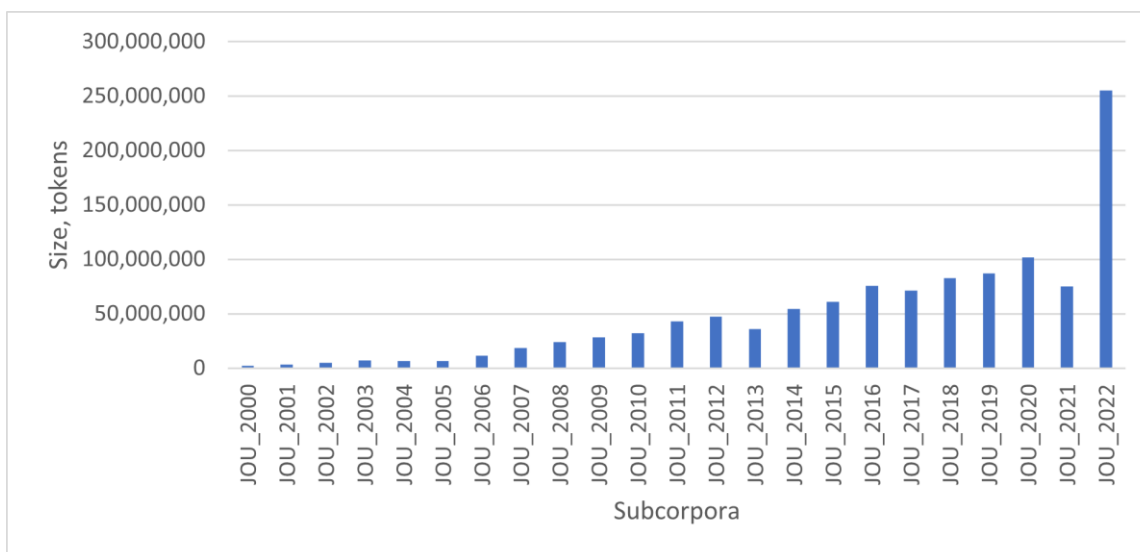


Figure 2: Sizes of the journalism subcorpora in GRAC, 2000–2022.

It is important to understand how GRAC is lemmatized and POS-tagged. GRAC texts are processed using an NLP package specifically designed for handling Ukrainian texts [30]. The key element of the package is the Large Electronic Dictionary of Ukrainian (VESUM) [31]. VESUM is a large morphological dictionary of Ukrainian employed for the analysis and synthesis of Ukrainian morphological data. It contains a rich set of morphological features for more than 415,000 Ukrainian lemmas and includes numerous lexical items not found in similar resources for Ukrainian, such as proper names, abbreviations, alternative spellings, deprecated items, as well as dialectal, archaic, and substandard words [35]. VESUM currently contains more than 5,000 feminine personal nouns, including some items that have come into use only recently and have been drawn directly from texts.

Lemma search in GRAC works for those Ukrainian words that are included in VESUM and are recognized by the dynamic tagging module of the NLP UK package, which handles typical combining forms and hyphenated compound words. All other tokens belong to out-of-vocabulary (OOV) words. They can be searched for using wordform search if the user is interested in a specific wordform. Alternatively, search queries can be constructed with the help of the Corpus Query Language (CQL), including combinations of morphological and semantic tags [34]. CQL queries are flexible and powerful, allowing for the use of regular expressions and making it possible to search for hundreds and thousands of words at once. We have used both lemma searches and CQL queries to search for multiple OOV words that are feminine derivatives.

3.2. Dictionary selection

One of the goals of the present study is to detect and analyze newly formed feminine derivatives in Ukrainian. This requires choosing a departure point in terms of a dictionary. No other lexicographic resource is more suitable for this role than the *Web Dictionary of Ukrainian Feminine Personal Nouns* (WDUF) published in January 2022 on the r2u.org.ua dictionary portal [47]. The compiler used different methods of collecting data, including corpus analysis [39], and laid a solid foundation for the standardization of feminine personal nouns in Ukrainian [40]. WDUF describes a total of 2,000 feminine derivatives, providing variant spellings and other types of information. More than a third of the entries are described for the first time in Ukrainian lexicography [47]. Essentially, the dictionary provides the most comprehensive lexicographic snapshot of Ukrainian feminine personal nouns as of the end of 2021.

By design, WDUF is not aimed at covering all feminine derivatives. Outside of its scope are demonyms (e.g., *княнка* [knyanka] (female resident of Kyiv)), ethnic names (*гуцулка* [hutsulka] (female Hutsul)), kinship terms (*братова* [bratova] (brother's wife)), and diminutive forms (*школярочка* [shkoliarochka] (little schoolgirl)) [39]. In the corpus analysis presented here, we have adopted the same scope as in WDUF with respect to new feminine personal nouns. We have also utilized WDUF's register to construct massive corpus queries as explained below.

4. Experiment

Our corpus analysis of Ukrainian feminine personal nouns pursues several lines of inquiry. The procedure for each of these analyses is described below.

4.1. Establishing a baseline: names of female athletes

Ukrainian feminine personal nouns have been used in the field of sports for a long time now and are included in multiple dictionaries of Ukrainian. It is reasonable to assume that, while subject to some seasonal fluctuations (e.g., in conjunction with high-profile sports events, such as the Olympic Games), the use of these forms can provide a baseline by virtue of established tradition in that feminine forms have been consistently applied to refer to female athletes and masculine forms are not used in this function. We have extracted nouns referring to female athletes from VESUM. The resulting list of 86 items turned out to involve only the feminizing suffixes *-к(а)* [-k(a)] and *-иц(я)* [-yts(ia)], e.g., *баскетболістка* [basketbolistka] (female basketball player), *рекордсменка* [rekordsmenka] (female record holder), *футболістка* [futbolistka] (female soccer player), *юніорка* [yuniorka] (female junior athlete), *веслувальниця* [vesluvalnytsia] (female rower), *лижниця* [lyzhnytsia] (female skier), and *фехтувальниця* [fekhtuvalnytsia] (female fencer). As all of these words were drawn from VESUM, the following CQL lemma query was constructed:

[lemma="акробатка|...|яхтсменка"],

where *акробатка* [akrobatka] (female acrobat) is the first and *яхтсменка* [yakhtsmenka] (yachtswoman) the last lemma, the pipe symbol | functions as the logical OR operator, and the rest of the lemmas from the list go in the place of three dots. This query was then run in each of the journalism subcorpora (JOU_2000 to JOU_2022) we have constructed within GRAC. (This and other massive

CQL queries whose results we report in this paper are made available online [23] rather than included here.) As a result, we obtained both the absolute frequency and relative (per million) frequency for all 86 nouns in each subcorpus. As the subcorpora differ in size, only relative frequencies are eligible for comparison. Relative frequencies were obtained by dividing the absolute frequencies by the size of the corpus in tokens. The results are presented in Figure 3.

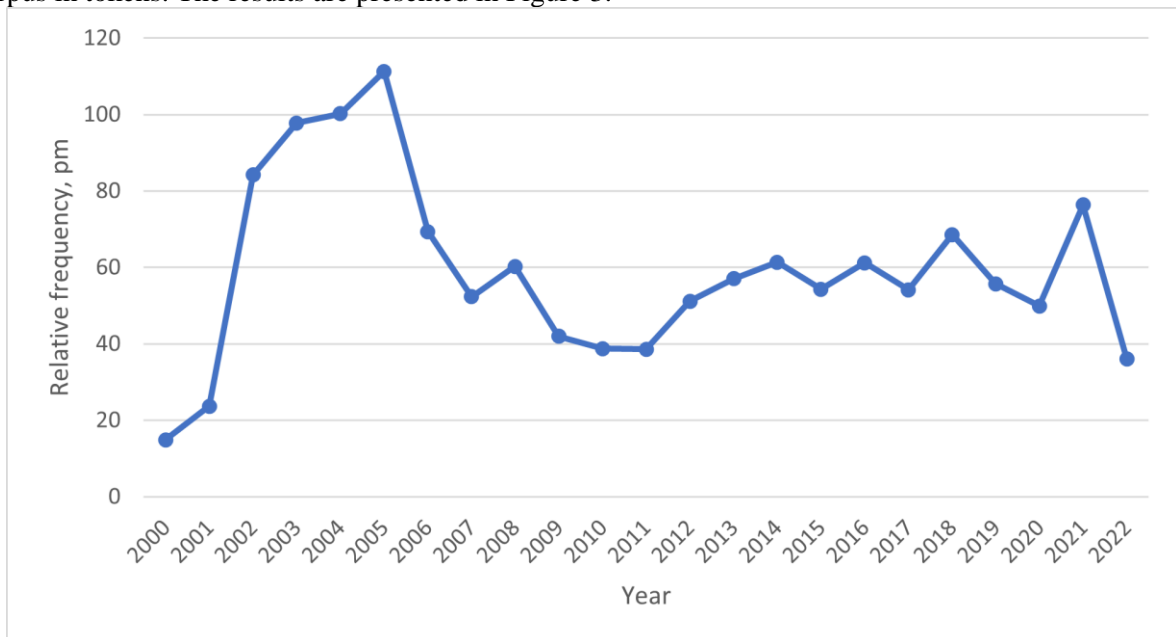


Figure 3: The dynamics of feminine nouns in sports in 2000–2022 in newspaper texts.

As can be seen, the results of corpus analysis confirm the original hypothesis: there are fluctuations but no clear trend, either upward or downward, in the use of nouns referring to women in sports. The sharp decline in the use of feminine derivatives in 2006 after several years of steady rise requires a separate investigation, but it can be surmised that this is partly due to the proliferation of specialized sports websites and other venues for publishing sports results, which inclined the editorial offices of general newspapers and journals to reduce sports reportage. Another possible contributing factor has to do with the subcorpus size: JOU-2006 is significantly bigger than JOU-2005 (11.6 to 6.4 million tokens) and later subcorpora continue to grow. Thus, the proportion of sports news could be diluted in the greater amount of overall text.

The significant differential in the early 2000s suggests that the subcorpora JOU_2000 (2.4 million tokens) and JOU_2001 (3.4 million tokens) may lack representativeness as compared to JOU_2002 to JOU_2005 (5-6.8 million tokens).

While analyzing GRAC texts, we discovered a handful of feminine derivatives referring to sports that are not listed in VESUM, e.g., *спортівка* [sportovka] (female athlete) and *півзахисниця* [pivzakhysnytsia] (female halfback). Their frequencies are much lower than those of established feminine nouns and do not affect the general picture as described above.

Thus, the dynamics of feminine personal nouns in the domain of sports serve as a useful baseline. Owing to the established position of these items in the lexicon, their use does not exhibit a clearly defined rising or falling tendency, instead fluctuating due to various factors.

4.2. Analysis of occupational titles

Occupational titles are an important segment of feminine derivatives in Ukrainian, and their use has been on the rise in recent years, as suggested by personal observations, reports in academic literature, and discussions in Ukrainian society. We have extracted feminine occupational titles from WDUF, a total of 744 words. More than 500 of them are listed in VESUM and have been combined to form one CQL lemma query similar to the one described above. The rest had to be treated as OOVs, so we specified endings for each word using regular expressions, for example

афазіологин(я|і|ю|єю|ь|ям|ями|ях)
полісмен(ка|ки|ці|ку|кою|ок|кам|ками|ках),

where the first regular expression searches for all inflected forms of *афазіологиня* [afaziolohynia] (female aphasiologist) and the second one, for all the forms of *полісменка* [polismenka] (policewoman). These expressions were then combined using the pipe symbol |. For some feminine derivatives that appear in multiple compound nouns and vary in spelling, regular expressions of the following type were added to the query:

.*міністерк.*|. *міністерок.*

This regular expression searches for any noun that includes the lemma *міністерка* [ministerka] (female minister), e.g., *віцепрем'єр-міністерка* [vitseprem'yer-ministerka] and *віце-прем'єр-міністерка* [vitse-prem'yer-ministerka] (female prime minister).

These two CQL queries were then combined into one and relative frequencies per year were obtained for the entire list of occupational titles under study. We were also interested in the number of different lemmas used in each subcorpus. Concordance results in GRAC were automatically sorted after which the lemma count was performed manually. The results are presented in section 5 below.

4.3. Analysis of war-related feminine personal nouns

To study war-related feminine derivatives, we have extracted them from WDUF and VESUM, e.g., *бійчиня* [biychynia] (female combatant), *ветеранка* [veteranka] (female veteran), *військовослужбовиця* [viyskovosluzhbovytsia] (servicewoman), *волонтерка* [volonterka] (female volunteer), *зв'язкова* [zv'yazkova] (female communications officer), *парамедикиня* [paramedykynia] (female paramedic), *полковниця* [polkovnytsia] (female colonel), and *снайперка* [snayperka] (markswoman). Moreover, we added those new items that have been discovered in GRAC, e.g., *жінка-бойовик* [zhinka-boyovyk] (female combatant), *військова-контрактниця* [viyskova-kontraktnytsia] (female contract servicewoman), *демінерка* [deminerka] (female deminer), and *диверсантка* [dyversantka] (female saboteur). A total of 124 lemmas were searched using one CQL wordform query constructed in the fashion described above.

4.4. Specific cases

A separate line of inquiry included an analysis of specific cases. We have selected four productive derivational models and traced their frequency over time. Two models involve specific feminine derivatives, viz., *президентка* [prezydentka] (female president) and *міністерка* [ministerka] (female minister). The CQL query [word=".*президентк.*|. *президенток"] and the simple query . *міністерк.* were utilized, respectively, to search for any nouns that contain these components. A separate search was performed with the CQL query [word=".*знавиц(я|і|ю|єю|ь|ям|цями|цях)"] to find all instances of feminine forms derived from the masculine one ending in *-знавець* [-znavets] (male -logist), e.g., *релігієзнавиця* [relihiyeznavytsia] (female religious studies scholar) and *мистецтвознавиця* [mystetstvoznavytsia] (female art critic). A CQL word query was also employed to search for all instances of words ending in *-логиня* [-lohynia] (female -logist) formed using a productive model, e.g., *рентгенологиня* [renthenolohynia] (female roentgenologist) and *мікробіологиня* [mikrobiolohynia] (female microbiologist). The number of different lemmas of this type was then calculated for each year. The outcomes of these analyses are presented and discussed below.

4.5. Searching for new feminine derivatives

One of our goals in this study is to discover and describe new feminine personal nouns that have not made their way into Ukrainian dictionaries of any kind. The starting point for this analysis is, again, provided by the two dictionaries we rely on: WDUF and VESUM. Words written in Ukrainian letters but not lemmatized in GRAC by VESUM and its dynamic complement receive the POS tag "unknown". A list of such tokens has been automatically generated and downloaded from GRAC. We then used

regular expressions to filter out tokens that do not fit any of the derivational models for feminine personal nouns [39]. This was followed by manual inspection and extraction of lexical items of interest from the remaining list and their verification in the corpus to make sure that they are indeed used in reference to women. As a result of this semi-automatic approach, more than 2,000 feminine derivatives have been detected. They are analyzed in section 5.4.

5. Results

Using the approach described above, we have obtained results that are presented below in the respective subsections.

5.1. Feminine occupational titles in GRAC

The dynamics of the frequency with which feminine occupational titles appear in journalistic texts in GRAC are presented in Figure 4 below.

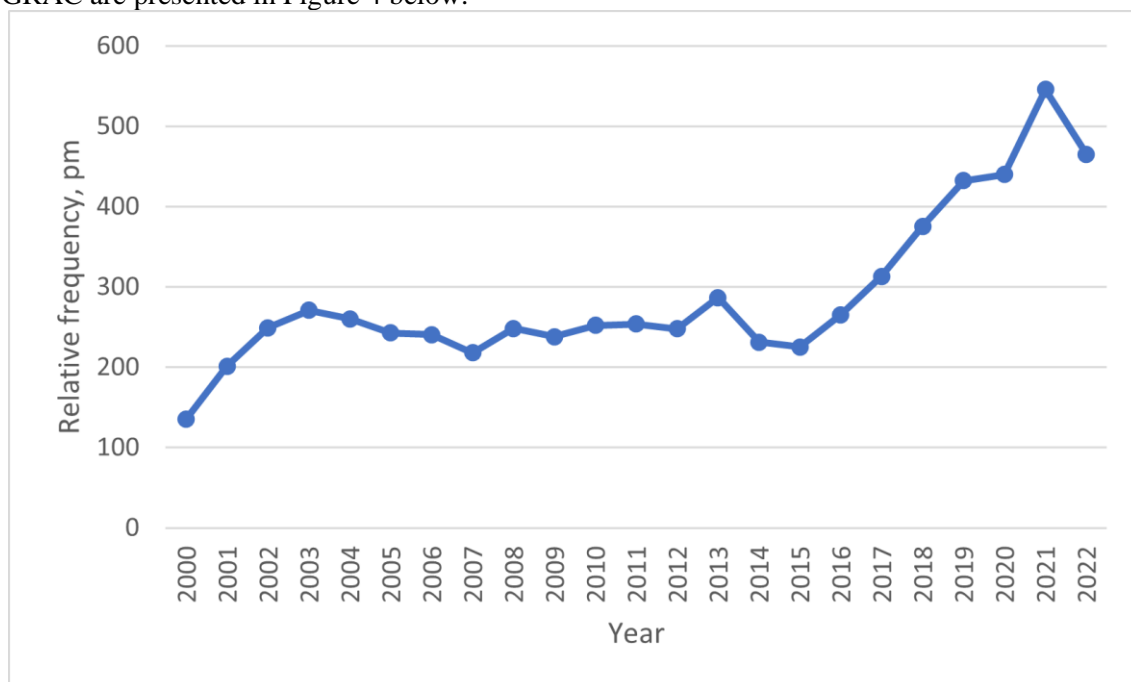


Figure 4: Dynamics of 744 feminine occupational titles in newspaper texts in GRAC.

The lexical items in question were used with little fluctuations until 2015, after which they started rapidly gaining popularity. Each year, with the exception of 2020 and 2022, their relative frequency increased by 15-24 percent. There is a clearly defined upward tendency, starting from 2015-2016.

For the purposes of better understanding how feminine personal nouns are used, it is crucial to look not only at relative frequencies but also at the variety, i.e., the number of different lemmas used. These results can be seen in Figure 5 below.

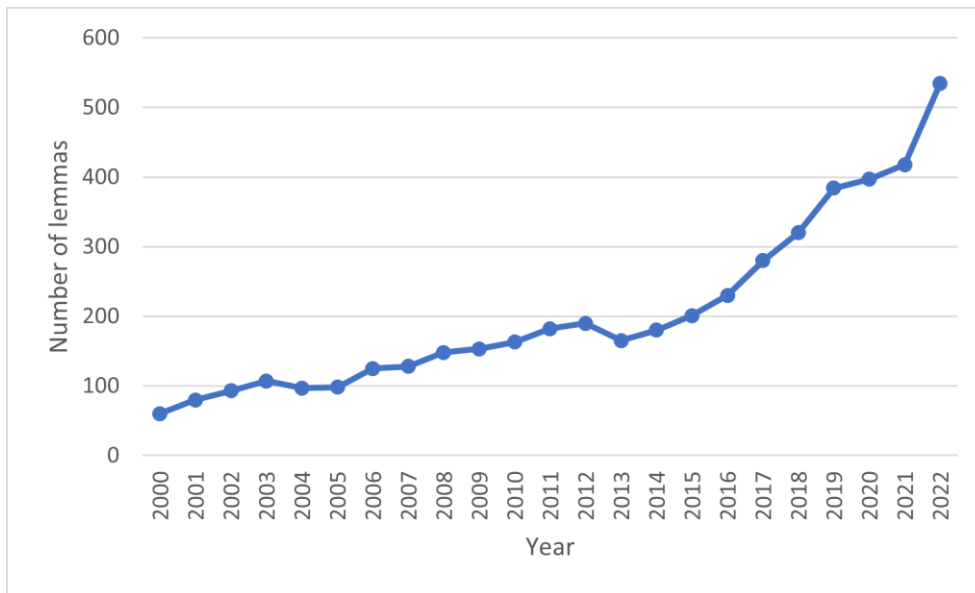


Figure 5: Lemma variety among women's occupational titles.

A steady increase in variety is again observed starting around 2014. Over the period of 2015–2019, the lemma count grew by 12 to 22 percent each year. Then, after a two-year essential plateau, it exploded in 2022, reaching 535 different lemmas for that year.

As can be observed from the two charts above there were two impulses that propelled the widespread use of the lexical units in question. The first one, in 2014–2015, was when the Revolution of Dignity happened in Ukraine and was followed by Russia's military invasion. The second one, most clearly manifested in the lemma variety, occurred in 2022 when Russia's invasion turned into a full-scale war against Ukraine.

5.2. Dynamics of war-related feminine derivatives in GRAC

The same but perhaps even more pronounced dynamics are characteristic of war-relative feminine nouns. Figure 6 demonstrates that the first spike occurred in 2014. After three years, probably due to reduced media coverage, a steep decline took place. In 2022, when Russia launched a massive military attack on all of Ukraine, the war was again (and even more so) the focus of attention in the mass media.

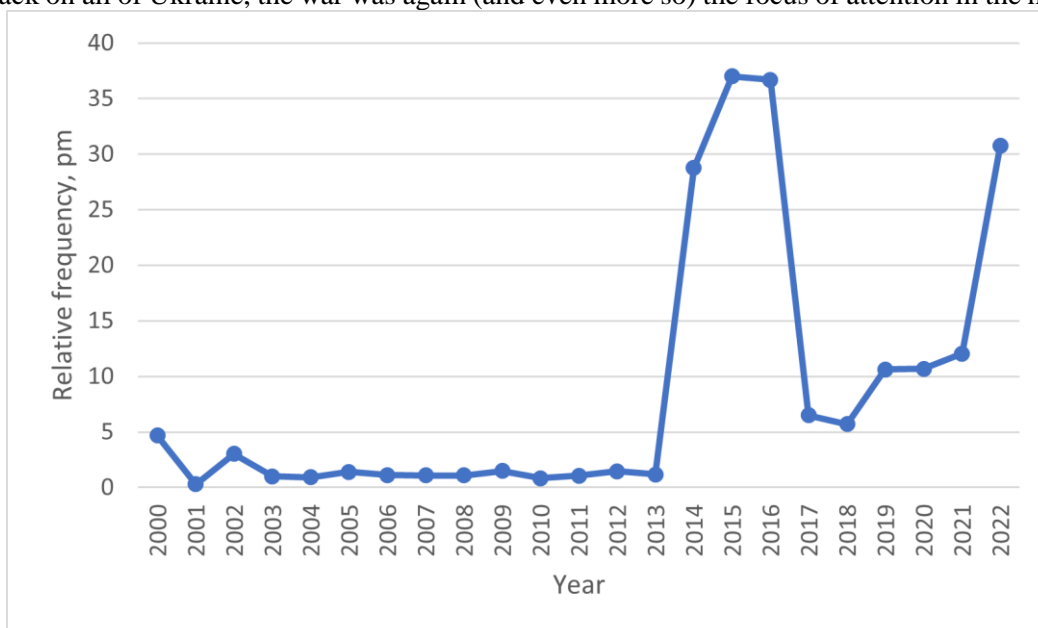


Figure 6: Dynamics of 124 war-related feminine derivatives in GRAC.

The fact that the relative frequency did not exceed the top recorded levels can be attributed to a much bigger size (and greater textual variety) of the JOU_2022 subcorpus (255 million tokens) in comparison to JOU_2015 (61 million tokens) and JOU_2016 (76 million tokens).

5.3. Dynamics of selected specific cases in GRAC

In this part of our study, we are interested to see how the use of individual feminine derivatives or specific derivational models has changed over time. The chart in Figure 7 illustrates that until 2016 the occurrence of *президентка* [prezydentka] (female president) in newspaper texts was minimal (less than 10, often one or zero occurrences per year). Its relative frequency jumped up in 2016 and then increased exponentially since 2018, reaching the absolute frequencies of 1,260 in the JOU_2021 subcorpus and 4,664 in JOU_2022. An inspection of contexts shows that these uses are by no means colloquial. Rather, journalists use this feminine form as a standard, neutral reference to female presidents and vice presidents.

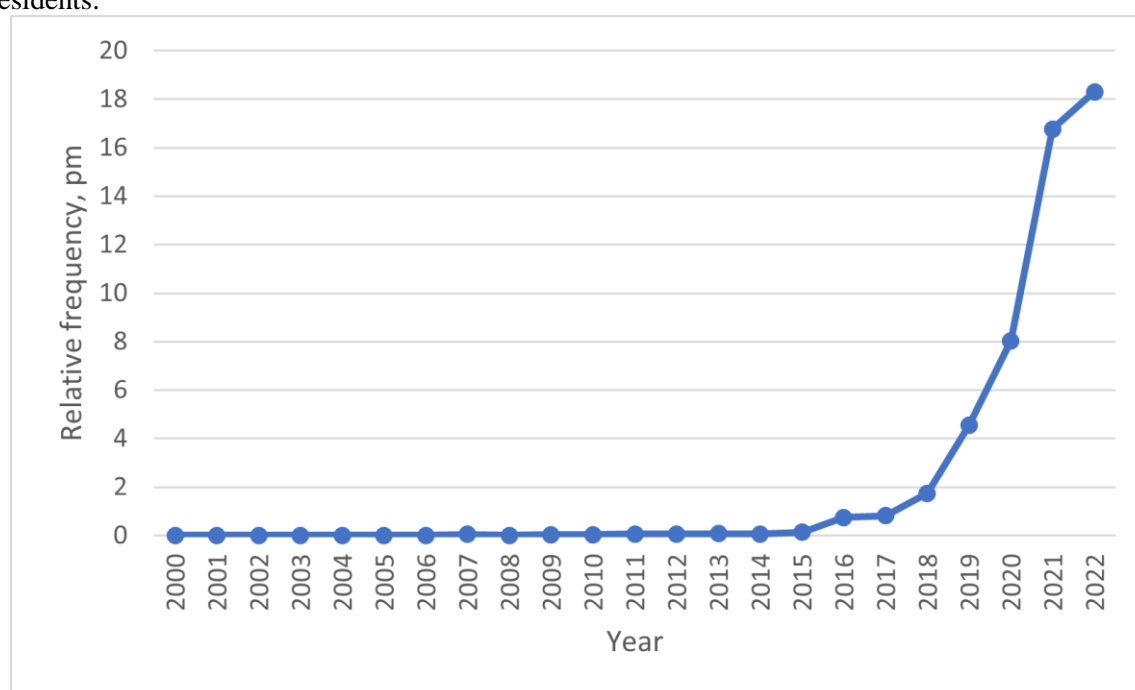


Figure 7: The use of *президентка* [prezydentka] (female president) in GRAC.

Undoubtedly, a major external factor spurring the use of the feminine form for president in Ukrainian has been an increased representation of women in the presidential offices over the past eight years: Dalia Grybauskaitė, Kersti Kaljulaid, Salome Zourabichvili, Zuzana Čaputová, Ursula von der Leyen, Kolinda Grabar-Kitarović, Park Geun-hye, to name just the most high-profile figures. However, each designation in text represents a conscious choice on the part of the author. Our analysis of contexts and Figure 7 both show that writers chose to apply the masculine form to female presidents, almost with no exceptions, until 2016, after which the situation began to change. One prominent case in point is Dalia Grybauskaitė, who was President of Lithuania in 2009-2019 and has been featured prominently in the Ukrainian mass media. In 2009-2015, Ukrainian journalists referred to her as *президент* [prezydent] (president) 804 times and as *президентка* [prezydentka] (female president) a mere three times, according to GRAC data. The latter form began to be applied to her with increasing frequency starting from 2017. The state of equilibrium was reached in 2020, after which, in 2021-2022, the relation between the masculine and feminine forms, now often prefixed with *екс-* [-eks] ‘ex-’, was the opposite: 21 to 86.

To further illustrate the point about a conscious decision involved in choosing between masculine and feminine terms, let us consider an individual case. Oleksandra Koval, a public figure, was the

president of the NGO “BookForum” and organizer of Ukraine’s largest book festival in Lviv in 1995-2018. Since 2018, she has been the director of the state-run Ukrainian Book Institute.

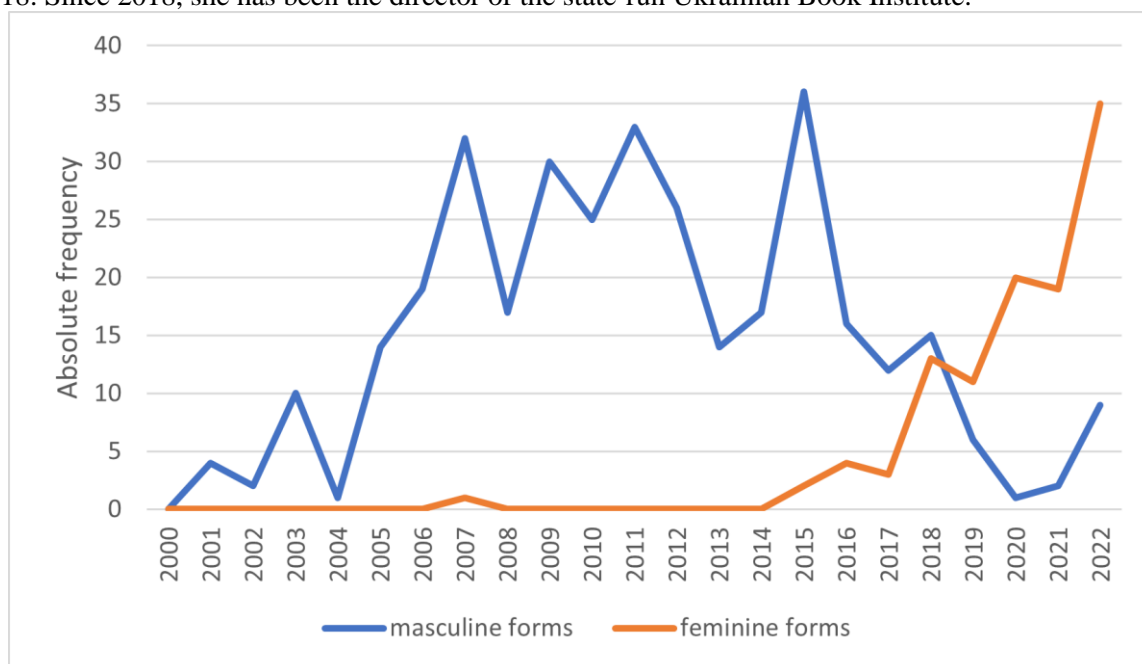


Figure 8: Masculine and feminine forms referring to Oleksandra Koval in GRAC’s newspaper texts.

Oleksandra Koval’s name appears consistently in GRAC in 2005-2022, and she is described as a president, director, organizer, founder, and leader. We have pooled together the masculine and feminine Ukrainian forms of these words when used in reference to her (except for *голова* [holova] (head), which is a noun of common gender) and plotted their cumulative frequencies by year (Fig.8). To this end, we executed the CQL search query [lemma="Олександр"][lemma="Коваль"], which found all mentions of Oleksandra Koval in GRAC’s newspaper texts, and then performed manual inspection and frequency count. Figure 8 shows the overwhelming prevalence of the masculine forms in 2001-2017, the almost complete absence of feminine forms until 2014, their rise since 2015, the state of near equilibrium in 2018, and the sharply diverging trends in 2019-2022 with unequivocal domination of the feminine designations.

A similar situation to that of *президентка* [prezydentka] (female president) can be observed with the use of *міністерка* [ministerka] (female minister) as a separate word or part of a compound noun. Its relative frequency is close to zero until 2017 (not shown before 2013 in Fig. 9) and is then followed by uneven growth (likely due to different numbers of women occupying key ministerial offices) until more than tripling and reaching 47.14 pm in 2022. The JOU_2022 subcorpus contains 12,016 occurrences of this feminine derivative, which has become a standard designation for a woman in this role in Ukrainian journalistic discourse. Noteworthy, this coincides in time with the beginning of Russia’s full-fledged war against Ukraine, even though the word itself belongs more to the political rather than war domain.

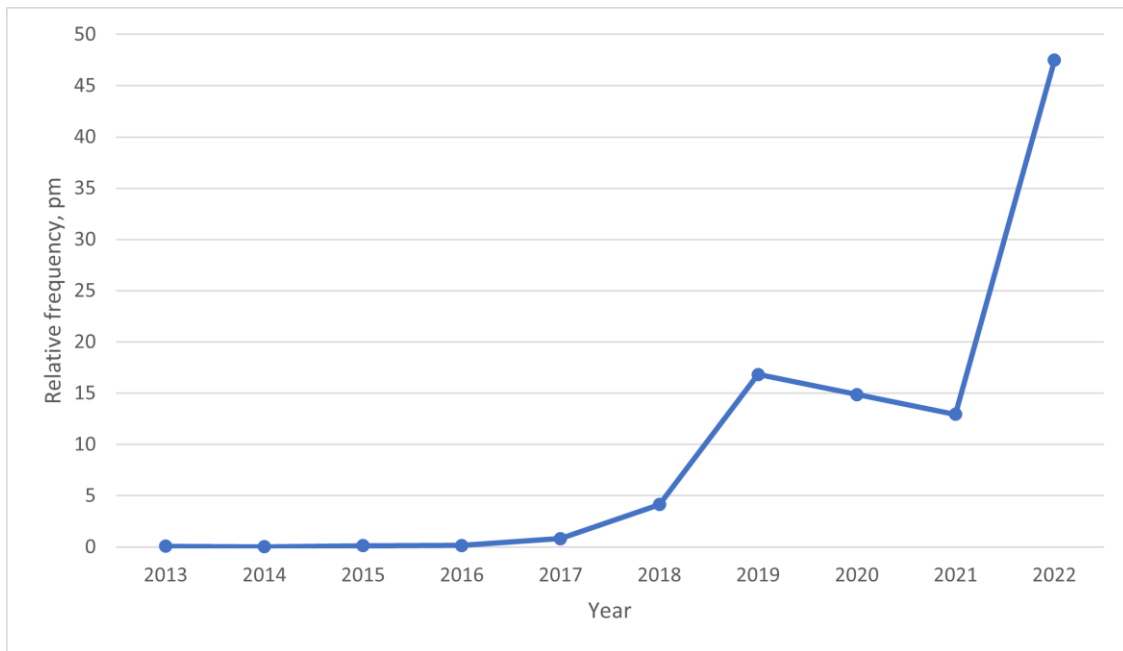


Figure 9: The use of *міністерка* [ministerka] (female minister) in GRAC.

The productive derivational model *-знавець* [-znavets] (male -logist) > *-знавиця* [-znavytsia] (female -logist) exhibits little to no temporal dynamics until 2015 after which its relative frequency began to rapidly increase every year in the period 2015-2018 (adding 60-300% annually), plateauing in 2019, and then continuing to grow in 2020-2021 (Fig. 10). The drop in 2022 can be attributed to the fact that the JOU_2022 subcorpus includes a greater number of regional and local newspapers that tend to write less about scholars than national mass media outlets. However, the derivatives in question reach the relative frequency of 2.01 pm in JOU_2022(select), a subcorpus composed of the same media as JOU_2021. The Russian war against Ukraine did not boost the overall trend for this model as the attention of society shifted to the war and away from academic endeavors.

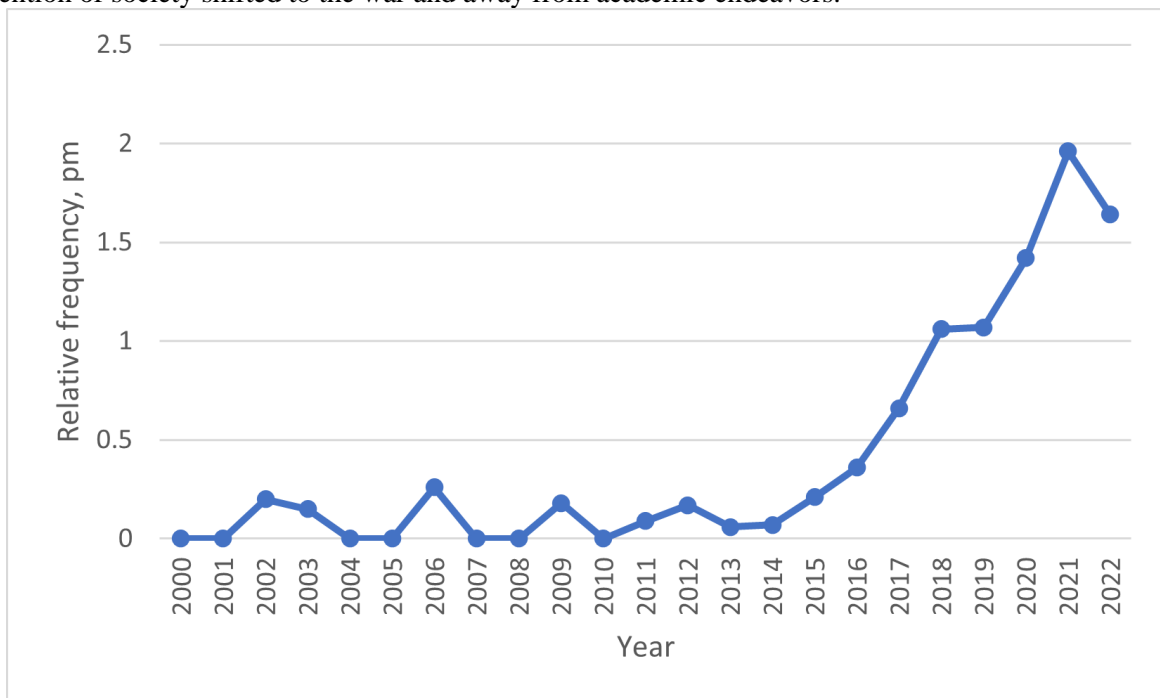


Figure 10: The use of feminine derivatives ending in *-знавиця* [-znavytsia] (female -logist) in GRAC.

Another productive Ukrainian feminizing model -лог [-loh] (male -logist) > -логиня [-lohynia] (female -logist) was little used in 2000-2017 with absolute frequencies ranging between 0-7 per year. However, starting from 2017, its popularity rose exponentially before plateauing in 2022 (Fig. 11).

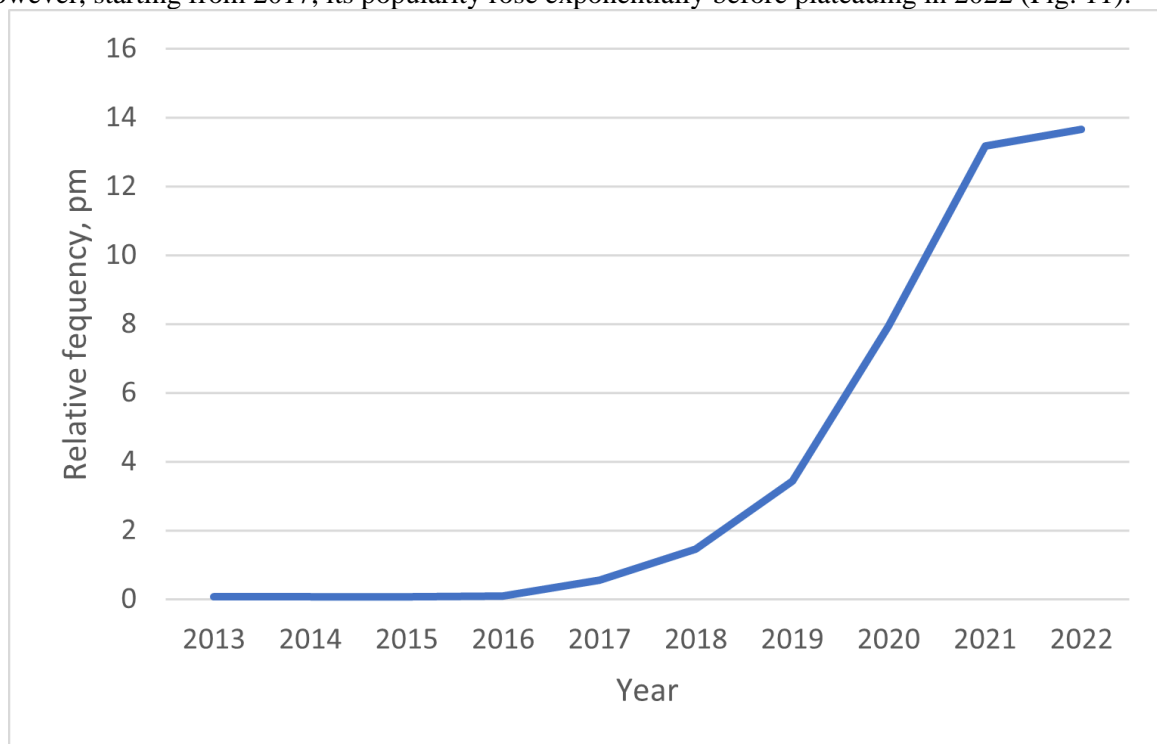


Figure 11: The use of feminine derivatives ending in -логиня [-lohynia] (female -logist) in GRAC.

We constructed the CQL query [word="*.логин(я|і|ю|е|є|ь|ям|ях)"] to find both lemmatized and unlemmatized words with the suffix in question. Remarkably, the absolute frequency of such derivatives for 2022 is slightly less than 3,500, and the lemma variety increases from 2-5 in 2013-2016 to 80 in 2020 and 135 in 2022. This is a testament to Ukrainian authors' adoption and active use of this productive model as a standard/neutral reference to women in science and other domains. Here are two typical examples of how such feminine forms are used: *Ідеологиня і директорка фестивалю – кінопродюсерка Євгенія Кригсхайм*. [Ideolohynia i dyrektorka festyvaliu – kinoprodiuserka Yevheniya Krihskhaim.] (Film producer Evgeniya Kriegsheim is the ideologist and director of the film festival.) (*Ukrainian Week*, 2022); *Дієтологиня та модель Мей Маск прийшла у Нью-Йорку на показ фільму "Освідчення"*. Вона, як завжди, обрала для себе вбрання від українського бренду Gasanova. [Diyetolohynia ta model Mei Mask pryishla u Niu-Yorku na pokaz filmu "Osvidchennia". Vona, yak zavzhdy, obrala dlia sebe vbrannia vid ukrayinskoho brendu Gasanova.] (Maye Musk, a model and dietitian, came to the screening of the movie *Proposal* in New York. As always, she chose to wear a dress by the Ukrainian brand Gasanova.) (*Channel 24*, 2022). Numerous similar examples can be easily retrieved from GRAC using the CQL query provided above.

5.4. New feminine personal nouns in GRAC

Employing the semi-automatic method described in section 4.5, we have identified over 2,000 new feminine derivatives in the entire GRAC corpus. While a detailed analysis of these findings is outside the scope of the present study, we will focus on several aspects that are of immediate interest.

First, certain conclusions can be drawn about the power of feminizing derivational models. We have analyzed six models and presented them below in the order of their productivity among new derivatives found in GRAC. The numbers show how many different new lemmas of each type have been detected GRAC:

913 with -ка [-ka], e.g., *інтровертка* [introvertka] (female introvert), *сценографка* [stsenohrafka] (female scenographer)

- 868 with *-иця* [-ytsia], e.g., *мінометниця* [minometnytsia] (female mortar gunner), *дешифрувальниця* [deshyfrualnytsia] (female codebreaker)
- 202 with *-иня* [-ynia], e.g., *ембріологиня* [embriolohynia] (female embryologist), *статисти́киня* [statystykynia] (female statistician)
- 68 with *-иха* [-ykha], e.g., *вождиха* [vozhdykha] (female chieftain), *воєводи́ха* [voyevodykha] (wife of a voivode)
- 50 with *-уса* [-ysa] or *-еса* [-esa], e.g., *арбі́треса* [arbitresa] (female referee), *лектри́са* [lektrysa] (female lector).

This ranking aligns well with the one obtained for feminine personal nouns in VESUM [39], which shows that the most productive models continue to be utilized to form new derivatives. However, there is one significant difference: the suffix *-иц(я)* is employed much more actively now. With 868 new coinages, its productiveness almost matches that of *-ка*, which is generally acknowledged to be the most productive feminizing suffix in Ukrainian and appears 2.23 times more frequently than *-иц(я)* among the 5,000+ feminine derivatives recorded in VESUM.

Our analysis of new feminine nouns has revealed a significant proliferation of derivational variants: speakers use different suffixes to construct multiple feminine derivatives from the same masculine form. This kind of overabundance and competition is natural for a nascent part of the lexicon that is just taking shape and shows that the speakers are actively searching for the best ways to express the concepts that require verbalization. Here are just a few illustrative examples of competing feminine derivatives arranged in the descending order of absolute frequency:

female voter — *виборчиня* [vyborchynia], *виборниця* [vybornytsia], *виборчи́ця* [vyborchytsia], *вибори́щиця* [vyborshchytsia]

female volunteer — *доброволі́ця* [dobrovolysia], *доброволка* [dobrovolka], *добровольни́ця* [dobrovolnytsia], *доброві́льниця* [dobrovilnytsia]

female) art critic — *мистецтвозна́виця* [mystetstvoznavytsia], *мистецтвозна́вчиня* [mystetstvoznavchynia], *мистецтвозна́вка* [mystetstvoznavka].

However, not all competing variants are created equal. Some of them are neutral and have a higher frequency, while others tend to be used with disapproval, disdain, or as unceremonious or colloquial denominations. For example, we have ascertained that a fairly large group of new feminine derivatives ending in *-ичка/-ічка* are used derisively or have colloquial flavor, e.g., *агно́стичка* [ahnostychka] (female agnostic), *бомжичка* [bomzhychka] (homeless woman), *кадрови́чка* [kadrovychka] (female HR specialist), and *мара́зматичка* [marazmatychka] (female dotard). For example, *Коли про цей інцидент пішов розголос, компанія, яка пред'являє такі дискримінаційні корпоративні вимоги, попросила пробачення за поведінку своєї «кадровички».* [Koly pro tsey intsydent pishov rozholos, kompaniya, yaka pred'yavliaye taki dyskryminatsiyni korporativni vymohy, poprosyla probachennia za povedinku svoeyi «kadrovychky».] (When the word about the incident spread, the company that made such discriminating corporate demands apologized for the conduct of its (female) HR manager). (Vysokyi Zamok, 2021)

The likely cause is that a number of similar derivatives are already established in colloquial speech and often appear in contexts when the speaker conveys an unceremonious or disrespectful attitude. Examples include names of female school subject teachers and disease-based or addiction-related designations, such as *фі́зичка* [fyzychka] (female physics teacher), *алкоголі́чка* [alkoholichka] (female alcoholic), and *паралі́тичка* [paralitychka] (female paralytic). For example, *І все лише через те, що одному подобалася в школі “фізичка”, а іншому – вчителька літератури.* [I vse lyshe cherez te, shcho odnomu podobalasia v shkoli “fyzychka”, a inshomu – vchytelka literatury.] (And all of this happens because one liked the female physics teacher at school, while another one liked the female literature teacher.) (Vysokyi Zamok, 2001) *Здоровий тридцятилітній мужик, який свого часу займався пошуками себе, однак залетів через дурачі в тюрюгу і зараз сидить на ший у своєї матері діабетички.* [Zdorovyy trydtsiatylitniy muzhyk, yakyy svoho chasu zaymavsia poshukamy sebe, odnak zaletiv cherez duroshchi v tiuriahu i zaraz sydyt na shyi u svoeyi materi diabetychky.] (A 30-year-old chap who once searched for his true self but foolishly ended up in the clink and is now sponging off his mother.) (Artem Chekh, *Anatomichnyi atlas. Vazhko buty zhaboiu*, 2007) Sensing these overtones, speakers resort to other suffixes to form neutral-sounding derivatives, e.g., *фі́зикиня* [fyzykynia], *фі́зиця* [fyzysia], or *жі́нка-фі́зик* [zhinka-fyzyk] (female physicist): *Нагадаємо, у Массачусетському технологічному інституті відкрили безкоштовну програму для учнів з*

України у пам'ять про математикиню Юлію Здановську, яка загинула під час обстрілів Харкова. [Nahadayemo, u Massachusettskomu tekhnolohichnomu instytuti vidkryly bezkoshtovnu prohramu dlia uchniv z Ukrainy u pamiat pro matematykyniu Yuliyu Zdanovsku, yaka zahynula pid chas obstriliv Kharkova.] (MIT has launched a free program for students from Ukraine in memory of the mathematician Yulia Zdanovska, who was killed during the shelling of Kharkiv.) (*Ukrainska Pravda*, 2022)

GRAC provides evidence that some of such recent derivatives have already eclipsed the colloquial forms in terms of frequency, while others are still vying for supremacy. Table 1 provides a summary of three such cases.

Table 1

Absolute frequencies of selected competing feminine derivatives in GRAC

female analyst	female historian	female mathematician
<i>аналітикиня</i> [analitykynia] 428	<i>історикиня</i> [istorykynia] 373	<i>математичка</i> [matematychka] 172*
<i>жінка-аналітик</i> [zhinka-analytyk] 3	<i>історичка</i> [istorychka] 34*	<i>математикиня</i> [matematykynia] 88
<i>аналітичка</i> [analitychka] 2	<i>жінка-історик</i> [zhinka-istoryk] 11	<i>жінка-математик</i> [zhinka-matematyk] 22
<i>аналітиця</i> [analitytsia] 0	<i>істориня</i> [istorynia] 0	<i>математиця</i> [matematytsia] 0
	<i>істориця</i> [istorytsia] 0	

The asterisked forms in Table 1 refer exclusively to teachers of the respective subjects (history and mathematics), while the derivatives with the suffix *-ин(я)* [-yn(ia)] are used, as contextual analysis shows, as neutral references to female scientists/scholars. Notably, these single-word derivatives surpass the more conservative compound nouns with the first element *жінка-* [zhinka-] (woman-) followed by a masculine form. The zero-frequency forms occur in some Ukrainian texts published online but are not recorded in GRAC.

6. Discussion

Ukrainian scholars previously pointed out that the introduction of new feminine forms has been gradual and uneven. To our knowledge, ours is the first wide-ranging corpus-based study of Ukrainian feminine derivatives and their temporal dynamics. We have shown that the frequency of feminine forms firmly established in the Ukrainian language, such as the names of female athletes, has fluctuated in 2000–2022, likely due to a number of factors (such as large sports competitions), but has not exhibited a clear directional tendency. A handful of new feminine forms have been added to this part of the lexicon, but in general the agency of women in sports have long been recognized, so the overall picture here is that of relative stability. This lexical group provides us with a useful baseline for the purposes of comparison.

We have studied several large groups of feminine personal nouns and built plots based on relative frequencies to account for the fact the volume of newspaper texts in GRAC varies from year to year. Converging data from the plots presented above convincingly show a significant shift in the adoption of feminine forms, after which their share in Ukrainian journalistic discourse has grown. GRAC includes texts from a variety of mass media outlets, so the observed effect cannot be attributed to one or several periodicals supposedly changing their editorial policy approximately at the same time.

The largest group of feminine derivatives we have studied includes more than 700 occupational titles. In a sharp contrast to the baseline described above, its overall relative frequency in newspaper texts manifests a steady upward trend starting from 2015-2016. The lemma variety in this group began growing around the same time until making a 128-percent leap in 2022. The two deflection points coincide in time with major events in Ukrainian society and are likely caused by them, at least partially: the Revolution of Dignity followed by Russia's military invasion and Russia's full-fledged war against Ukraine.

That these changes were not accidental is further proved by the designations of female presidents and ministers, as well as two feminizing derivational models corresponding to the English *-logist*. In all of these cases, the deflection points in the relative frequency curves occur around 2015-2017, and the

upward trend generally continues, with few deviations, until 2022. One of the contributing factors here is the continuously growing number of women in prominent offices and in Ukrainian politics.

The dynamics of war-related feminine derivatives has two peaks, in 2014-2016 and in 2022, clearly corresponding to Russia's military actions against Ukraine and their extensive coverage in the Ukrainian mass media. When media coverage of the topic decreased in 2017-2018, the frequency curve sank. According to recently published data, the number of women in Ukraine's Armed Forces has increased by the factor of 2.5 since 2014. In 2022, there are seven times more female officers in the army, and many more women have joined the ranks of volunteers and paramedics. Thus, the increased agency of women in this sphere and a societal demand for media coverage of their activities, coupled with external factors (Russian aggression), have led to much wider use of feminine derivatives in the war domain and the proliferation of new designations for women.

There has been considerable debate among Ukrainian linguists as to the stylistic range of feminine personal nouns. We have found that they are most frequently used as neutral lexical items in journalism discourse. While newspaper texts can and do contain colloquialisms, the sheer frequency of feminine personal nouns, their growing and enthusiastic adoption by mass media outlets, especially in the past 5-7 years, and the context of their use (upon close-up inspection) convincingly show that the majority of these lexical items are neutral designations. For example, the feminine occupational titles we selected for analysis occur a total of 118,000 times in 2022 alone (465 pm, JOU_2022 subcorpus). The derivatives referring to female presidents and ministers are widely used in reportage, interviews, and other news reports where colloquial forms would be unacceptable.

At the same time, certain feminine personal nouns are clearly non-neutral. These include a sizable group of nouns ending in *-ичка/-ічка* [-ychka/-ichka], as well as individual derivatives that compete with the dominant neutral forms derived from the same basis. A narrow focus on this group of colloquialisms may lead to the erroneous perception that all Ukrainian feminine derivatives are colloquial or emotionally colored. A wider inspection of feminine nouns in the GRAC corpus shows that such derivatives are in the minority.

We have identified multiple cases of competing feminine lexical items in which one form, typically the most frequent one, is neutral, while others, including some colloquial and disparaging terms, are used much more rarely. Stylistic differentiation occurs precisely at the level of such clusters of competing derivatives.

The number of new Ukrainian feminine derivatives we have identified in the GRAC corpus is comparable to the register of a recent dictionary (WDUF) [40]. However, not all of them are felicitous coinages, and some compete with each other, as explained above. We have also established that the most productive feminizing suffixes (*-к(а)* [-k(a)], *-иц(я)* [-yts(ia)], and *-иця* [-yn(ia)]) continue to be actively used, while the least productive ones generate only a small proportion of new derivatives. These findings largely agree with the recommendations put forward in both official documents [28, 29, 46] and research publications that positively view the potential of feminine derivatives [48]. At the same time, a more detailed investigation into derivational models is needed.

7. Conclusions

The widespread adoption and proliferation of feminine personal nouns is one of the most significant changes in the Ukrainian lexicon over the past decade. The vast majority of these lexical items are used as neutral designations, while a relatively small number of such forms are colloquial or emotionally colored.

Feminine derivatives are not artificial coinages but a response of the language to the increasing agency of women in certain domains. While the feminizing derivational models are well-established in the Ukrainian language and have been in use for centuries, their much more active application over the past decade is caused by societal demands and has been enhanced by major events (a revolution and a war) that have shaken up Ukrainian society, urging it to recognize the growing role of women and the challenges they face in present conditions.

In addition to these disruptive events, there are factors that exert steady influence on the adoption of feminine personal nouns. First, the role of women in politics, armed forces, and professional domains has been expanding in Ukraine. The second factor is the increasing gender sensitivity of Ukrainian mass

media outlets and wider media coverage of women in the professional sphere, politics, armed forces, and other domains. The third contributing factor is the activities of human rights organizations and the women's movement and their growing media presence in Ukraine. A combination of the disruptive and continuous factors is responsible for the significant — indeed, unprecedented — upward dynamics of feminine personal nouns in Ukrainian journalistic discourse over the last 7-8 years.

The present study has shown the growing adoption of feminine personal nouns in Ukrainian journalism. An important research question, not addressed here, is the changing relation between these and masculine forms applied to women. Further corpus-based studies of Ukrainian feminine derivatives are needed to analyze the dynamics of other thematic groups and in other genres and provide more detailed answers to the questions about their stylistic range.

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