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A REASSESSMENT OF THE ADAPTATION OF WEST OLD TURKIC LOANWORDS IN HUNGARIAN: NEW FINDINGS AND PERSPECTIVES

Abstract. The adaptation of West Old Turkic (WOT) loanwords into Hungarian is reevaluated in this work, with an emphasis on phonetic and phonological changes that occur during borrowing and the adaptation processes. Building on the previous work that measured phonetic distances using an improved Levenshtein distance algorithm, this study includes dataset adjustments and theoretical understanding of the different processes of borrowing and adaptation. The study separates the more significant rule-based phonological adaptations that have been seen throughout time from the more subtle phonetic changes that occurred during the initial borrowing stage. These results demonstrate the systematic phonological tendencies of L1 in absorbing foreign lexical items, illustrating the interaction between contact dynamics and language evolution. Additionally, the study reveals recurrent patterns of adaptation and the alteration of certain phonemes, providing insight into the linguistic processes behind the nativization of loanwords. This study adds to broader discussions on phonological adaptation by resolving previous morpho-phonological inconsistencies and integrating improved data to offer a more thorough understanding of the phonetic and phonological dynamics in the adaptation of WOT loanwords in Hungarian.

Keywords: Hungarian, Oghur, historical linguistics, diachronic linguistics, contact linguistics, loanword adaptation, Levenshtein distance, operation cost, phonetic assimilation, edit distance, distinctive features.

1. Introduction

Understanding the dynamics of language contact through the adaptation of loanwords has been a key focus, illustrating how foreign linguistic features are integrated into and changed within the target language. In order to quantify phonetic distance, the study applies an improved Levenshtein distance algorithm, based on previous research (Yalçınkaya & Parapatics & Szent-

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györgyi 2023) that examined the phonetic adaptations of West Old Turkic (WOT) loanwords in Hungarian. In order to shed light on this phenomenon, the previous study examined the phonetic modifications of 377 Hungarian loanwords from WOT. The adaptation rates and phonological assimilation patterns between these historically related languages were measured using a distinctive-feature-weighted Levenshtein distance algorithm. It also aimed to help improve edit distance algorithms by providing a framework for measuring phonetic distance that is more sensitive.

This paper offers a reevaluation of the adaptation rates of WOT loanwords in Hungarian, integrating corrections and fresh research, building on the preceding study. It has been derived from the doctoral dissertation (Yalçınkaya 2024). The main development is the clear division of the processes of borrowing and adaptation, with different rates of change noted for each phase. This distinction demonstrates the different implications on these processes: adaptation represents rule-based phonological adjustments that bring loanwords into line with the target language's changing linguistic system, whereas borrowing involves the initial transfer of words with little modification. Apart from that, a few small mistakes have been fixed, including misjudging a few suffixed words as word stems. Additionally, a number of morpho-phonological issues were resolved by means of thorough modifications, which required revising the entire dataset multiple times.

Throughout this study, 'West Old Turkic' (WOT) refers to the reconstructed Oghuric variety underlying the early borrowings into Hungarian, following the terminology and reconstruction framework of Róna-Tas & Berta (2011). The term is used here as a practical cover label for the historical Chuvash-type Turkic lects (Khazar, Onogur, Bulgar, etc.) spoken between roughly the 5th and 10th centuries, even though these varieties are not directly attested. As noted by Erdal (2018), the designation 'West Old Turkic' is not uncontroversial; nonetheless, the reconstruction by Róna-Tas & Berta remains the most comprehensive model available. For the purposes of this quantitative study, 'WOT' simply denotes the reconstructed donor forms presented in that monograph.

For the sake of clarity and readability, a concise overview of the methodological framework is provided below, although this study does not fully redemonstrate the quantification procedure, as the underlying technique remains unchanged. The present contribution focuses instead on separating the borrowing and adaptation stages and on refining the dataset as thoroughly as possible. Although the quantification framework remains the same, the refined dataset and the borrowing–adaptation distinction yield new linguistic insights into the phonological history of Hungarian and the nature of its early Turkic contacts.

2. Methodological overview

The study applies a refined version of the Levenshtein Distance (LD) algorithm in order to quantify phonetic distance between reconstructed West Old Turkic (WOT) forms and their Hungarian counterparts. LD is well established in comparative linguistics, but its classical formulation treats all substitutions, insertions, and deletions as equal operations. For historical-phonological data, this is insufficient: not all sound differences are equally distant, and a fixed penalty for every mismatch cannot capture the phonetic realities of Hungarian–WOT correspondences.

The present study therefore uses a distinctive-feature-weighted LD, in which each substitution cost reflects the phonological contrast between the two sounds involved. Insertions and deletions retain the value of 1, but substitutions receive fractional costs determined by shared vs. contrasting features.

This refinement allows for more realistic modeling of Hungarian phonological behavior, including the distinction between borrowing (minimal early changes) and adaptation (later rule-governed phonological developments).

Before calculating distance, each WOT–Hungarian pair undergoes phonemic alignment, a step sometimes left implicit in LD applications. In alignment, each phoneme of one form is paired with the most plausible counterpart in the other. The total number of aligned positions is called N-align, and it serves as the denominator for expressing the penalty score as a percentage.

For example, in the comparison below, the alignment consists of four positions. Insertions or deletions appear when one form contains a phoneme without a counterpart on the other side. Three penalty points out of four alignments conclude a 75% distance between the pair.

Table 1

An example of the classical phonetic distance calculation

Hungarian	*kéz* 'hand'	[k e: z -]
Finnish	*käsi* 'hand'	[k æ s i]
Penalties		3
N-align		4
LD%		75

In its classical form, LD assigns a uniform cost of one point to every operation, whether a substitution, an insertion, or a deletion. This produces unrealistic distances in loanword data. For instance, the substitution of /uː/ with /ʊ/ is intuitively closer than the substitution of /uː/ with /æ/. Similarly, substituting /t͡ʃ/ with /ʃ/ is far smaller a change than substituting /t͡ʃ/ with /b/. Thus, a phonologically informed refinement is required. The refined algorithm weights substitutions by counting how many distinctive features differ between the phonemes. This follows the logic that phonemes sharing more features are perceptually and articulatorily closer. Features are grouped into base categories:

- Major class features (syllabic, consonantal, sonorant)
- Laryngeal features (voice, spread glottis)
- Manner features (continuant, nasal, lateral, delayed-release)
- Place features (labial (round), coronal (anterior, distributed), dorsal
- Vowel space (high/low/mid, back, tense)

Each contrasting feature contributes an equal fraction of one full penalty. In the refined algorithm, a substitution receives a full penalty point only when all sub-features within a given base category stand in opposition between the two phonemes. A full penalty equals one because each phoneme occupies a single alignment slot, and therefore a one-phoneme word can be maximally distant from another one-phoneme word only if the difference amounts to exactly one penalty point. Under this logic, the features belonging to any given base category must contribute equally to the total cost, ensuring that

the measurement reflects the full contrast within that category when all its sub-features differ.

> ”For example, the sound /a/ is [+low], [+back], and [-tense] while /y:/ is [+high (-low)], [-back], and [+tense]. Therefore this pair shows full contrast in terms of the ”vowel space” base category. In the case of vowel space, 0.33 penalty points would be applied for contrast in [±high], 0.33 for [±back], and again 0.33 for [±tense], since there are three features in this category. Considering the fact that this pair in the example above also shares a difference in placing, /a/ being [–labial] and /y:/ being [+labial (+round)], and knowing that the place category also has three main features (labial, coronal, dorsal), 0.33 additional points would be added. Therefore the distance between the pair would cost 1.33 points in total. That being the case, very distinct pairs, and vowel-to-consonant and vice versa adaptations would generally cost more than a full penalty point, further sensitizing the operation cost. A standard 2 penalty points approach for the vowel-to-consonant and vice versa adaptations is problematic since these types of assimilations are not always equally distant either.” (Yalçınkaya 2024).

Table 2

Refined distance

Hungarian	*kéz* ’hand’	[k e: z -]
Finnish	*käsi* ’hand’	[k æ s i]
Penalties		2.16
N-align		4
LD%		54

The refined LD calculation for *kéz* and *käsi* proceeds as follows. The two lexemes align across four phonemic positions, giving an N-align value of 4. The Hungarian lexeme lacks the final vowel found in the Finnish lexeme, which counts as a deletion and therefore contributes 1 full penalty point.

In addition to the deletion, there are two substitutions. The first is the vowel correspondence /e:/ → /æ/. These two vowels differ only in lowness (highness) and tenseness, both belonging to the vowel-space category. Since the vowel-space category consists of three sub-features, each contrast contributes 0.33, giving a total substitution cost of 0.66.

The second substitution is /z/ → /s/. Here the only difference lies in voicing. The relevant manner category contains two sub-features (voice and spread glottis), and each contrasting feature therefore carries 0.50. Because only voicing differs in this pair, the substitution cost amounts to 0.50.

Summing these values — 1.00 (deletion) + 0.66 (vowel substitution) + 0.50 (consonant substitution) — gives a total penalty of 2.16. Dividing this by the N-align value of 4 results in a refined LD of 54%, representing the phonemic distance between the two forms under the distinctive-feature-weighted model.

Sub-features within the major place categories may themselves contain finer-grained contrasts, as described by Clements & Keyser (1983). Thus, *labial* includes rounding, *coronal* includes anterior and distributed, and *dorsal* includes high and back. When two phonemes share the main category but differ in one of these lower-level sub-features, each such contrast contributes

0.16 penalty points, reflecting half of the standard 0.33 used for a full vowel- or place-feature contrast. For instance, /ð/ and /z/ are both [+coronal], yet differ in [±distributed], resulting in a cost of 0.16. Length also participates in this refinement: the feature [±tense] carries a value of 0.33, so gemination and degemination receive the same penalty as vowel lengthening and shortening, ensuring consistent treatment of segmental duration.

Metathesis is handled separately. When two adjacent sounds transpose but remain otherwise identical, the operation is treated as a structural disruption costing 1 full penalty point; if substitution is also involved, the relevant substitution cost is added on top.

Certain phonemes require additional refinement. Although the vowel /a/ is phonetically a low central vowel, it is consistently grouped with the back-vowel series in both Hungarian and Turkic vowel harmony. For the purposes of the feature matrix, it is therefore treated as [+back] at the phonological level. The voiced velar fricative /ɣ/ likewise requires special treatment: although not silent in Old Turkic, its strongly intervocalic distribution, high sonority, and articulatory position between consonant and vowel justify treating it as a transitional sound. For this reason, insertions and deletions of /ɣ/ incur only 0.5 penalty points, the same reduced value assigned to the semivowels /j/ and /w/.

Although /e/ and /ɛ/ are both classified as mid vowels, /e/ is a high-mid vowel, closer to the high region of the vowel space, while /ɛ/ is a low-mid vowel, closer to the low region. Since this single contrast falls within the vowel-space category, and that category assigns 0.33 to each differing sub-feature, the substitution /e/ → /ɛ/ (or vice versa) receives a penalty of 0.33, reflecting their minimal phonetic distance.

Because sound correspondences in extinct languages cannot always be verified directly, the study relies on the comprehensive reconstructions of Róna-Tas & Berta (2011), supplemented by comparative evidence from related Oghuric languages. A full exposition of the refined algorithm, the treatment of distinctive features, and additional examples can be found in (Yalçınkaya 2024).

Obsolete items, (e.g., *bular* 'Volga Bulgar', *ugu* 'owl') that were attested in Old Hungarian but disappeared later were retained, as their attested forms still demonstrate historical adaptation to Hungarian phonotactics at the time of borrowing.

3. Borrowing and adaptation processes

The processes of borrowing and adaptation were distinguished, as the accommodation of a newly borrowed word relies on distinct factors. Primarily, it hinges on the congruence or proximity between the constituents and structures of the word in both the donor and recipient languages (Paradis & Lacharité 2011 : 764). Only the borrowed word itself undergoes further adaptation, a process influenced by time and frequency. Words encountered frequently undergo complete adaptation more rapidly. Meanwhile, as adaptation progresses, the recipient language undergoes its own evolution, with the borrowed word becoming integrated into this linguistic change. The preliminary copying process (borrowing) and the subsequent adaptation of these loanwords inside the target language's acoustic system are the two main processes (Kenstowicz 2001) that are examined in this inquiry. Words from

the source language, West Old Turkic, are directly transferred into the target language, Hungarian (Róna-Tas & Berta 2011), in the first process, known as borrowing. As the target language replicates the words from the source language, not much changes are noticeable at this point. A comparison between the reconstructed West Old Turkic words and the reconstructed Old Hungarian copies is used to calculate the modification rate for this process. The second process, adaptation, includes the rule-based modifications made to the loanwords to conform to the destination language's changing phonological and phonetic structure.

It is crucial to emphasize that loanwords, regardless of their origin, will experience the same phonological changes as native words when they are incorporated into a new language. This emphasizes that a language's phonological changes typically impact all words, not just loanwords, and aren't merely driven by the need to integrate loanwords. This element is essential for dispelling the myth that all loanwords inevitably adapt to the phonological characteristics of the host language over time; in fact, they occasionally undergo modifications that go the other way (Jaggers & Baese-Berk 2020). Notably, rather than the process of loanword assimilation, the changes that have occurred over the long period from the era of borrowing to the present are mostly associated with the natural evolution of Hungarian phonology. The term 'adaptations' can be used to describe these modifications, regardless of whether they are unique to loanword integration. Although the phrase is frequently used to refer to the particular changes made to make room for loanwords, it can also refer to more general phonological changes that have an impact on the language as a whole. Pronunciation, vocabulary, and grammar are only a few examples of how language changes to suit the demands and use of its speakers. In this study, the adaptation of the loanwords is evaluated by comparing the reconstructed Old Hungarian copies with modern Hungarian equivalents. This assessment reveals the extent of rule-based modifications required for the loanwords to take their current form in modern Hungarian.

The following comparison tables offer a detailed analysis of the rates of change seen in the processes of borrowing and adaptation. A detailed and scrutinized overview of the changes the loanwords underwent throughout their assimilation into the Hungarian language may be found in tables 1 and 2, which display the phonetic and phonological alterations that occurred over time.

The complete data is available at the Open Science Framework. To access Tables 1 and 2, visit: https://doi.org/10.17605/OSF.IO/QR9TS.

4. Borrowing Process

The study shows that the borrowing alteration rate for these loanwords is 7.20% (92.80% homophones) when comparing the reconstructed West Old Turkic words with the reconstructed Old Hungarian counterparts. This discovery sheds light on the straight transmission of lexical information from West Old Turkic to Old Hungarian by highlighting the few modifications that take place throughout the borrowing phase. Notably, an interesting discovery is made from the 377 pairings that were examined: 178 pairs, or roughly 47% of the sample, exhibit 0% distance.

5. Adaptation Process

West Old Turkic loanwords have been adapted into Hungarian throughout many centuries. The period of adaptation includes both the original borrowing of these loanwords and their later absorption and integration into the changing Hungarian phonological and phonetic structure. In order to conform to the changing sound patterns and structures of the Hungarian language, the loanwords, like the native words, have experienced a number of phonetic and phonological modifications over time. These modifications are mostly a result of the continuous absorption and adaptation of foreign linguistic components into the local system, which is influenced by phonotactic restrictions, linguistic conventions, and other features like language interaction and change.

On average, the 377 word pairings had a pronunciation distance of 27.41%. Thus, the original copies of this collection of words and their current Hungarian adaptations are 72.59% homophones. Turkic native speakers generally do not recognize most of the Turkic content in Hungarian (Navracsics 2016 : 15). This distance may appear short at first look because of this. But it should be highlighted that the common Turkic languages — all Turkic languages today except Chuvash — are very different from the Oghur branch (Savelyev & Robbeets 2020 : 41), and there is very little mutual intelligibility between them. The degree of similarity between the source languages — from which Hungarian obtained the words — and contemporary Chuvash is one vital factor to take into account at this point. Three dialects of WOT from the 10th to 13th centuries were reconstructed, two being extinct and one being Middle Chuvash, but what concerns the Hungarian interaction of the process more was apparently before the 10th century. For what is known before that period about the Chuvash-type languages such as Khazar, Saragur, Onogur, and Volga-Bulgar, the strongest source already is the WOT loanwords in Hungarian (Agyagási 2019).

6. Patterns

In order to emphasize important data about the most prevalent phonological adjustments, frequency analysis is done in this section. The phonological disposition of Hungarian towards the nativization process of loanwords is reflected in the most common phonological tendencies in terms of adaptations. This section presents only the most notable adaptation patterns. The findings show that the L1 uses specific phonological processes to nativize loanwords. The important thing to note here is that the adaptations show, to a large degree, systematic patterns that help us understand how phonological restrictions function in a predetermined, non-arbitrary way when integrating borrowings. This, of course, can be evaluated as an indication that the nativization through production stance (Hyman 1970; Lovins 1975; Danesi 1985; Jacobs & Gussenhoven 2000; LaCharité & Paradis 2005; Paradis & Lacharité 2011; As-Sammer 2015) has a valid basis. The patterns that are displayed below demonstrate that the adaptations are not the results of the random perception of mere phonetic inputs. The creation of patterns for the ”initial copying process” is not viable because of the negligible changes that are performed. Figure 1 below lists all of the exceptions. ”Occurrence rate in the whole data” refers to the proportion of all 377 loanwords in the

dataset that show a given pattern, while "occurrence rate in the relevant data" refers only to the subset of items where that pattern could in principle apply (for example, only lexemes that actually contain the phoneme or structural feature under comparison). Reporting both measures is important because many adaptation patterns are conditionally restricted, and calculating their frequency over the full dataset would artificially lower their apparent rate. This distinction makes the tables more transparent and reflects the functional distribution of each pattern more accurately.

Pattern	Occurrence rate in the whole data	Occurrence rate in the relevant data	Common adapted forms
Adaptation of [ɨ]	11.67% (377/44)	88% (50/44)	[o], [i]
Adaptation of [æ]	20.69% (377/78)	92.86% (84/78)	[ɛ], [ø]

Figure 1. **Borrowing patterns.**

Pattern	Occurrence rate in the whole data	Occurrence rate in the relevant data	Common adapted forms
Heavy syllables	52.25% (377/197)	52.25% (377/197)	vowel lenghtening
Nasal palatalization	7.43% (377/28)	35.44% (79/28)	[ɲ]
Adaptation of [ɣ]	30.77% (377/116)	100% (116/116)	[–], [j], [v]
Labialization of vowels	46.15% (377/174)	–	[a]==>[ɒ][o][u], [e][ɛ]==>[ø][y], [i]==>[ø][y], [ɨ]==>[o][u]
Adaptation of [d͡ʒ] ➔ [ɟ]	8.75% (377/33)	68.75% (48/33)	[ɟ]
Adaptation of [t͡ʃ] ➔ [ʃ]	5.57% (377/21)	29.17% (72/21)	[ʃ]

Figure 2. **Adaptation patterns.**

7. Discussion

One significant finding from this study is that, in the early stages, there seems to be little integration of loanwords — words that are taken or copied from WOT — into Hungarian. The borrowed terms and their WOT originals have a very close phonetic resemblance, as seen by the average pronunciation distance of 7.20%. A considerable number of the acquired terms were copied or reproduced in their original phonetic form.

There are a number of reasons for this slight alteration in the early stages. First of all, it might show how these specific languages borrowed from one another during the time period under study. It makes sense that the borrowed terms were incorporated into Hungarian with little change in phonetics, since

speakers of WOT and Hungarian interacted and spoke frequently. This might be as a result of the borrowing community's familiarity with WOT's phonetics and pronunciation.

Second, the phonetic similarities between WOT and Hungarian may have contributed to the little initial alteration seen in this study. It would take less work to adapt imported words to fit Hungarian phonetic patterns if the two languages have overlapping phonetic features or similar phonetic systems. As a result, the pronunciation gap between the borrowed terms and their WOT roots would be reduced. Although the paper's snapshot analysis points to a striking similarity at the moment of borrowing, it is important to recognize that this process was ongoing. The period of bilingualism during which the Hungarian language underwent substantial modifications, including the introduction of new phonemes and sounds, coincided with the borrowing of Turkic elements. Additionally, the influence of Turkic caused notable changes to the Ugric vowel system (Róna-Tas & Berta 2011 : 1121). A considerably larger degree of difference would be revealed by investigating the changes that occurred in the Hungarian language from its split from the Ugric group through its contact with Turkic languages and continuing to observe these changes during the borrowing process.

Furthermore, the cultural or social aspects of language interaction and borrowing may be responsible for the comparatively small changes at the beginning. There may have been a propensity to maintain the phonetic integrity of borrowed terms in Hungarian if WOT was highly valued in society or culture, or if its linguistic characteristics were positively viewed. This might be interpreted as a means of preserving the borrowed vocabulary's apparent legitimacy or status. It is crucial to remember, nevertheless, that investigating the later phases of adaptation in Hungarian is equally significant. This difficulty is also taken on by the research, which looks at how the acquired content has been "adapted" into the Hungarian language. With the development of the Hungarian language, it is clear that the imported words experienced further alterations and phonetic changes over time. Consequently, a close phonetic similarity between Hungarian borrowings and their WOT equivalents is suggested by the slight alteration seen at the first stage of the loan process. This low rate of alteration may have been caused by a number of factors, including regular linguistic contact, phonetic similarities between the two languages, and cultural or social influences. In order to obtain a more thorough understanding of the entire loanword adaptation process in Hungarian, additional study is presented separately to examine the following stages of adaptation.

Upon this procedure, the loanwords' adaptation rate in modern Hungarian is found to be 27.41%. The phonological limitations and inclinations of the recipient language, Hungarian, when incorporating borrowed words are reflected in the existence of specific patterns in loanword adaptations. Phonotactic restrictions, historical phonological shifts, and the interplay between the donor and target languages are some of the linguistic elements that contribute to these patterns. By comprehending these trends, one can gain insight into the fundamental processes and ideas that underlie Hungarian loanword adaptation.

The study found that heavy syllables are preserved in loanword adaptations, which is one notable pattern. The understanding that a light syllable

usually consists of a single mora—which could be a single consonant, a diphthong, or a short vowel—is the first step in this process. In contrast, two moras are present in a heavy syllable, which usually takes the shape of a long vowel, a vowel followed by a single consonant, or a vowel followed by a cluster of consonants. Interestingly, vowel lengthening is found in about half of the comparisons, indicating that it is a relatively frequent pattern.

There are some intriguing patterns in the way the high back unrounded vowel (/ɯ/ or /ï/) is adapted in loanword nativization. Instead of rigorously following the front-back harmony norms of Turkic and Hungarian, loanword adaptations prioritize preserving specific traits, such as [+high] and [+back], as seen by the observed substitutions of /o/, /ɒ/, or /i/ for this vowel. The influence of similar sounds in the recipient language or characteristics like pronunciation ease could be responsible for this departure from predicted harmonical rules. It suggests that intricate interactions between the phonological systems of the borrowing and destination languages are also involved in loanword modifications, which are not only motivated by phonetic similarity.

In loanword nativization, the voiced velar fricative (/ɣ/) exhibits patterns similar to the "soft g" phenomenon in contemporary Turkish. The trends that have been identified, such as vowel lengthening, deletion, or substitution to the semivowel /j/, point to a convergence between the phonotactic preferences of loanword adaptations and the historical phonological changes of Hungarian. The dynamic character of language contact and the impact of past linguistic advancements on the adaptation of acquired terms are both reflected in this convergence.

There are a number of reasons why labialization is preferred. One could be the impact of nearby consonants. The vowel frequently experiences labialization to match the articulatory properties of the consonants when a borrowed word has labial or labialized consonants next to it. In the case of *gyümölcs* 'fruit', where the vowels next to the labial /m/ labialize during adaptation, this assimilation process guarantees phonetic concord and makes it easier to pronounce loanwords smoothly.

The /d͡ʒ/ → /ɟ/ correspondence represents a regular internal sound change in Hungarian. Old Hungarian preserved /d͡ʒ/, but it later merged with the palatal stop /ɟ/ as the affricate weakened. Because both are voiced, palatal obstruents with similar acoustic cues, this merger is phonetically natural and typologically common.

Refinement techniques to the operation cost in the Levenshtein algorithms, despite the fact that the principles are default, significantly alter the obtained results. Some modifications may reflect little to nothing in human perception. Conversely, some adaptations could seem more apparent than others, yet they are still less remote. To start, it could be a good idea to develop a computerized (or non-computerized) assessment methodology that assesses the perceived distance of a specific collection of sounds unique to two phonological systems. This requires a database large enough to contain a sufficient number of co-occurrences of the same sound pairs. In any case, to use the LD and get significant, reliable results, massive data with a large word base is required. One restriction and apparent drawback of the use of the LD is the limited data, such as the 35 recognized Cuman loanwords in Hungarian. A substantial amount of data about WOT loanwords in Hungarian was used

in this study. The refinement procedures' requirement for a strong grasp of the phonological knowledge of the compared languages is another drawback. A disadvantage may also arise if any of the languages lack thorough phonological information, as is the case with Cuman, which is an extinct language. On the other hand, data regarding the frequency of specific adaptations as regular patterns and the ability to quantify the relatedness of comparable lexemes are advantages. Honti also points out that consonantal changes are known to exhibit a higher degree of regularity than vowel changes (Honti 2017 : 189). The debate over whether adaptations are phonological or perceptual may potentially be resolved by the automated phonetic comparisons. A proper recognition of the dynamics of loanword adaptation may be attested to by phonologically sensitive automatization techniques for determining the adaptation rates of loanwords between languages.

One thing to keep in mind is that, of course, Turkic and Hungarian speakers were not the only ones in the Sprachbund of the Eurasian steppes. At various points in time, the former two coexisted with Slavonic speakers, Germanic speakers like Goths, and Iranian speakers like Alans. Undoubtedly, the loan phonology of Hungarian borrowings must have been impacted by the exchanges with these populations. In this sense, a flexible approach to modifications rather than a rigid one may lead to a deeper comprehension. This problem is raised by Stachowski, who proposes a comparison between the phonetic adaptation processes of Pannonian Slavonic and Turkic loanwords in Hungarian (Stachowski 2014 : 221).

Testing native speakers of the language being borrowed and asking them how they perceive the words from the source language, or the other way around, and comparing the results with the automated rates, is another way to gauge the need for more research. Considering the results of Honti (2017) for the selection of lexemes to be analyzed, it might also be beneficial to do the study previously mentioned in this study.

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Abbreviations

L1 — first language; **LD —** Levenshtein Distance; **N-Align —** Total number of aligned positions; **WOT —** West Old Turkic.

REFERENCES

Agyagási, Klára 2019, Chuvash Historical Phonetics: An areal linguistic study with an Appendix on the Role of Proto-Mari in the History of Chuvash Vocalism, Wiesbaden: Harrassowitz Verlag (Turcologica 117).

As-Sammer, Muhammed A. Abdul Sattar 2015, Phonetic and Phonological Adaptations of English Loanwords into Iraqi Arabic: A Generative Study. — Journal of the College of Arts, no. 73, 1—46.

Clements, George N. & Keyser, Samuel Jay 1983, CV Phonology. A Generative Theory of the Syllable, Cambridge: MIT Press. http://seas3.elte.hu/egg12/clements-keyser-83.pdf.

Danesi, Marcel 1985, Loanwords and phonological methodology, Ottawa: Didier (Studia Phonetica 20).

Erdal, Marcel 2018, Review of A. Róna-Tas & Á. Berta, West Old Turkic. Turkic Loanwords in Hungarian. Harrassowitz 2011 = Turcologica 84. — Orientalistische Literaturzeitung, 113—116.

Honti Lásló 2017, A magyar és a nyugati ótörök szókészleti kapcsolatairól, Budapest: Tinta Könyvkiadó.

Hyman, Larry M. 1970, The role of borrowing in the justification of phonological grammar. https://www.academia.edu/24409087/The_role_of_borrowing_in_the_justification_of_phonological_grammars.

Jacobs, Haike & Gussenhoven, Carlos 2000, Loan Phonology: Perception, Salience, the Lexicon and OT. — J. Dekkers, F. van der Leeuw, J. van de Weijer (eds), Optimality Theory, Phonology, Syntax, and Acquisition, Oxford: Oxford University Press.

Jaggers, Zachary & Baese-Berk, Melissa 2020, Investigating a bias for cue preservation in loanword adaptation. — The Journal of the Acoustical Society of America. Volume 147, Issue 6. https://doi.org/10.1121/10.0001375.

Kenstowicz, Michael 2001, Review Article: The Role of Perception in Loanword Phonology. A review of Les emprunts linguistiques d'origine européenne en Fon by Flavien Gbéto, Köln: Rüdiger Köppe Verlag, 2000. — Studies in African Linguistics. Volume 32, 95—112.

LaCharité, Darlene & Paradis, Carole 2005, Category Preservation and Proximity versus Phonetic Approximation in Loanword Adaptation. — Linguistic Inquiry. Vol. 36, No. 2, 223—258.

Lovins, Julie B. 1975, Loanwords and the Phonological Structure of Japanese, Bloomington: Indiana University Linguistics Club.

Navracsics, Judit 2016, Living with two languages and cultures. The complexity of self-definition for bilingual individuals. — Hungarian Journal of Applied Linguistics. Issue XVI, no. 2, 1—23. http://dx.doi.org/10.18460/ANY.2016.2.006

Paradis, Carole & Lacharité, Darlene 2011, Loanword Adaptation: From Lessons Learned to Findings. — J. Goldsmith, J. Riggle, A. C. Yu (eds), The Handbook of Phonological Theory. Second Edition, Oxford: Wiley-Blackwell, 751—778.

Róna-Tas, András & Berta, Árpád 2011, West Old Turkic. Turkic Loanwords in Hungarian I—II,Wiesbaden: Harrassowitz Verlag.

Savelyev, Alexander & Robbeets, Martin 2020, Bayesian phylolinguistics infers the internal structure and the time-depth of the Turkic language family.— Journal of Language Evolution. Volume 5, Issue 1, 39—53.

Stachowski, Marek 2014, Remarks on the investigation of the oldest layer of Turkic loanwords in Hungarian. — Studia Etymologica Cracoviensia. Volume 19, Issue 4, 215—222.

Yalçınkaya, Ali Can 2024, Turkic Loanwords in Hungarian: A study concerning loanword adaptation. Phd Dissertation, Veszprém: University of Pannonia.

Yalçınkaya, Ali Can & Parapatics, Andrea & Szentgyörgyi, Szilárd 2023, Adaptation Rates of West Old Turkic Loanwords in Hungarian: A Quantitative Study. — Turkish Studies — Language and Literature. Volume 18, Issue 2, 1395—1427.

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ПЕРЕОЦЕНКА АДАПТАЦИИ ЗАИМСТВОВАНИЙ ИЗ ЗАПАДНОГО ДРЕВНЕТЮРКСКОГО ЯЗЫКА В ВЕНГЕРСКОМ ЯЗЫКЕ: НОВЫЕ РЕЗУЛЬТАТЫ И ПЕРСПЕКТИВЫ

В настоящей работе проводится переоценка адаптации заимствований из западного древнетюркского языка (West Old Turkic, WOT) в венгерском языке с особым акцентом на фонетические и фонологические изменения, происходящие в процессе заимствования и последующей адаптации. Опираясь на предыдущие исследования, в которых фонетические расстояния измерялись с помощью усовершенствованного алгоритма расстояния Левенштейна, данное исследование включает уточнение корпуса данных и углублённое теоретическое осмысление различных этапов и механизмов заимствования и адаптации. В работе проводится разграничение между более значимыми, системными фонологическими адаптациями, основанными на правилах и прослеживаемыми на протяжении длительного исторического периода, и более тонкими фонетическими изменениями, возникшими на начальной стадии заимствования. Полученные результаты демонстрируют системные фонологические тенденции родного языка (L1) при усвоении иноязычных лексических единиц, наглядно иллюстрируя взаимодействие контактной динамики и языковой эволюции. Кроме того, исследование выявляет повторяющиеся модели адаптации и изменения отдельных фонем, что позволяет глубже понять лингвистические процессы, лежащие в основе натурализации заимствований. Настоящая работа вносит вклад в более широкие дискуссии по проблемам фонологической адаптации, устраняя ранее выявленные морфофонологические несоответствия и интегрируя уточнённые данные для более всестороннего понимания фонетической и фонологической динамики адаптации заимствований из западного древнетюркского языка в венгерском языке.

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UNGARI KEELE LÄÄNEVANATURGI LAENUDE MUGANEMISE ÜMBERHINDAMINE: UUED AVASTUSED JA VÄLJAVAATED

Artiklis esitatakse ungari keele läänevanatürgi laenude muganemise kohta uus tõlgendus, pöörates erilist tähelepanu foneetilistele ja fonoloogilistele muutustele, mis on toimunud laenamise ja sellele järgnenud kohanemise käigus. Tuginedes varasematele töödele, milles foneetilisi kaugusi on mõõdetud Levenshteini kaugusalgoritmi täiustatud versiooni abil, on selle uurimuse aluseks andmekorpuse täpsustamine ning laenamise ja muganemise erinevaid järke ja mehhanisme selgitav põhjalik teooria. Eristatakse olulisemaid ja süsteemsemaid reeglipõhiseid fonoloogilisi kohandusi, mis on esile tulnud pikema ajalooperioodi jooksul, ning väiksemaid foneetilisi muutusi, mis tekkisid laenamise algjärgul. Saadud tulemused näitavad võõrkeele leksikaalsete üksuste omandamisel toimivaid emakeele süsteemseid fonoloogilisi tendentse ja tõestavad keelekontaktide ja keelearengu koosmõju. Lisaks tuuakse uurimuses esile üksikfoneemide korduvad muganemis- ja muutumismustrid, mis võimaldavad sügavamalt aru saada laenude omaksvõtu aluseks olevatest keeleprotsessidest. Artiklis lahendatakse varem tuvastatud morfofonoloogilised vastuolud ja lisatakse täpsustatud andmeid, aidates niiviisi edasi viia fonoloogilise muganemise laiemat arutelu.