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Kateryna Laidler
Uniwersytet Marii Curie-Skłodowskiej w Lublinie
ORCID: https://orcid.org/0000-0002-1455-9089
e-mail: kateryna.laidler@mail.umcs.pl

Divergent Paths of Vowel Adaptation: English /ɪ/ in Russian and Ukrainian loanwords

Rozbieżne mechanizmy adaptacji samogłoski: realizacja angielskiego /ɪ/ w zapożyczeniach rosyjskich i ukraińskich

Abstract
This paper investigates the divergent adaptation of the English vowel phoneme /ɪ/ in Russian and Ukrainian loanwords, revealing notable differences despite the close linguistic relationship between the two languages. In Russian, /ɪ/ is predominantly adapted as /i/, with minimal occurrences of [ɨ] on allophonic level, whereas Ukrainian shows a broader range of adaptations, favouring /i/, followed by /ɪ/ and /ɛ/. We explore factors influencing these patterns, including orthographic representation, phonological systems, and perceptual mapping. Our analysis suggests that the differing phonemic status of the high front vowels in Russian and Ukrainian affects the perception of English /ɪ/ and the resulting contrast in its adaptation. Additionally, Ukrainian tends to preserve marked features signalled by orthographic cues in the source language. These findings contribute to a deeper understanding of cross-linguistic vowel adaptation and the interplay between perception, phonology and orthography in loanword integration.

Keywords: loanword phonology, vowel adaptation, phonological integration, cross-linguistic perception, language contact

Abstrakt
Artykuł analizuje odmienne wzorce adaptacji angielskiego fonemu samogłoskowego /ɪ/ w zapożyczeniach do języka rosyjskiego i ukraińskiego, ujawniając istotne różnice mimo bliskiego pokrewieństwa tych języków. W rosyjskim /ɪ/ jest przeważnie adaptowane jako /i/, a allofoniczne realizacje z [ɨ] są bardzo rzadkie, podczas gdy ukraiński wykazuje szerszy zakres adaptacji, preferując /i/, a następnie /ɪ/ i /ɛ/. Analizujemy czynniki wpływające na te wzorce, takie jak reprezentacja ortograficzna, systemy fonologiczne i percepcyjne odwzorowanie dźwięków. Nasza analiza sugeruje, że różnice w statusie fonemicznym wysokich samogłosek przednich w rosyjskim i ukraińskim wpływają na percepcję angielskiego /ɪ/ i prowadzą do odmiennych sposobów jego adaptacji. Dodatkowo, ukraiński wykazuje tendencję do zachowywania nacechowanych cech sygnalizowanych

przez ortografię w języku źródłowym. Wyniki te pogłębiają rozumienie międzyjęzykowej adaptacji fonemów samogłoskowych oraz współdziałania percepcji, fonologii i ortografii w integracji zapożyczeń.

Słowa kluczowe: fonologia zapożyczeń, adaptacja samogłosek, integracja zapożyczeń, percepcja międzyjęzykowa, kontakt językowy

1. Introduction

Loanword adaptation has been central to phonological studies for the past three decades. This is because the outcomes of the nativisation process often offer an insight into the phonological intricacies of the languages involved. Much of this research has focused on language pairs with markedly different phonological structures, making them ideal for testing theoretical models (Kang 2006; Wetzels 2009; Paradis & LaCharité 1997). However, a growing body of research has also turned to phonologically closer languages, showing that comparisons between English and Polish (Szpyra-Kozłowska & Radomski 2016; Szpyra-Kozłowska 2016), English and Russian (Laidler 2022; Laidler 2024) or English and Czech (Molęda 2011) reveal puzzling patterns. Analysing these patterns contributes to ongoing debates about nativisation and its theoretical implications.

This paper[1] examines divergent patterns in the adaptation of the English high front vowel /ɪ/ in two East Slavic languages sharing high structural and lexical similarity: Ukrainian and Russian. The choice of these languages is deliberate. There is a clear gap in loanword research on Ukrainian, possibly due to its linguistic proximity to Russian, which may lead to the mistaken view that the two are interchangeable. Yet their differences have been well documented through historical linguistics and phonological analysis (Watkins 2000). Their phonetic systems differ not only in phonemic inventories but also in the phonological processes that govern them. Comparing how these similar yet distinct systems treat the same foreign element sheds light on the nuanced influences of phonemic and phonological structure on adaptation outcomes.

Furthermore, English /ɪ/ presents a particular challenge in adaptation due to a lack of a direct equivalent in many languages, including Russian and Ukrainian, and its intermediate phonetic quality which makes it perceptually ambiguous for speakers of languages with simpler or differently structured

[1] An earlier version of this research was inspired by broader comparative idea discussed with colleagues, as well as by the analysis of English /ɪ/ adaptation in Polish presented by Szpyra-Kozłowska (2016).

vowel inventories. As shown by Szpyra-Kozłowska (2016) in her study of English /ɪ/ in Polish, this vowel serves as a valuable test case for examining how phonetic detail and orthographic cues interact in shaping loanword adaptation.

The paper begins with Russian data in Section 2, outlining basic adaptation facts (2.1) and examining orthographic, perceptual and phonological influences (2.2 – 2.5). We then turn to Ukrainian, applying the same framework across Sections 3.1 – 3.5. Final conclusions are presented in Section 4.

2. Russian

This section focuses on the basic facts of English /ɪ/ adaptation in Russian anglicisms with attention to possible influence of orthography, perception and phonology on the observed patterns.

2.1. English /ɪ/ in Russian loanwords. Basic facts

The number of Russian vowel phonemes is the issue marked by controversy. It is considered to include 5 or 6 phonemes: /a, e, i, (ɨ), o, u/ with the high centralised vowel being treated either as an independent phoneme or as an allophone of the phoneme /i/ by St. Petersburg (Leningrad) and Moscow schools, respectively. This paper adopts the allophonic treatment of [ɨ] as a contextual variant of /i/, a stance which will be discussed in more detail in Section 2.4 and which subsequently will be shown to converge with our experimental findings.

One of the major differences between the vowel systems of Russian and English lies in the latter's use of vowel length and tenseness, features that are not phonemically contrastive in Russian. Nevertheless, Russian /i/ and [ɨ] are often considered the closest phonemic approximations of the English high front vowels:[2]

(1) E /i:/ – R /i/ E /ɪ/ – R [ɨ]

Unsurprisingly, R /i/ is overwhelmingly used to substitute E /i:/ in loanwords, e.g., *free* /fri:/ → *фри* /frʲi/, *dealer* /ˈdi:lə/ → *дилер* /ˈdʲilʲer/. What is more surprising, however, is that the same Russian /i/ rather than [ɨ]

[2] This phonetic proximity is established on the basis of the distinctive features that the corresponding vowels share.

is also predominantly used to nativise English /ɪ/ in anglicisms, e.g., *hit* /hɪt/ → *xum* /çit/, *business* /ˈbɪznəs/ → *бизнес* /ˈbʲiznɛs/.

For the purpose of this study, a corpus of 430 Russian anglicisms containing English /ɪ/ was analysed.[3] Of these, 92% were adapted using Russian /i/, while only 8% employed other vowels, including Russian [ɨ], whose occurrence was marginal. This distribution presents an apparent paradox. While the adaptation of English /iː/ as Russian /i/ is phonetically predictable, the consistent substitution of English /ɪ/ with Russian /i/, despite the availability of [ɨ] as a closer phonetic match, suggests that other factors are at play. The following sections explore possible explanations.

2.2. The influence of spelling on the adaptation of English /ɪ/ in Russian

In examining the factors relevant to loanword adaptation, orthography is cited as a significant variable (Vendelin & Peperkamp 2006; Szpyra-Kozłowska 2016) particularly given that many borrowings enter the recipient language through written channels. Spelling-based adaptations are common when the donor and recipient languages share compatible writing systems. English and Russian do not: despite superficial graphic resemblances between some Latin and Cyrillic letters (e.g., E <k> → R <к> /k/, E <a> → R <a> /a/, E <e> → R <e> /e/) substitutions based solely on visual similarity play no systematic role in Russian adaptation of English loans. In most cases, the process relies on some phonemic alignment or transliteration conventions, where English graphemes map onto Russian grapheme-to-phoneme correspondences (e.g. E <p> → R <п> /p/, E <i> → R <и> /i/).

In Standard Russian orthography, the phoneme /i/ is consistently written as <и>, with no alternative graphemic representations, e.g. *мир* /mʲir/ ‘the world’. However, the grapheme <и> is not always realised phonetically as [i]: after /ʂ/, /ʐ/ and /t͡s/, it surfaces as [ɨ], as in *шить* [ʂɨtʲ] ‘to sew’, *жить* [ʐɨtʲ] ‘to live’, *цирк* [t͡sɨrk] ‘circus’. Otherwise, [i] is graphically represented by the letter <ы>, e.g. *быть* [bɨtʲ] ‘to be’.

In English, /ɪ/ is most commonly written as <i> (61%), <e> (16%), <y> (20%), with <a>, <ie> and <ey> occurring less frequently (Cruttenden 2014: 113). Considering the graphemic conventions of both Russian and English, the loans in which the adaptation of English /ɪ/ may be at least partially shaped by orthographic influence include the following patterns:

[3] The major source of such anglicisms was the Dictionary of Anglicisms of the Russian Language compiled by Dyakov (1990) and updated as a website in 2014.

(2) a. **E <i> → R <и> /i/**: *abi**l**ity* /əˈbɪlətɪ/ → *аби**л**ити* /aˈbʲilʲtʲi/
b. **E <e> → R <е> /e/**: *limit**e**d* /ˈlɪmɪtɪd/ → *лими**т**ед* /lʲimʲˈtʲet/
c. **E <a> → R <а> /a/**: *or**a**nge* /ɒrɪndʒ/ → *ора**н**ж* /oˈranʐ/

While adaptations following the patterns (2a) and (2b) are relatively common, accounting for approximately 75% of the examined loans, those in (2c) comprise less than 1%. The remaining 15% of borrowings clearly do not follow any orthographic patterns and appear to be driven by other factors:

(3) *mess**a**ge* /ˈmesɪdʒ/ → *мес**с**еджс* /ˈmɛsːɛdzʲ/
*self**ie*** /ˈselfi/ → *сел**ф**и* /ˈsɛlfʲi/
***E**ngland* /ˈɪŋgləndˈ/ → ***А**нглия* /ˈanglʲija/
*Jers**ey*** /ˈdʒɜːzi/→ *Джерс**и*** /dzɛrsʲi/

These examples show that while orthographic influence could play a role in the adaptation of English /ɪ/ in Russian anglicisms, it does not fully account for the range of observed patterns. Even the most frequent substitution – E /ɪ/ → R /i/ – can only be partially attributed to spelling: script mismatch does not allow for direct graphic substitution, so /ɪ/ must first be mapped phonologically into a Russian vowel category. Orthography then acts as a secondary bias, since English /ɪ/ is frequently written <i>, which is routinely rendered as Russian <и> (/i/) in transliteration. Crucially, the consistent preference for Russian /i/ over the phonetically closer [ɨ] remains unexplained by orthography alone.

2.3. The influence of perception on English /ɪ/ adaptation in Russian

When loanwords enter a recipient language through auditory channel, their shape is inevitably influenced by the adaptors' perception, often referred to in the literature as nativisation-through-perception (Peperkamp & Dupoux 2003; Peperkamp 2005; Vendelin & Peperkamp 2006). The examples in Section 2.2 show that only some adaptation patterns of English /ɪ/ in Russian can be attributed to the vowel's spelling. However, in many loans, nativisation clearly defies the established grapheme-to-phoneme correspondences between English and Russian, raising the question of whether Russian speakers' perception of English /ɪ/ could explain some of these patterns. To explore this, an experiment was conducted, and its results are presented in this section.

The study involved 41 native speakers (27 women, 14 men aged 35–65) of the Southern Russian dialect group. Because the goal was to examine how native-speaker perception shapes the adaptation of English sounds absent from Russian, only individuals with no knowledge of English were selected.

All participants listened to a recording of 42 English words, including 9 items with 11 instances of /ɪ/ in various phonological contexts.[4] The words were recorded by a male native speaker of Educated Southern British English and played individually to each participant through headphones. Rather than repeating after the recording, listeners wrote down what they heard using the Cyrillic characters, avoiding the influence of faulty production. The following results were derived from the obtained spellings:

(4) E /ɪ/ → R <и> (/i/) = 68%
E /ɪ/ → R <ы> ([ɨ]) = 17%
E /ɪ/ → R <э> (/ɛ/) = 15%

Russian speakers overwhelmingly perceive the English vowel /ɪ/ as closest to Russian /i/. Specifically, /i/ was chosen in 68% of cases, compared to 17% for [ɨ] and 15% for /ɛ/. No context-dependent variation was found – /i/ was equally common across all items.

These findings partially align with the patterns in established anglicisms where a higher proportion (92%) of loanwords use /i/. The key difference is that in established borrowings substitutions with [ɨ] and /ɛ/ are marginal, while in our experiment they were selected by 17% and 15% of the participants, respectively.[5] A surprising picture emerges when we examine the acoustic distance between the English /ɪ/ and the most commonly selected substitutes by comparing the four vowels' formant values.[6] The average F1 and F2 of English /ɪ/ are:[7]

(5) **E /ɪ/:**
F1 390
F2 1900

The average formant values of Russian /i/, [ɨ] and /ɛ/, following Leonov et al. (2009: 878) are:

(6)	**a. R /i/**	**b. R [ɨ]**	**c. R /ɛ/**
	F1 420	F1 415	F1 472
	F2 2475	F2 2425	F2 2200

Figure 1 plots the data from (5) and (6).

[4] The following words were used: *wing, rhythm, swim, singer, reject, prison, kid, withstand, misbehave, misthink*. F1 and F2 values for the target vowel were within the ranges reported in Cruttenden (2014).

[5] No contextual dependencies were established among these adaptations.

[6] Acoustic distance is often used as a measure and predictor of phonetic closeness (Kuhl 2000).

[7] The average values of /ɪ/ produced by the native speaker fall within the range given in the literature (Cruttenden 2014: 104).

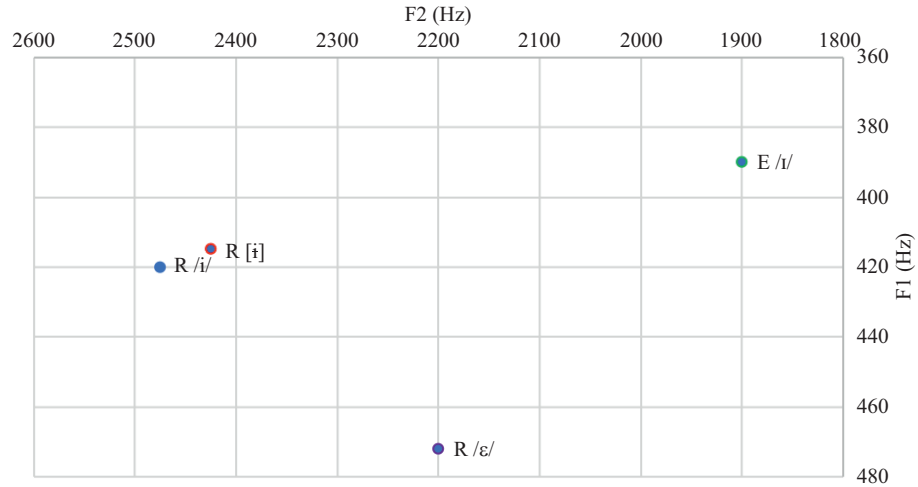


Fig. 1. Average F1 and F2 values of English /ɪ/ and Russian [ɨ], /i/ & /ɛ/

Figure 1 shows that of the three substitutes Russian /ɛ/ most closely resembles English /ɪ/ in formant structure, yet it is chosen by only 15% of participants.[8] The second-best match is Russian [ɨ], whose F1 value is closest to English /ɪ/. F1 is the primary and most stable acoustic cue to vowel height, and vowel identification relies heavily on F1 even under coarticulatory variation (e.g. Peterson & Barney 1952; Fry et al. 1962). Given this, [ɨ] is a plausible substitute, yet it was chosen in only 17% of cases. This suggests that acoustic distance is not the main factor guiding participants' perception in the experiment. If it were, we would expect more /ɛ/ and [ɨ] substitutions. In the absence of orthographic cues, the pattern likely stems from phonological factors.

2.4. The influence of phonology on English /ɪ/ adaptation in Russian

The Russian data shows little variation in the adaptation of established borrowings: with 92% of loans adapted by means of Russian /i/, this vowel appears to be selected across all phonological contexts. The only clear example of the adaptation pattern conforming to phonotactic constraints is the absence of word-initial [ɨ] in loanwords, which is prohibited in Russian. However, there are no other restrictions that could explain the high rate of /i/-adaptations.

[8] Bark, ERB and Mel scales were additionally used to compute vowel distances; all three scales provided the same relative ordering of Russian candidates with respect to English /ɪ/.

This choice appears perception-driven: native speakers judge /i/ as the closest match to English /ɪ/, as shown in Section 2.3. Yet acoustically /i/ is not the best match – [ɨ] is in fact closer to English /ɪ/.

This counterintuitive preference may be attributed to the phonological status of [ɨ] in Russian, where its phonemic distinctiveness remains contested. A strong case can be made that [ɨ] is not a separate phoneme, but rather an allophonic variant of /i/, conditioned by phonological context. This is supported by their complimentary distribution: [i] follows palatalised consonants, [ɨ] non-palatalised ones (e.g., *бить* /bʲitʲ/ 'to hit' vs. *быть* /bɨtʲ/ 'to be'). Such distributional patterns are a classic hallmark of allophony (Halle 1985), and there is little evidence of minimal pairs that would demonstrate phonemic contrast between them. Furthermore, [ɨ] is highly restricted in Russian phonotactics. It never occurs word-initially and its appearance is bound to specific phonological environments. This has implications for English /ɪ/ adaptation in Russian loanwords and can be observed in the fact that Russian [ɨ] substitutes English /ɪ/ only in a limited number of cases, typically when the vowel follows retroflex fricatives /ʂ/ and /ʐ/, which are non-palatalised in Standard Russian. In such contexts, the vowel inventory is restricted to /a, o, ɛ, ɨ, ʊ/,[9] making [ɨ] the only viable option:

(7) E *shilling* /ˈʃɪlɪŋ/ → R *шиллинг* /ˈʂɨlʲɪnk/
E *agility* /əˈdʒɪlətɪ/ → R *аджилити* /aˈdʐɨlʲɪtʲɪ/

Timberlake (2004: 40) also notes that Russian suffixes begin with <и> [i] rather than <ы> [ɨ], suggesting that [i] has a more robust phonemic status, while [ɨ] lacks morphological productivity often associated with phonemes.

According to the Perceptual Assimilation Model (Best 1994), non-native sounds are mapped onto native phonemic categories, not allophones. L2 acquisition studies also show that L1 phonemic categories shape L2 perception (Flege 1995; Gitsaki 1998) since phonemes carry greater cognitive weight and play a central role in speech perception (Kazanina et al. 2018; Agrawal 2020). If Russian [ɨ] is an allophone of /i/, with limited, context-dependent distribution, Russian speakers may lack a distinct mental representation of [ɨ]. Since phonemes are contrastive and lexically encoded, they are more easily retrieved in perceptual tasks, as shown in our perceptual experiment. This suggests that cross-linguistic adaptation is shaped not only by phonetic and phonological factors like acoustic proximity or phonotactics, but also by psycholinguistic dimensions.

[9] The Cyrillic letter <и> spells both /i/ and the [ɨ] allophone after retroflex fricatives (/ʂ/, ʐ/). Thus, in those few loans where English /ɪ/ is realised as Russian [i], the change is purely phonetic: /ʂ/ and /ʐ/ obligatorily trigger [ɨ], while the spelling still reflects substitution by /i/.

3. Ukrainian

In the sections that follow, we present how English /ɪ/ is adapted in Ukrainian loanwords and discuss potential factors contributing to the observed patterns. To ensure the accuracy and comparability of the data, we have applied the same procedures for data collection and experimental design in both the Russian and Ukrainian contexts.

3.1. English /ɪ/ in Ukrainian loanwords. Basic facts

Ukrainian vowel inventory is comprised of six phonemes: /i, ɪ, ɛ, a, ɔ, u/ (Pompino-Marschall et al. 2017), featuring two high front vowels /i/ and /ɪ̱/,[10] whose phonological behaviour is discussed in more detail in Section 3.5. Similarly to Russian loanwords, English borrowings containing /ɪ/ are predominantly adapted by means of Ukrainian /i/ (e.g., *click* /klik/ → *клікати* /ˈklʲikatɪ/). Other adaptations include /ɪ/ (e.g., *design* /dɪˈzaɪn/ → *дизайн* /dɪˈzajn/) and /ɛ/ (e.g., *reporter* /rɪˈpɔːtə/ → *репортер* /rɛpɔrˈtɛr/. In order to establish any distinctive adaptation strategies, a corpus of 390 anglicisms containing /ɪ/ in the original item has been compiled.[11] The following patterns were established:

(8) E /ɪ/ → U /i/ = 53%
E /ɪ/ → U /ɪ/ = 36%
E /ɪ/ → U /ɛ/ = 11%

The adaptation by means of other vowels, e.g., /a/, amounted to less than 1%.

[10] There is some discrepancy in the phonetic transcription of Ukrainian vowel <и> in the scholarly literature. For the purpose of this paper, we are going to employ the description assumed by Pompino-Marschall et al. (2017: 353). As the authors point out, it is more correctly transcribed as [ɪ̱] since in its production the tongue is retracted and lowered and due to its articulation with strongly spread lips it may shift to [ɪ] in the acoustical vowel space.

[11] Seeing that there is no single comprehensive corpus of English loanwords in Ukrainian, the data for the purpose of this research comes from multiple sources to ensure both historical depth and contemporary relevance. One of the sources is the *Dictionary of Foreign Words in Ukrainian* (Melnychuk 1974) which in our study is supplemented with the entries from the online Dictionary of Anglicisms available at https: //slovnyk.lutsk.ua/ to capture more recent developments in lexical borrowings. Although not yet a printed source, it is a dynamic and regularly updated resource which reflects the most current influx of English loanwords in Ukrainian. Additionally, the corpus includes a selection of proper names, both personal and geographical, collected independently by the author through the observation of public and media discourse.

Similarly to the Russian data, there is a clear preference for /i/-substitutions in established borrowings. Moreover, replacing the original vowel with Ukrainian /i/ often triggers further modifications to the word's phonological structure, i.e., the palatalisation of the preceding consonant, which distances the nativised form even further from the original (e.g., *limit* /ˈlɪmɪt/ → *лімім* /lʲiˈmʲit/). However, unlike in Russian anglicisms, the Ukrainian data reveal more flexibility in adaptation, with Ukrainian /ɪ/ being frequently selected in the analysed corpus of loanwords. In the sections that follow, the possible reasons for the observed variation will be discussed.

3.2. The influence of spelling on the adaptation of English /ɪ/ in Ukrainian

Ukrainian also uses the Cyrillic script, but its orthography differs from Russian in ways directly relevant to /ɪ/ adaptation. In Ukrainian, <i> encodes /i/ and <и> encodes /ɪ/, while <e> and <a> encode /ɛ/ and /a/, respectively. In English, /ɪ/ is most often written <i>, but it is also attested with <e> and <a>. Orthography can therefore affect adaptation via preservation of the English vowel letter in Ukrainian spelling and subsequent application of Ukrainian grapheme-to-phoneme rules, resulting in the following patterns:

(9) **a. E <e> → U <e> /ɛ/:** ***e****mitter* /ɪˈmɪtə/ → ***е****мітер* /ɛˈmʲitɛr/
b. E <i> → U <i> /i/: E *tw****i****st* /twɪst/ → тв***і***ст /tvʲist/
c. E <a> → U <a> /a/: E *priv****a****te* /ˈpraɪvɪt/ → *прив****а****т* /prɪˈvat/

Pattern in (9a) is consistent with donor-letter preservation followed by Ukrainian G2P, and nearly all instances in our corpus where English /ɪ/ is spelled as <e> are adapted accordingly. For <a> the corpus contains too few items to support any generalisations. Pattern (9b), however, is not fully predictable from orthography: although donor <i> (/ɪ/) is retained as Ukrainian <i> (/i/) in 60% of loanwords in our corpus, a substantial subset (40%) is nativised with Ukrainian <и> (/ɪ/), indicating that orthography interacts with additional constraints.

An interesting tendency emerges when comparing common and proper nouns containing the letter <i> in the donor form: the latter exhibit less variation with a clear preference for the spelling-based adaptation, i.e. E <i> → U <i>, with no instances of E <i> → U <и>:[12]

(10) ***Di****ckens, Darw****i****n, R****i****chard, Stephen Hawk****i****ng, Greenw****i****ch, M****i****ssiss****i****pp****i***

[12] English <i> is adapted as Ukrainian /i/ (<i>) in all the examples in (10).

There could be multiple reasons for that starting from the borrowers' attempt to preserve visual and orthographic identity of such names, to transliteration conventions or orthographic salience of such nouns, which could reinforce spelling-based adaptation when they are borrowed through writing channel.

There are also cases where the nativised form clearly deviates from the patterns in (9), including instances where English /ɪ/, spelled as <e>, <i> or <a>, is not adapted according to the expected spelling-based patterns, or where the original word contains less common spelling variants. Such cases as in (11) cannot be attributed to orthography.

(11) *d**e**sign* /dɪˈzaɪn/ → *д**у**зайн* /dɪˈzajn/
*turn**i**p* /ˈtɜːnɪp/ → *турн**е**пс* /tʊrˈnɛps/
*im**a**ge* /ˈɪmɪdʒ/ → *ім**і**дж* /ˈimʲidʒ/
*b**u**siness* /ˈbɪznəs/ → *б**і**знес* /ˈbʲiznɛs/
*bodyb**ui**lder* /ˈbɒdɪˌbɪldə/ → *бод**і**б**і**лдер* /bodʲiˈbʲildɛr/

To sum up, while orthography appears to play some role in the adaptation of English /ɪ/, the overall picture remains inconclusive. This means that the explanation for the observed patterns should be sought elsewhere. In the following sections we examine several such factors.

3.3. The influence of perception on English /ɪ/ adaptation in Ukrainian

To enable direct comparison, the same experimental design as in 2.3 was used with Ukrainian native speakers. The group was selected to closely resemble the Russian one: 41 participants, aged 25–60, with no or very limited command of English, all using Ukrainian exclusively in daily life.[13] They were presented with the same auditory stimuli and asked to transcribe them using Cyrillic script. The data below show how Ukrainian speakers adapted English /ɪ/.

(12) E /ɪ/ → U <и> (/ɪ/) = 53%
E /ɪ/ → U <і> (/i/) = 26%
E /ɪ/ → U <е> (/ɛ/) = 21%

Most participants preferred Ukrainian /ɪ/ (53%), suggesting a strong perceptual alignment between this vowel and English /ɪ/. Additionally, 26% of adaptations involve a substitution with Ukrainian /i/, indicating that some speakers might perceive English /ɪ/ as a higher vowel. Meanwhile, 21%

[13] Participants reported no dialect features that would meaningfully affect their vowel perception.

of adaptors opted for Ukrainian /ɛ/, pointing to occasional interpretations of English /ɪ/ as a more open vowel. These results highlight a high degree of variability in the perception of the non-native element, though with a tendency towards its interpretation as a native /ɪ/.

We now examine the acoustic distance between the selected vowels and English /ɪ/ using formant values. Ukrainian vowel averages were based on Vakulenko (2023)

(13) **a. U /i/** **b. U /ɪ/** **c. U /ɛ/**
F1 265 F1 319 F1 617
F2 2721 F2 2342 F2 2355

Figure 2 plots the values from (13) along with those of English /ɪ/.[14]

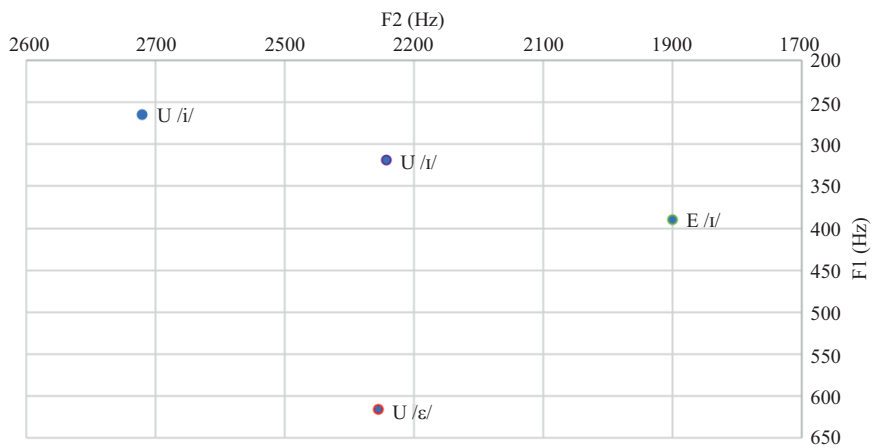


Fig. 2. Average F1 and F2 values of English /ɪ/ and Ukrainian /ɪ/, /i/ & /ɛ/

Figure 2 shows that Ukrainian /ɪ/ is acoustically closest to English /ɪ/, aligning with its frequent selection (53%) and supporting the idea that acoustic proximity often drives perceptual similarity (Kuhl 2000). Interestingly, Ukrainian /i/ was the second most common choice, despite being acoustically more distant from English /ɪ/ than Ukrainian /ɛ/. This may be due to its F1 proximity to English /ɪ/, which is often a more reliable cue for vowel recognition.

However, these findings differ from the Russian group. While Russian speakers' adaptations of English /ɪ/ represent similar vowels – /i/, [ɨ] and /ɛ/ – there is a clear discrepancy in the frequency of their choice across Russian and Ukrainian results, which are shown in Figure 3.

[14] The same values for English /ɪ/ were used as in the Russian experiment: F1 390 and F2 1900.

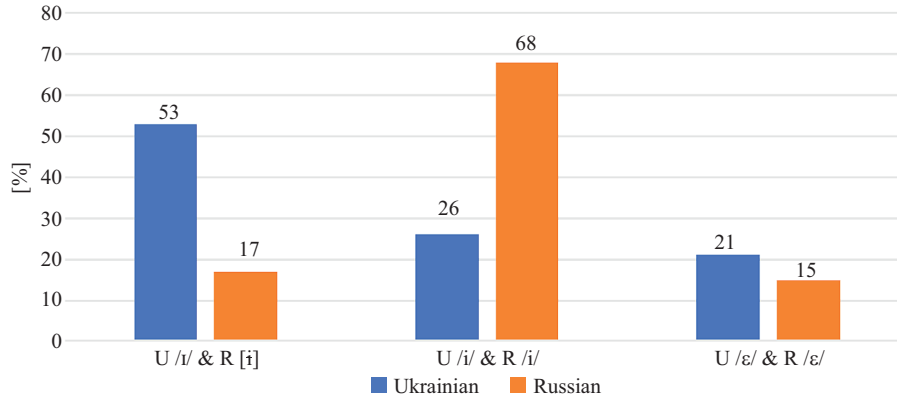


Fig. 3. The comparison of most common adaptations of E /ɪ/ in Ukrainian & Russian perceptual experiment

While Ukrainian speakers more frequently map English /ɪ/ to Ukrainian /ɪ/, for the Russian speakers the best perceptual match of the target vowel is /i/. Furthermore, Ukrainian speakers' choice seems to be guided by the acoustic similarity between English and Ukrainian vowels whereas Russian data clearly demonstrates that acoustic proximity is not the primary factor in their choice of the best substitute.

Nevertheless, the experiment does not fully explain patterns in established borrowings where English /ɪ/ is replaced by Ukrainian /i/ in as many as 53% of loans and Ukrainian /ɪ/ appears in 36%. To clarify when one pattern is favoured over another, we next examine Ukrainian segmental environment and structural constraints.

3.4. The influence of phonology on English /ɪ/ adaptation in Ukrainian

To begin with, let us focus on the phonemic status of /i/ and /ɪ/. That of Ukrainian /i/ is well-supported by minimal pairs in word-initial position, e.g., *Іра* /ˈira/ (female name) – *ара* /ˈara/ 'are, gen.' (metric unit) (Gryschenko et al. 2002). In contrast, /ɪ/ does not occur in similar minimal pairs word-initially, which could raise questions about its phonemic status.

Nonetheless, /i/ and /ɪ/ show complementary distribution with each other conditioned by palatalisation of the preceding consonants. Specifically, /i/ follows palatalised consonants, while /ɪ/ occurs after non-palatalised ones, for example, *син* /sɪn/ 'son' – *сін* /sin/ 'hay, gen.'. However, this distributional pattern might suggest that the contrast between /i/ and /ɪ/ is conditioned by

the palatalisation of the preceding consonant, rather than being entirely independent.

Nevertheless, there are strong arguments in favour of recognising /ɪ/ as an independent phoneme. Although its occurrence in word-initial position is limited, it has been attested in the speech of some Ukrainian speakers, particularly in certain dialects and idiolects. For example, variation between /i/ and /ɪ/ can be observed in forms such as *іноді* /ˈinɔdʲi/ ~ /ˈɪnɔdʲi/ 'sometimes', *індик* /inˈdɪk/ ~ /ɪnˈdɪk/ 'turkey' etc. (Gryschenko et al. 2002). These alternations suggest that, at least for some speakers, /ɪ/ is not merely a contextual variant but may function as an independent phoneme. Furthermore, if the minimal pairs like син /sɪn/ 'son' – сін /sʲin/ 'hay' contrast primarily in terms of the palatalisation of the preceding consonant rather than the quality of the vowel, then similar consonantal contrasts should be observable before other vowels and word-finally. However, this is not the case for a number of consonants, specifically /g/, /k/, /x/, /ɦ/, /ʒ/, /t͡ʃ/, /ʃ/, /b/, /p/, /m/, /f/ and /v/. These consonants can only be half-palatalised before /i/, and thus function as allophones of their non-palatalised counterparts (e.g. *кіно* [kʲiˈnɔ] 'cinema', *фірма* [ˈfʲirmɐ] 'company', *віз* [vʲiz] 'cart'). This distributional limitation further supports the interpretation that in minimal pairs such as *кинь* /kɪnʲ/ 'throw' – *кінь* /kʲinʲ/ 'horse', the contrast lies in the vowel quality, /i/ versus /ɪ/, rather than in the consonantal palatalisation alone (Gryschenko et al. 2002). This provides compelling evidence for treating /i/ and /ɪ/ as distinct phonemes in Ukrainian.

We now turn to how this affects English /ɪ/ adaptation. The table below provides a breakdown of all substitutions in our corpus involving Ukrainian /ɪ/ and /i/, with particular attention to segmental context – specifically, the preceding consonant in the adapted lexical items.

Table 1. The ratio of Ukrainian /ɪ/ and /i/ adaptations in different segmental contexts

	E /ɪ/ → U /ɪ/	E /ɪ/ → U /i/
word-initial	0%	100%
after velars	0%	100%
after lateral	4%	96%
after labials[a]	6%	94%
after rhotic	93%	7%
after coronal obstruents	85%	15%

[a] Both bi-labial as well as labio-dental sounds are included within this category.

We can observe that English /ɪ/ is consistently substituted with Ukrainian /i/ in word-initial position (14) as well as after velars (15):

(14) *import* /ɪmˈpɔːt/ → *імпорт* /ˈimport/
(15) *hipster* /ˈhɪpstə/ → *хіпстер* /ˈxʲipstɛr/

Furthermore, Ukrainian /i/ is preferred over /ɪ/ when the preceding consonants have a labial place of articulation (16) or in the case of a lateral sound (17):

(16) *cabin* /ˈkæbɪn/ → *кабіна* /kaˈbʲina/
(17) *limit* /ˈlɪmɪt/ → *ліміт* /lʲiˈmʲit/

On the other hand, Ukrainian /ɪ/ appears to be the preferred choice after the sound /r/ (18) as well as following coronal obstruents (19):

(18) *bridge* /brɪdʒ/ → *бридж* /brɪd͡ʒ/
(19) *radical* /ˈrædɪkəl/ → *радикал* /radɪˈkal/

According to Paradis and LaCharité (1997), minimal repairs are preferred to satisfy the phonotactic constraints of the borrowing language. In Standard Ukrainian only /i/ is allowed in word-initial position, so loanwords conform to this. In other contexts, both /i/ and /ɪ/ are attested in Ukrainian:

(20) **velar**: *хіба* /xʲiba/ ‘perhaps’ ~ *хитрий* /xɪtrɪj/ ‘sly’
labial: *німu* /pʲiˈtɪ/ ‘to go’ ~ *нитu* /ˈpɪtɪ/ ‘to drink’
coronal: *діти* /dʲitɪ/ ‘children’ ~ *дивний* /ˈdɪvnɪj/ ‘odd’
lateral: *ліс* /lʲis/ ‘forest’ ~ *лице* /lɪˈt͡sɛ/ ‘face’
rhotic: *ріка* /rʲiˈka/ ‘river’ ~ *риба* /ˈrɪba/ ‘fish’

In the absence of specific phonotactic restrictions in these contexts, it could be argued that Ukrainian /ɪ/ is a better substitution for English /ɪ/. Not only does it lie in the close acoustic proximity to the target vowel, its choice additionally aligns with the minimal repair principal proposed within Paradis and LaCharité nativisation-through-production approach as it allows for the retention of the non-palatalised quality of the preceding consonants. Nevertheless, despite being perceptually and acoustically less similar to the input and triggering additional steps in the repair process, the vowel /i/ is preferred in 53% of loanwords.

However, once the specific consonants that are typically followed by either Ukrainian /i/ or /ɪ/ in loanwords are examined, a clear pattern emerges:

(21) a. /p, b, f, v, g, k, x, l, m/ + /i/
b. /t, d, s, z, r/ + /ɪ/

The consonants in (21a) can only have half-palatalised allophones before /i/, graphically <i>, whereas those in (21b) stand in phonemic opposition

to their palatalised counterparts. The only exception to this generalisation is /l/, which, in our corpus, is followed by /i/ in almost all loanwords.[15]

Palatalisation is often considered as a less marked feature than half--palatalisation, which is described as strongly marked in the majority of languages (Menn 2013). In Ukrainian, this marked status of the latter is supported by its non-contrastive role (unlike full palatalisation which is phonemic), limited distribution and relative articulatory complexity which involves secondary palatal gesture without full palatal articulation. In the context of loanword adaption, we can observe that the presence of the orthographic cue in the original form, letter <i>, following consonants that only allow half-palatalised allophones in Ukrainian, appears to reinforce the retention of this strongly marked feature in the nativised form. Conversely, when English /ɪ/ follows consonants which exhibit a phonemic palatalisation contrast in Ukrainian, such as coronal obstruents or /r/, the adapted form tends to favour Ukrainian /ɪ/, which is its closest perceptual and acoustic match. This choice does not trigger palatalisation of the preceding consonant, despite the presence of the letter <i> in the original form.

In other words, when an orthographic cue signals a strongly marked phonological feature, such as half-palatalisation, the drive to preserve such feature may override both perceptual similarity and the preference for less marked structures. This suggests that one of the factors shaping phonological adaptation of loanwords could indeed be orthographic transparency, particularly, when it aligns with the marked articulatory patterns in the recipient language. In contrast, when such orthographic cues are absent, as in the perceptual experiment reported in this paper, the substitutions drop dramatically and the adaptation results in the acoustically closest substitute.

4. Conclusions

The investigation of English /ɪ/ adaptation in Russian and Ukrainian loanwords examined in this paper reflects the complex nature of this process. By juxtaposing and analysing the nativisation patterns of two closely related languages that nonetheless differ in their phonemic and phonological structure, we can see how these differences shape loanword adaptation.

The data suggests that the difference in the phonemic status of high front vowels in Russian and Ukrainian is the major factor in the divergent adaptation of English /ɪ/. Ukrainian treats /i/ and /i/ as distinct phonemes,

[15] The reason for that is unclear at this point and requires further investigation.

allowing speakers to access both in their mental lexicon and process them through a perceptual filter. This enables acoustic similarity between input and output forms to guide adaptation (Peperkamp & Dupoux 2005), resulting in a greater variability in the nativised forms. In contrast, Russian speakers' mental representation is limited to /i/, making it a more accessible substitute for English /ɪ/ than its allophone [i], as reflected in the preference for /i/ in both established and online loans.

The phonological structure of the target language also impacts adaptation outcomes. Relevant phonotactic constraints are typically observed, and there may be a preference for retaining strongly marked features in loanwords particularly in the presence of orthographic cues that signal them. This is evident in Ukrainian where nativised forms tend towards /i/ (graphically <i>) when it preserves half-palatalisation. Orthography also influences adaptation more broadly: in both data sets, overlap between established loans and perceptual experiment results suggests that spelling-based adaptations reflect a deeper perceptual alignment rather than mere transliteration habits.

Overall, this study highlights the interplay between phonological systems, perceptual mechanisms and orthographic influences in loanword adaptation. Examining closely related languages with distinct phonemic inventories offers insight into how subtle structural differences yield divergent linguistic outcomes. These findings contribute to a more nuanced understanding of cross-linguistic variation in loanword phonology.

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