

# The phonetics, phonology and morphophonology of Secondary Imperfectives in Polish

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## 1. Introduction

The Secondary Imperfectives in Polish are formed by means of two suffixes: *-a-*, e.g. *za-głodz-i-ć* [zagwɔdʑit͡ɕ] ‘to starve’ > *za-głodz-a-ć* [zagwad͡zɔt͡ɕ] ‘to starve, SI’, and *-ywa-/iwa-*, e.g. *po-czyt-a-ć* [pɔt͡ʃit͡ɕ] ‘to read’ > *po-czyt-ywa-ć* [pɔt͡ʃit͡ɕivɔt͡ɕ] ‘to read, SI’. Both ways of deriving the SI forms involve sound changes in the suffix itself as well and in the stem. In this paper, using phonological criteria of a non-derivational model of phonology, we will consider some of the main sound patterns related to SI formation with a view to determine the actual phonological aspects, as well as those which seem to belong to morphophonology. The non-derivational perspective forces us to look at the phenomenon of SI formation in a slightly different way to that which is present in numerous standard generative phonological and morphological analyses (e.g. Czaykowska-Higgins 1988, 1997, Gussmann 1980, Laskowski 1975*a*, Rubach 1984, Szpyra 1987, 1989). The views presented here will be closer to those in Gussmann (2007), which require synchronic presence of phonological motivation for a phenomenon to be deemed phonological. Otherwise, even seemingly regular sound patterns must be relegated to morphophonology, which is regaining its independent status in grammar. It will be signalled below that, even under this view, there may be different approaches to morphophonology. It is not the task of this paper to explicate a particular stance. On the other hand, where phonology indeed appears to be active, we will attempt to account for the irregular behaviour of the velar fricative, as in, e.g. *za-koch-a-ć* [zakɔxɔt͡ɕ] ‘to fall in love’ > *za-koch-iwa-ć* [zakɔçiivɔt͡ɕ] ‘to fall in love SI’. A possibility of two distinct underlying representations for the suffix *-ywa-/iwa-* is also considered. We begin our discussion with the *-a-* suffix.<sup>1</sup>

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<sup>1</sup> In generative studies, this suffix is represented as *-aj-* (Gussmann 1980: 46, 2007: 286, Laskowski 1975*a*: 48, 1975*b*, Szpyra 1987: 188). In these approaches, the glide undergoes deletion in relevant contexts.

## 2. Secondary Imperfectives in *-a-*

The derivation of SI by means of the suffix *-a-* is very complex as it involves a number of sound changes in the stem which, in turn, may also have consequences for the shape of the prefix. The effects to be enumerated below are a mixed bag of lexicalizations, productive morphophonological patterns and truly phonological phenomena. The borderlines between these three groups depend on the theoretical model. We will follow Gussmann (2007) in assuming that all the alternations within the stem are in fact morphophonological, while the vowel-zero alternation in the prefix is phonologically controlled.

Thus, there is quite a range of vocalic alternations in the stem nucleus, or nuclei, in this morphological category such as [ɔ ~ a, u ~ a, ε ~ a] (1a,b,d,e), including alternations with zero, as in [ϕ ~ i/i̇, ϕ ~ ε] (1f,g). Additionally, the [ɔ ~ a] alternation may affect two nuclei in the stem (1c). The morphologically induced vowel-zero alternations within some stems (1f,g) provide contexts for vowel-zero alternations within the prefix. These vocalic alternations may be accompanied by changes in consonant qualities. Below, the consonant qualities are marked in the following way: C = hard, C<sup>j</sup> = soft, C<sup>+</sup> = hard, but historically, a result of palatalization. In some morphological formations, the hard C<sup>+</sup> consonants pattern with the soft ones, and are then referred to as ‘functionally soft’ (e.g. Gussmann 1980: 56).

In our discussion, we bypass two important questions which may be interesting from the point of view of morphological derivation, that is, the question of the direction of motivation, and the problem of phonological conditioning of particular affix selection.<sup>2</sup> While melodic regularities can be observed, and these will be enumerated below to a great extent, it is rather difficult if not impossible to provide hard and fast principles of phonological conditioning for affix selection. Thus, we limit the discussion to the existing melodic patterns as they arise after the morphological derivation, rather than discuss the derivation itself. Likewise, the direction of motivation is not always clear. For example, the form *po-wątpi-ewa-ć* ‘doubt, SI’ does not seem to be based on an existing simpler infinitive form *\*po-wątpić*. Other examples illustrating the muddled nature of the direction of motivation will be pointed to in relevant places.

Let us look at the vocalic and consonantal alternations accompanying the SI derivation in the following data.

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<sup>2</sup> The morphological and semantic aspects of the phenomenon under discussion are analyzed by Szymanek (this volume).

- (1) a. [ɔ ~ a]
- |                               |                                 |
|-------------------------------|---------------------------------|
| <i>u-wolni-ć</i> [uvɔlɲit͡ɕ]  | <i>u-walni-a-ć</i> [uvalɲat͡ɕ]  |
| ‘to liberate’                 | ‘SI’                            |
| <i>za-robi-ć</i> [zarɔbʲit͡ɕ] | <i>za-rabi-a-ć</i> [zarabʲat͡ɕ] |
| ‘to earn’                     | ‘SI’                            |
- b. [ɔ ~ a], C<sup>j</sup> ~ C<sup>+</sup>
- |                                 |                                  |
|---------------------------------|----------------------------------|
| <i>za-grozi-ć</i> [zagrɔzʲit͡ɕ] | <i>za-graż-a-ć</i> [zagraʒat͡ɕ]  |
| ‘to threaten’                   | ‘SI’                             |
| <i>za-prosi-ć</i> [zaprocʲit͡ɕ] | <i>za-prasz-a-ć</i> [zapraʃat͡ɕ] |
| ‘to invite’                     | ‘SI’                             |
- c. [ɔ ɔ ~ a a], (C<sup>j</sup> ~ C<sup>+</sup>)
- |  |                                   |
|--|-----------------------------------|
| <i>o-swobodzi-ć</i> [ɔsfɔbɔd͡zʲit͡ɕ]     | ‘to liberate’                     |
| <i>o-swobadz-a-ć</i> [ɔsfɔbad͡zʲat͡ɕ]    | ‘SI’                              |
| <i>o-swabadz-a-ć</i> [ɔsfabad͡zʲat͡ɕ]    | ‘SI’                              |
| <i>wy-narodowi-ć</i> [vʲinarɔdɔvʲit͡ɕ]   | ‘to deprive of national identity’ |
| <i>wy-narodawi-a-ć</i> [vʲinarɔdavʲat͡ɕ] | ‘SI’                              |
| <i>wy-naradawi-a-ć</i> [vʲinaradavʲat͡ɕ] | ‘SI’                              |
| <i>o-szołomi-ć</i> [ɔʃɔwɔmʲit͡ɕ]         | ‘to stupefy’                      |
| <i>o-szołami-a-ć</i> [ɔʃɔwamʲat͡ɕ]       | ‘SI’                              |
| <i>o-szałami-a-ć</i> [ɔʃawamʲat͡ɕ]       | ‘SI’                              |
- d. [u ~ a]<sup>3</sup>, (C<sup>j</sup> ~ C<sup>+</sup>)
- |                                |                                   |
|--------------------------------|-----------------------------------|
| <i>od-wróci-ć</i> [ɔdvrućit͡ɕ] | <i>od-wrac-a-ć</i> [ɔdvratsʲat͡ɕ] |
| ‘to turn over’                 | ‘SI’                              |
| <i>za-mówi-ć</i> [zamuvʲit͡ɕ]  | <i>za-mawi-a-ć</i> [zamavʲat͡ɕ]   |
| ‘to order’                     | ‘SI’                              |
- e. [ɛ ~ a], C<sup>j</sup> ~ C
- |                                    |   |
|------------------------------------|---|
| <i>wz-lecie-ć</i> [vzlet͡ɕet͡ɕ]    | <i>wz-lat-a-ć</i> [vzlata͡ɕ] <sup>4</sup> |
| ‘to fly up’                        | ‘SI’                                      |
| <i>po-wiedzie-ć</i> [pɔvʲɛd͡zɛt͡ɕ] | <i>po-wiad-a-ć</i> [pɔvʲadat͡ɕ]           |
| ‘to tell’                          | ‘SI’                                      |

<sup>3</sup> Gussmann (2007: 287) considers the possibility that the underlying vowel in, e.g. *odwrócić* is [ɔ]. It is replaced by [u] by means of a morphophonological replacement. Under this view, there is no independent [u ~ a] alternation in SI to speak of.

<sup>4</sup> There is an interesting form *wz-lat-ywa-ć* [vzlatʲvat͡ɕ] ‘fly up, SI’, which Szpyra (1987: 193) calls a double derived imperfective. The stem vowel [a] suggests that first the SI was formed by the suffix *-a-*, and then the form served as a base for another SI derivation, this time by means of the suffix *-iwa-/-ywa-*. Like with *po-wątpiewać* ‘to doubt, SI’,

- f. [ $\emptyset \sim i/y$ ] - including the v- $\emptyset$  alternation in prefixes
- |                                  |  |
|----------------------------------|--|
| <i>ode-tk-a-ć</i> [odetkac̆]     | <i>od-tyk-a-ć</i> [odtikac̆]                   |
| 'to unclog'                      | 'SI'   |
| <i>ze-rw-a-ć</i> [zervac̆]       | <i>z-ryw-a-ć</i> [zrivac̆]                     |
| 'to pluck'                       | 'SI'   |
| <i>za-pomni-e-ć</i> [zapom̆nɛc̆] | <i>za-pomin-a-ć</i> [zapom̆inat̆] <sup>5</sup> |
| 'to forget'                      | 'SI'   |
- g. [ $\emptyset \sim \varepsilon$ ], ( $C^+ \sim C$ )
- |                              |                                |
|------------------------------|--------------------------------|
| <i>za-wrz-e-ć</i> [zav̆zɛc̆] | <i>za-wier-a-ć</i> [zav̆ɛrac̆] |
| 'to include'                 | 'SI'                           |
| <i>u-mrz-e-ć</i> [um̆zɛc̆]   | <i>u-mier-a-ć</i> [um̆ɛrac̆]   |
| 'to die'                     | 'SI'                           |
| <i>ze-br-a-ć</i> [zebrac̆]   | <i>z-bier-a-ć</i> [zb̆ɛrac̆]   |
| 'to collect'                 | 'SI'                           |

In the generative tradition, the effects illustrated in (1a–g) are referred to as ‘vowel tensing’ (e.g. Durand-Deska 1991, Gussmann 1980, Laskowski 1975a, 1975b, Szpyra 1987). In a more recent analysis (Gussmann 2007), the alternation is viewed as a morphophonological vowel replacement. It is probably true that historically speaking, we were dealing with some sort of ‘tensing’ in this type of derivations, which should probably be more accurately described as lengthening of the stem vowel. Synchronically speaking, however, a morphophonological replacement is much closer to reality.

The most productive vowel alternation in the SI derivation induced by the suffix *-a-* is [ $\varepsilon \sim a$ ] illustrated in (1a,b,c), as well as (1d) if [u] < [ɔ]. Gussmann (2007: 286) provides two interesting arguments in support of the relative productivity of this morphophonological alternation. One concerns the fact that sometimes, and quite optionally, this replacement affects more than one vowel [ɔ] within the stem (1c). The other argument concerns the substandard phenomenon of substituting [a] for [ɔ] in the SI of forms such as *właczac̆* [v̆wɔnt̆jat̆] > \*[v̆want̆jat̆] ‘to switch on, SI’.

It seems that the use of the SI suffix *-a-* has, or in fact, historically had some sort of templatic or harmonic effect on the stem vowel. Below, we present a scheme expressing this historical ‘vowel tensing’, or synchronic morphophonological replacements, if one prefers, focusing only on the observable effects.

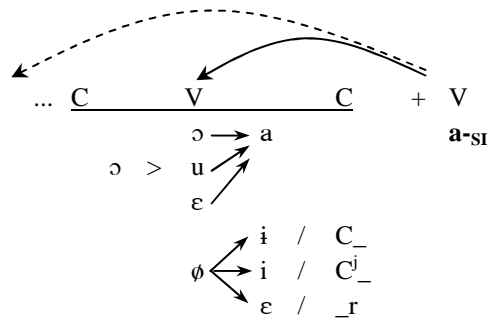
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mentioned above, there does not seem to be a simpler form *\*wz-lat-a-ć* on which the SI would be formed.

<sup>5</sup> There are also forms like, *za-piąć* [zap̆jɔ̆nt̆c̆] ‘do up’, *za-pin-a-ć* [zap̆j̆inat̆c̆] ‘to do up / SI’, which are similar, but they involve additional alternation with a nasal vowel *ɔ̆*, realized as vowel + nasal consonant.

(2) ‘Vowel tensing’ (sometimes more than one vowel)

- a. [ɔsfɔbadzaɕ]
- b. [ɔsfabadzaɕ]
- c. [zagrɔziɕ]>[zagrazaiɕ]
- d. [zavruɕiɕ]>[zavraɕiɕ]
- e. [vzlɛɕɕiɕ]>[vzlaɕiɕ]
- f. [odɛɕiɕ]>[odiɕiɕ]
- g. [zapɔmɲɕiɕ]>[zapɔmiɕiɕ]
- h. [zɛbraɕ]>[zibraɕ]



The ‘vowel tensing’ may be responsible for the other changes observed in (1), including the alternation of zero with vowels [i/i/ɛ] in asyllabic stems (1f,g). In generative studies, this alternation was understood as vowel insertion or epenthesis, see e.g. Gussmann (1980: 72, 92), Laskowski (1975a: 32). One reason was the predictability of the shape of the inserted vowel, i.e. [i/i/ɛ]. An alternative analysis which assumes a separate development of the ‘tensed’/lengthened vowels in respectively lexicalized by morphologically related forms does not lose this regularity from sight in fact. Though, admittedly, it is less attractive from a generative point of view.

Two points need to be made here, one concerning the targets of ‘tensing’ in total, and one referring to the vocalization of one of them, that is, the empty vocalic site in asyllabic stems. The inputs to ‘vowel tensing’ form an interesting mixture. Given the possibility discussed in Gussmann (2007), that the alternation [u ~ a] may in fact be treated as [ɔ ~ a], the overt inputs can be reduced to two mid vowels [ɔ] and [ɛ]. These are replaced with a low vowel [a]. One must bear in mind that this process is conditioned by a particular morphological derivation, and should not be viewed as phonological.<sup>6</sup> The other target of ‘tensing’ in (2f–h) appears to be an empty nucleus.<sup>7</sup> Here the emerging vowels [i,i,ɛ] occur in mutually exclusive contexts. [i] is found after hard consonants (2f), [i]

<sup>6</sup> One might feel tempted to say that the mid vowels are lowered, which could have been the case historically. It is not impossible to express this phenomenon uniformly in terms of, e.g. elements of Government Phonology. The mid vowels are [ɔ]={U,A} and [ɛ]={I,A} respectively, Thus the lowering consists in delinking all categories other than {A} before the following {A} belonging to the SI suffix. It would therefore resemble a vowel harmony phenomenon. However, from the synchronic point of view, this phenomenon occurs only before the -a- suffix of SI, and is not regular even there.

<sup>7</sup> We assume that the so called asyllabic stems contain an empty vocalic site ‘ϕ’ inside the cluster, e.g. *tka-ć* /tϕkac̣/ ‘to weave’.

after soft ones (2g), while [ɛ] occurs in front of [r]. It is this mixture of morphological causality of the changes and the clear phonological conditioning of the outcomes that make a successful synchronic description of the facts difficult. It is, however, not impossible to understand the pattern, if certain strict assumptions are made. Firstly, if morphological causality of phonological processes is eschewed, the zero alternating with [i, i, ɛ] in (2f–h) must not be treated as insertion. Neither are we dealing with vowel deletion in the contexts outside SI derivation, which would normally be the other natural alternative to be considered in such cases of alternation in derivational models.

The morphophonological view of such alternations may either derive the forms by means of morphophonological replacements (Gussmann 2007), or alternatively, it may assume that we are dealing with two separate lexical representations of the stem, which developed separately in terms of phonology, but which are morphologically related. In other words, there is no vowel insertion in (2f–h) because historically the SI suffix did not allow an asyllabic stem to arise in the first place. The ‘tensing’ therefore could well be a historical phenomenon, protecting the front high vowel from disappearing. The later development of that vowel, i.e. respecting the phonotactic pattern C<sup>i</sup> vs. Ci, and lowering to [ɛ] before [r] are viable phonological changes which however only appear to be a result of synchronic derivation in Modern Polish once the insertion view is entertained.

There are interesting exceptions to the patterns listed in (2), which require at least a brief comment.<sup>8</sup> The first of them is *za-korzenić* – *za-korzeni-a-ć* [zakɔʒɛɲit͡ɕ – zakɔʒɛɲat͡ɕ] ‘to put down roots / SI’, but not \**zakarzeniać*. Neither the [ɛ ~ a] nor the [ɔ ~ a] alternation is observed. In a sense, given that [ɛ] is not affected, we should not expect the preceding [ɔ] to change. Thus the explanation of this form should perhaps concentrate on what prevents the change of [ɛ] to yield \**zakorzaniać*. A similar problem is posed by the form *za-zieleni-a-ć* ‘to turn green, SI’. Some of the exceptional SI forms, such as *za-lesi-a-ć* < *za-lesić* ‘afforest, SI/Inf.’ but not \**zalasiać* or \**zalasac*, *o-świec-a-ć* < *o-świecić* ‘to enlighten, SI/Inf.’ but not \**oświacać* may be connected with the absence of an alternation with a depalatalized or non-palatalized following consonant (*za-lesi-a-ć*), or the wrong type of alternation is present, i.e. [t͡ɕ ~ t͡s] instead of [t͡ɕ ~ t], which does not allow for the [ɛ ~ a] correlation, as in *o-świec-a-ć*. There are also exceptions to the [u ~ a] alternation, as in *rzucić* – *rzuc-a-ć* ‘to throw / SI’ (not \**rzacać*) and *roz-różnić* – *roz-różni-a-ć* ‘to distinguish / SI’ (not \**rozrażniać*). One way to explain these forms would be to assume that only those [u]’s alternate with [a] which are historical [ɔ]’s and the alternation [u ~ ɔ] is still present in the derivative forms. For example, the alternation *na-wrócić* – *na-wrac-a-ć* ‘to convert /

<sup>8</sup> I am grateful to Edmund Gussmann for pointing these examples to me.

SI' is possible because there is also a form *na-wroty* 'return, pl.'. These are only hypothetical explanations. The forms require a detailed morphological analysis.

Let us briefly comment on the optional modifications of the stem-final consonants which are observed in the data in (1). From a derivational point of view, it seems that once there is a change in consonant quality in SI derivation, it is towards a hard or harder one. This distinction is used solely for the purpose of illustration, but it has some grounding in the way these consonants pattern, for example, for the purpose of affix selection in Polish. The distinction between soft and hard consonants may be made on phonetic grounds. The one we use in this paper is based on a distributional fact concerning vowels [i] and [i̯]. The details will be discussed in the following section in connection with the SI suffix *-ywa/-iwa-*. Suffice it to say, at this stage, that a soft consonant is one that can be followed by [i], e.g. [p<sup>i</sup>, m<sup>i</sup>, ɕ, t̪c̪, d̪z, c, ʃ], while hard consonants are followed by [i̯], e.g. [r, s, z, t, d, f, v, b]. There is, however, a group of historically soft consonants which were hardened and take [i̯] nowadays, e.g. [ʒ, ʃ, t̪ʃ, d̪ʒ, t̪s, d̪z]. The scheme in (3) assumes a direction of motivation in synchronic derivation of SI. It must be born in mind that a non-derivational morphophonological view of these relationships would not recognize arrows. The correlation would be lexical or at best derived by morphophonological replacements. The former view would treat the 'depalatalized' forms as ones which had never been palatalized in the first place. Depalatalization in Polish morphophonology deserves a longer discussion which we cannot afford here. The term suggests two things, neither of which may be synchronically true. Firstly, it suggests that we are dealing with a phonological phenomenon. The exceptionality and lack of phonological context force us to eschew this possibility. Secondly, it strongly suggests the direction of motivation, which, as mentioned earlier, is not always recoverable.

(3) Modification of stem-final consonant – a derivational perspective

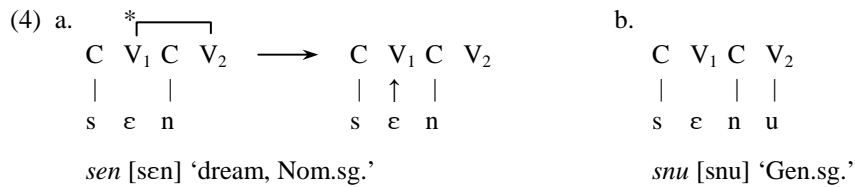
	soft C <sup>i</sup>	historically soft C <sup>+</sup>	hard C
a. [zagrɔ̯zi̯t̪c̪] > [zagrɔ̯zɔ̯t̪c̪] 'to threaten / SI'	z	→ ʒ	
b. [zavʒet̪c̪] > [zavʒer̪at̪c̪] 'to include / SI'		ʒ	→ r
c. [vzlet̪c̪et̪c̪] > [vzlat̪at̪c̪] 'to fly / SI'	t̪c̪	→	t

The selection of the *-a-* suffix seems to be correlated with one or both types of stem modification, that is, 'vowel tensing' or consonant 'depalatalization'.<sup>9</sup> For

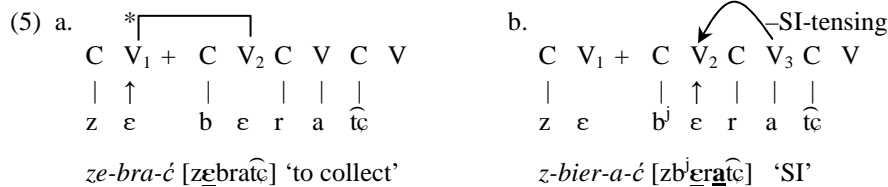
<sup>9</sup> Obviously, we are talking about a tendency and counterexamples where, for more or less apparent reasons, neither change occurs easily come to mind: *roz-marzyć* – *roz-*

example, if we look at the SI derivation *do-pyta-ć* > *do-pyt-ywa-ć* ‘to ask / SI’, which takes the suffix *-ywa-* and not *-a-*, the stem vowel is a lexical /i/, which is not a target of ‘tensing’, and the final consonant is already hard, that is, not a target of ‘depalatalization’. However, just as in the cases of ‘vowel tensing’, there is no visible synchronic phonological causality of the consonant ‘depalatalization’, either.

There is, however, what appears to be a purely phonological phenomenon connected with this type of derivation of Secondary Imperfectives. The morphophonological alterations of the stems (asyllabic > syllabic), e.g. *za-tka-ć* / *za-tyk-a-ć* ‘to clog / SI’ or *za-bra-ć* / *za-biera-ć* ‘to take away / SI’, spawn truly phonological vowel-zero alternations in the prefixes. For example, the alternation *ze-bra-ć* [zɛbrat͡ɕ] – *z-bier-a-ć* [zbʲɛrat͡ɕ] ‘to collect / SI’ resembles other classical examples of vowel-zero alternations in Polish, e.g. *sen* – *snu* [sen – snu] ‘dream, Nom.sg. / Gen.sg.’. Below, we provide a simplified Government Phonology illustration. Regular vowel-zero alternation in Polish is due to interaction between nuclei. The alternating vowel is represented as a floating melody [ɛ] under V<sub>1</sub>, which must link to its nucleus if V<sub>2</sub> is empty ([sen]).<sup>10</sup> The melody remains unassociated when the following nucleus has a melody ([snu]).



The same pattern is observed in some prefixes followed by an SI form derived from an asyllabic root by ‘vowel tensing’. The morphological seam in (5b) is assumed to be invisible to phonology.<sup>11</sup>



*marz-a-ć* ‘to daydream / SI’, *spalić* – *spal-a-ć* ‘to burn / SI’, *skupić* – *skupi-a-ć* ‘to concentrate / SI’, *od-móżdżyć* – *od-móżdż-a-ć* ‘to brainwash / SI’.

<sup>10</sup> A nucleus that contains a floating melody is also formally empty. We assume that there is a universal constraint disallowing sequences of two formally empty nuclei.

<sup>11</sup> In GP terms, the prefix is synthetic, or non-analytic.



Note that the linking of the melody to  $V_2$  in (5b) has no phonological basis, as the nucleus is followed by a full vowel in  $V_3$ . This is why the [ $\emptyset \sim i/i, \emptyset \sim \varepsilon$ ] alternations in (1f–g) must not be viewed as phonological. It is true, however, that the outcome of this morphophonological alternation provides phonological conditioning for the interpretation of the nucleus  $V_1$  in the prefix. Thus, the vowel-zero alternations involved in SI derivations are partly morphological and partly phonological, but only if we are talking about two different contexts: the vocalic site in the so called asyllabic root, and the vocalic site in the prefix, respectively. Now, we turn to the phonological aspects of SI derivation with the suffix *-ywa-/-iwa-*.

### 3. Secondary Imperfectives in *-ywa-/-iwa-*

The other major way to form the SI is by adding the suffix *-ywa-/-iwa-*. Contrary to what the data in (6) might suggest in surface terms, this suffix is mostly selected for stems ending in hard consonants (6a–c), and only seven exceptional stems ending in soft consonants (6d). However, the velar (hard) consonants (6b–c) become soft and, on the surface, they pattern with the exceptional seven stems in (6d) in terms of the actual shape of the suffix, that is, *-iwa-*.

(6) a. **hard consonant ...C-iva-**

- ob-skrob-ywa-ć* [ɔpskrɔbivac̥] ‘to scrape off’
- pod-gotow-ywa-ć* [pɔdɡɔtɔvivac̥] ‘to cook’
- prze-klam-ywa-ć* [pʃɛkwamivac̥] ‘to distort’
- o-pęł-ywa-ć* [ɔpɛntivac̥] ‘to beguile’
- wy-siad-ywa-ć* [vɨɕadivac̥] ‘to sit around’
- wy-cios-ywa-ć* [vɨtɕɔsivac̥] ‘to carve’
- za-maz-ywa-ć* [zamazivac̥] ‘to daub’
- roz-wikt-ywa-ć* [rɔzvɨkwivac̥] ‘to solve’
- ob-mac-ywa-ć* [ɔbmatɕivac̥] ‘to palpate’
- przy-równ-ywa-ć* [pʃɨrɔvnivac̥] ‘to compare’

b. **velar stops [k, g]>[c, ɟ] ...C<sup>l</sup>-iva-**

- ob-ścisk-iwa-ć* [ɔpɕɕiscivac̥] ‘to cuddle’
- od-krzyk-iwa-ć* [ɔtkɕicivac̥] ‘to shout back’
- o-klask-iwa-ć* [ɔklascivac̥] ‘to applaud’
- po-jęk-iwa-ć* [pɔjɛɕcivac̥] ‘to moan’
- za-bryzg-iwa-ć* [zabrɨʒɕivac̥] ‘to splash over’
- za-dzierzg-iwa-ć* [zadʒɛʒɕivac̥] ‘to tie up’
- ze-strug-iwa-ć* [zɛstruɕivac̥] ‘to carve off’

- c. **velar spirant [x]>[ç] ...C<sup>j</sup>-iva-**  
*od-słuch-iwa-ć* [ɔtswuçivac̥] 'to hear'  
*na-dmuch-iwa-ć* [nadmuçivac̥] 'to pump'  
*ob-wąch-iwa-ć* [ɔbvɔ<sup>w</sup>çivac̥] 'to sniff'  
*od-mach-iwa-ć* [ɔdmaçivac̥] 'to wave back'  
*po-szturch-iwa-ć* [pɔʃturçivac̥] 'to prod'
- d. **soft consonant ...C<sup>j</sup>-iva- (exceptions?)**  
*o-strzel-iwa-ć* [ɔstʃɛlivac̥] 'to fire'<sup>12</sup>  
*ob-myśl-iwa-ć* [ɔbmic̥livac̥] 'to plan'  
*od-kaszl-iwa-ć* [ɔtkɑ̃livac̥] 'to cough'  
*o-kp-iwa-ć* [ɔkp<sup>j</sup>ivac̥] 'to outwit'  
*nad-gn-iwa-ć* [nadgnivac̥] 'to start to rot'  
*przy-śn-iwa-ć* [pʃic̥nivac̥] 'to have a dream'  
*wy-drw-iwa-ć* [vidrv<sup>j</sup>ivac̥] 'to jest'

The data in (6) illustrate all the relevant facts about the distribution of *-ywa-/-iwa-*.<sup>13</sup> The most numerous in this group of SI derivatives, contrary to what may appear, are the forms with [i<sup>h</sup>va] (6a). The complementary distribution of [i<sup>h</sup>va] / [iva] appears to replicate the well-known distribution of [i/i] vowels elsewhere in Polish phonology. Let us review some of the relevant facts concerning the phonology of [i/i] before we propose the representation of the suffix and illustrate the derivation of the forms in (6) in phonological terms, as well as point to some facts which do not seem to be regular phonologically.

### 3.1. The phonology of [i/i] in Polish

Generally speaking, the surface distribution of the vowels [i/i] in Polish is complementary and depends on three major parameters listed below:<sup>14</sup>

- (7)
- whether there is a preceding consonant
  - whether the preceding consonant is a velar stop [k,g]
  - whether the preceding consonant is soft/palatalized (C<sup>j</sup>) or not (C)

<sup>12</sup> Each of these stems may appear with different prefixes, e.g. *po-kp-iwa-ć*, *wy-kp-iwa-ć*, *wy-strzel-iwa-ć*, etc.

<sup>13</sup> The SI suffix may be viewed as bi-morphemic +i/iv+a+, e.g. Szpyra (1987).

<sup>14</sup> In essence, we assume Baudouin's view that there is one front high vowel (phoneme), of which the allophones [i<sup>h</sup>] and [i] depend on the quality of the preceding consonant (Baudouin de Courtenay 1894).

Beginning with the soft context of the statement in (7c), it should be noted that, on the surface, C<sup>j</sup> covers a number of situations in which a consonant takes the following [i]. Firstly, it stands for soft segments [c, t̃c, z, d̃z, ɲ], which may occur as such independently of the presence or shape of the following vowel, for example in the following soft stems.

(8)

- wieś / wsi / wsiami* [v<sup>j</sup>ɛc - fci - fcam<sup>j</sup>i] ‘village, Nom./Gen./Instr.’  
*pleć / płci / płciami* [pwɛt̃c - pwt̃ci - pwt̃cam<sup>j</sup>i] ‘gender, Nom./Gen./Instr.’  
*gałąź / gałęzi / gałęziami* [gawo<sup>w</sup>c - gawe<sup>w</sup>zi - gawe<sup>w</sup>zam<sup>j</sup>i] ‘branch, Nom./Gen./Instr.pl.’  
*mieź / miedzi / miedziany* [m<sup>j</sup>ɛt̃c - m<sup>j</sup>ɛd̃zi - m<sup>j</sup>ɛd̃zany] ‘coper, Nom.sg./Gen.sg./adj.’  
*dłoń / dłoni / dłoniom* [dwɔɲ - dwɔɲi - dwɔɲom] ‘hand, Nom.sg./Gen.sg./Dat.’

Secondly, C<sup>j</sup> also comprises segments like [l], which do not betray traces of phonetic palatalization, but which pattern with such consonants, e.g. *sól / soli* [sul – sɔli] ‘salt, Nom.sg./Gen.sg.’, (not \*[sɔli]).

Another group involves [c, ʃ, ç], which are dependent on the following vowel. That is, they do not occur pre-consonantly and word-finally.

(9)

- bok – boki* [bɔk – bɔci] ‘side, Nom.sg./pl.’  
*róg – rogi* [ruk – rɔɟi] ‘horn, Nom.sg./pl.’  
*monarcha – monarchini* [mɔnarxa – mɔnarçɲi] ‘monarch, masc./fem.’

This group will be shortly returned to, as it relates to the statement (7b), concerning velar consonants, where SI derivation provides an interesting twist to the established phonological pattern. Finally, there is a mixed group of soft labials and coronals [p<sup>j</sup>, b<sup>j</sup>, f<sup>j</sup>, v<sup>j</sup>, m<sup>j</sup>, w<sup>j</sup>, t<sup>j</sup>, d<sup>j</sup>, s<sup>j</sup>, z<sup>j</sup>, ʃ<sup>j</sup>, ʒ<sup>j</sup>, tʃ<sup>j</sup>, dʒ<sup>j</sup>].

- (10) a. *писаć* [p<sup>j</sup>isat̃c] ‘to write’  
*wina* [v<sup>j</sup>ina] ‘guilt’  
*trafić* [traf<sup>j</sup>it̃c] ‘to find one’s way’  
*misa* [m<sup>j</sup>isa] ‘bowl’
- b. *butik* [but<sup>j</sup>ik] ‘boutique’  
*dinozaur* [d<sup>j</sup>inɔzawr] ‘dinosaur’  
*singel* [s<sup>j</sup>inɟɛl] ‘single’  
*Zidane* [z<sup>j</sup>idan] ‘name’  
*Chicago* [ʃ<sup>j</sup>ikagɔ] ‘name of city’

*żigolak* [ʒ<sup>i</sup>igɔlak] ‘gigolo’  
*Gucci* [gu<sup>i</sup>ʦi] ‘name’  
*dżihad* [dʒ<sup>i</sup>ixat] ‘jihad’

In both cases in (10), the palatalized consonants are dependent on the presence of the following vowel, just like the velars in (9). However, while the palatalized labials in (10a) seem to belong to the native stock of segments, in the sense that they may form contrastive pairs with their non-palatalized congeners, and they are felt to be native, the coronals in (10b) are generally found in borrowings and proper names.<sup>15</sup>

With so defined context for the occurrence of [i], that is, after a soft consonant (C<sup>j</sup>), it is correct to say that this is where the other vowel, [i̯], does not occur in Polish. However, it would not be correct to say that [i̯] occurs elsewhere, or after non-palatalized consonants. The statements in (7a) and (7b) explain why. Let us look at the velar consonants first. There are three velar consonants in Polish; two plosives and a voiceless spirant [k, g, x]. All three may be followed by [i] as illustrated in (9) above, in which case they become palato-velars [c, ʃ, ç], respectively. However, the retracted vowel [i̯] may not follow the velar stops. Forms beginning with \*ki and \*gi are found only in a handful of exceptions, which fall into one of three categories; borrowings, proper names or onomatopoeia, e.g. *kynolog* [kinɔlɔk] ‘cynologist’, *gyros* [girus] ‘food name’, *Kydryński* [kidri<sup>̃</sup>ski] ‘name’, and *kysz* [kiʃ], as in *a kysz!* ‘be gone!’.

The restriction is much more rigid across morphemes, where no exceptions are found. The constraint \*ki/\*gi reveals itself in what happens with the inflectional ending -y, when attached to forms ending in a velar stop.<sup>16</sup> We know that the ending is a retracted vowel [i̯] on the basis of the forms in (11a). However, the velar stops [k, g] followed by the plural ending /-i/ appear as palatalized, and the ending itself surfaces as [i], in accordance with the surface generalization (C<sup>i</sup>). Thus we are dealing with some sort of mutual influence between the velar stops and the front high vowel.

- (11) a. *but* [but] ‘shoe, sg.’                      *but-y* [buti] ‘shoe, pl.’  
           *chleb* [xlep] ‘bread, sg.’                    *chleb-y* [xlebi] ‘bread, pl.’

<sup>15</sup> The case of [w<sup>i</sup>] as in *weekend* [w<sup>i</sup>ikent] ‘weekend’ is slightly complicated. For example, Gussmann (2007) treats Polish [w] as a coronal consonant in underlying representation. There is a regular morphophonological pattern in Polish in which [w] alternates with [l], e.g. *była* – *byli* [biwa – bili] ‘she was / they were’.

<sup>16</sup> The inflectional ending -y may be an exponent of three inflectional categories: the nominative singular masculine ending in adjectives, e.g. *dobr-y* ‘good’, the nominative

- b. *byk* [bɨk] ‘bull, sg.’                      *byk-i* [bɨci] ‘bull, pl.’  
*róg* [ruk] ‘horn, sg.’                          *rog-i* [rɔɟi] ‘horn, pl.’

This gives us grounds to believe that in the case of SI derivation by means of the suffix *-ywa-/-iwa-*, we are dealing with the same phenomenon. Namely, phonologically the suffix is */-iwa-*, and all the surface forms follow from regular phonology: hard consonants (6a) are followed by [iɨva], velar consonants are palatalized (6b,c) and followed by [iɨva], just as with the soft consonants in (6d).

Unfortunately, in inflection, the velar spirant behaves like other hard consonants and takes the plural ending [ɨ]. For convenience we juxtapose the plural formation and the SI derivation below. Note that we are dealing with the same stems, but different effects.

- (12) a. *po-dmuch* [pɔdmux] ‘gust’      *po-dmuch-y* [pɔdmuxɨ] ‘pl.’      \*[pɔdmuɟɨ]  
*sluch* [swux] ‘hearing, sg.’      *sluch-y* [swuxɨ] ‘rumour, pl.’      \*[swuɟɨ]  
 b. *na-dmuch-iwa-ć* [nadmuɟivaɕ] ‘to pump, SI’<sup>17</sup>      \*[nadmuɟivaɕ]  
*od-sluch-iwa-ć* [ɔtswuɟivaɕ] ‘to hear, SI’      \*[ɔtswuɟivaɕ]

Clearly, outside the SI derivation, the velar spirant does not behave like other velar consonants. The same holds word-internally. While the stops can only be followed by [ɨ], in which case they are palatalized [ci,ɟɨ], the spirant can be both palatalized as in *chichot* [ɟixɔɕ] ‘chuckle’, and non-palatalized as in *chyba* [xɨba] ‘perhaps’.<sup>18</sup> To deal with this dual behaviour of the velar spirant, Gussmann (2007: 88) assumes that there are two distinct phonological representations of the phonetic velar spirant. One is the native spirant that resists palatalization in the context of the following [ɨ], e.g. *chybotać* [xɨbɔtaɕ] ‘to wobble’. For simplicity, we may call this object */x<sub>1</sub>/*. The other object, */x<sub>2</sub>/*, is a truly velar spirant, or so it appears, which may be palatalized just as the other velar consonants, e.g. *historia* [ɟɨstɔrja] ‘history’.<sup>19</sup>

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plural of some masculine and feminine nouns, e.g. *kot-y* ‘cats’, *kobiet-y* ‘women’, and genitive singular of feminine nouns, e.g. *herbat-y* ‘tea, Gen.sg.’.

<sup>17</sup> Apart from *-iwać*, the velar spirant is also palatalized before a native *-in-*, e.g. *monarcha* [mɔnarxa] ‘monarch, masc.’ - *monarchini* [mɔnarɟɨni] ‘monarch, fem.’, and, unsurprisingly, before non-native *-ista*, *-izm*, *-it-*, e.g. *anarchista* ‘anarchist’, *anarchizm* ‘anarchism’, *lechita* ‘Lech Poznań’s footballer’.

<sup>18</sup> Gussmann (2007: 88) notes that [ɟɨ] is not a native pattern and the forms like *chichot*, *chichrać* are exceptional – they are onomatopoeic.

<sup>19</sup> Gussmann may be right, but the problem with this proposal is that the phonologically velar spirant, which is expected to behave like the other velars, is found mostly in non-native vocabulary.

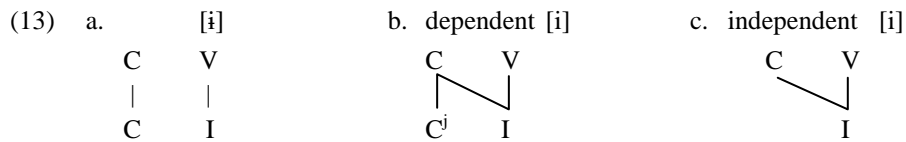
The presentation of the distribution of [i/i̥] in Polish would not be complete without referring to the context mentioned in (7a) above. Namely, the word-initial one. There is some interesting affinity between the post-velar-(plosive) and word-initial context, in that word-initially [i̥] is also banned. This is an exceptionless generalization, in that there is no word beginning with [i̥] in Polish. Of the two high front vowels it is [i] that is found in this position, e.g. *igła* [ig-wa] ‘needle’, *izba* [izba] ‘chamber’. Thus, [i] in Polish occurs in fact in two environments: word-initially (#\_) and after soft consonants (C<sup>j</sup>\_), where, it will be recalled, C<sup>j</sup> comprizes native independent segments [ç, ʧ̥, z, d̥z, ɲ], dependent native and non-native segments [p<sup>j</sup>, b<sup>j</sup>, f<sup>j</sup>, v<sup>j</sup>, m<sup>j</sup>, c, ʃ, w<sup>j</sup>, t<sup>j</sup>, d<sup>j</sup>, s<sup>j</sup>, z<sup>j</sup>, ʒ<sup>j</sup>, ʃ<sup>j</sup>, ʒ<sup>j</sup>, t̥<sup>j</sup>, d̥<sup>j</sup>, ç], and [l]. On the other hand, [i̥] is found after non-palatalized consonants (C\_), but it is banned after velar stops and word-initially.

What needs to be clarified at this stage is the phonological representation of the vowels [i/i̥], which would correspond to the parameters enumerated in (7). In the illustration below, we assume the Element Theory of Government Phonology in its simplest version. Only the relevant aspects of individual representations are shown. The skeleton is expressed by means of a consecution of Cs and Vs. This is shorthand for skeletal x-slots linked to consonantal and vocalic (Onset-Nucleus) positions, respectively. At this stage, we assume the following two things. Firstly, the category responsible for the representation of [i/i̥] and palatalization of consonants is the element {I}. Within the nucleus, the element {I} is pronounced as [i] if the element is shared with the preceding onset (13b,c), and it is pronounced as [i̥] if unshared (13a). The second assumption is that there is a phonological process of {I}-spreading to placeless onsets, that is velar stops, and empty onsets. It is due to this spreading that velar stops are palatalized before /i/, and the vowel itself is pronounced as [i] because the resulting structure is that of (13b), that is identical to the cases in which the consonant is lexically palatalized.

Thus, the mutual influence between the onset and its nucleus in velar palatalization is explained not as an ordered derivation, but as a natural consequence of two disparate phenomena: phonological {I} spreading and phonetic interpretation of {I} preceded by a consonant also containing this element. There is no phonological ‘tensing’ of the type /i/ > [i] in a melodic sense. The [i] is a phonetic interpretation of the structure which resulted from spreading, a doubly linked {I}.<sup>20</sup>

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<sup>20</sup> Gussmann (2004b, 2007) proposes that this I-Alignment between the onset and the nucleus results in a headed element {I̥}. In this paper we remain agnostic with respect to the status of {I̥}, noting only, that the structural difference might be sufficient to express the tenser variety of the front high vowel.



The representations in (13) illustrate all the facts which were enumerated in (7). Firstly, the phonetic vowels [i/ɨ] are indeed identical at the melodic level – they are phonetic exponents of one and the same category. The difference is contextual, in fact, structural, in that {I} which is linked only to the nucleus is pronounced as [i] (13a), while a doubly linked {I} yields the tenser variety [i] (13b,c).<sup>21</sup>

Note that the configuration in (13b) may have different origins. It will be present in cases when the consonant is lexically palatalized, or arise due to the process of {I}-spreading to placeless onsets, that is velar stops. We call this vowel ‘dependent’ because it depends on the quality of the preceding consonant. On the other hand, the vowel in (13c) is called ‘independent’ due to the fact that it shares the melody with an otherwise empty onset. Note that the independent [i] in (13c), is structurally not different from the dependent [i] in (13a). The difference lies in the fact that its onset is empty, as is the case word-initially.<sup>22</sup> Its functional independence will soon become apparent. Here, like in the case of the velar stops, the shared structure is due to {I}-spreading. In this sense, we capture the affinity between the post-velar and word-initial contexts. We are able to say why [i] does not occur in these contexts. It is because the element {I} must spread into the preceding onset.<sup>23</sup>

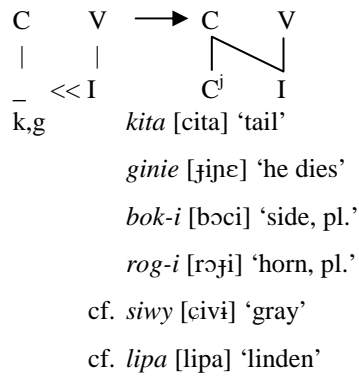
Below, we illustrate the distinction between the lexical representations of velar stops and empty onsets, on the left of the arrow, and the phonological representation, which results from phonological derivation. Here, it is {I}-spreading.

<sup>21</sup> See Gussmann (2004*b*, 2007) for a similar analysis which, however, additionally operates with the property of element headedness. The double linking, corresponds to I-Alignment in Gussmann’s work.

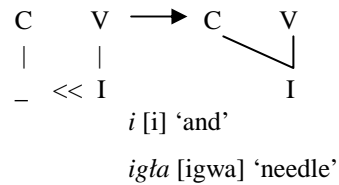
<sup>22</sup> It is quite apparent now that the surface [i] is in fact a phonological /ji/. Non-standard varieties of Polish actually pronounce the glide and have [jigwa] instead of [igwa]. We assume that the fact that this glide is not pronounced is a pure phonetic and not a phonological fact (cf. e.g. the modulation principle in Ohala 1992).

<sup>23</sup> Let us assume that there may be a slight difference between the lexical (underlying) and phonological representation, where the latter is a result of all the necessary derivations that phonological computation allows for. It is the phonological representation that is subject to phonetic, language / dialect specific interpretation. Sometimes the lexical representation is identical to the phonological one.

(14) a. velar + {I}



b. empty onset + {I}



Thus, velars cannot be followed by [i] in Polish because of the phonological process of {I}-spreading.<sup>24 25</sup> Hard consonants remain unaffected by {I}-spreading because they have a place defining category (13a). In such cases, we may be speaking of some kind of identity between the lexical and phonological representations, because no phonological process affects the lexical forms. As signalled above, the same refers to the so called velar spirant [x], e.g. *chyba* [xiba] ‘perhaps’, *duch-y* [duxɨ] ‘ghost, pl.’, which, word-internally and in inflection, takes the retracted [ɨ] in native vocabulary, namely, contrary to the truly velar stops, e.g. *bok-i* [bɔci] ‘side, pl.’, there is no {I}-spreading.<sup>26</sup> It should be emphasized, that the doubly linked phonological representation in (14a) is also present lexically in forms containing lexically soft consonants, in which no {I} spreading, but rather lexical {I}-sharing is at play, e.g. *siwy* [civi] ‘gray’, *lipa* [lipa] ‘linden’.

Having seen how the distribution of [i/i] works in Polish, we are ready to look in more detail at the derivations of SI with the suffix *-ywa/-iwa-*.

<sup>24</sup> As opposed to Gussmann (2004b, 2007), who deals with the absence of \*ky, \*gy by means of a separate Empty Heads constraint, we believe that the presence of an active spreading mechanism expresses the same fact more accurately.

<sup>25</sup> We must bear in mind that some such exceptions exist, e.g. *kynolog*, *kysz*, in which case perhaps some sort of mechanism needs to be evoked, which would block the {I}-spreading.

<sup>26</sup> We may follow Gussmann (2004b, 2007) here and assume that phonologically the spirant is glottal. However, for the sake of simplicity, we will refrain from proposing the actual representation of this segment in terms of the Element Theory.



3.2. SI derivation with -ywa-/-iwa-

In this section, we attempt to illustrate the consequences of using a single representation of the suffix -ywa-/-iwa- to handle the derivation of all the SI forms listed in (6) above. To this end, we are making two representational assumptions. Firstly, stems ending in consonants, structurally end with a vocalic site, an empty nucleus. Secondly, in vowel initial suffixes, the vocalic melody does not possess its own syllabic (skeletal) structure. The melody is floating and attaches to the final empty nucleus of the base.<sup>27</sup>

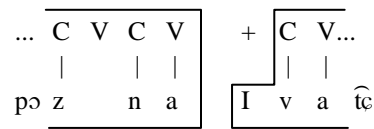
The representations below assume one representation of the suffix, and correspond respectively to the data sets in (6). Note the absence of lexical or phonological palatalization in (15a), its lexical presence in (15d), and the process of {I}-spreading in (15b,c), which results in the palatalization of the velars, and a tense interpretation of the front high vowel. Both (15c) and (15d) are exceptional, albeit for different reasons. The former is exceptional because, from what we know about Polish phonology, the velar spirant should not be a target of {I}-spreading. The latter, on the other hand, is not exceptional phonologically speaking. It is exceptional in that a soft stem selects the -ywa-/-iwa- suffix, and not -a-. In (15e), we provide an additional illustration of what seems to happen if the base is assumed to be vowel-final.

- (15) a. *prze-klam-ywa-ć* [pʃekwamivac̥] 'to distort'  
 b. *od-krzyk-iwa-ć* [ɔtkʃicivac̥] 'to shout back'  
 c. *od-słuch-iwa-ć* [ɔtswuçivac̥] 'to hear'  
 d. *o-strzel-iv-a-ć* [ɔstʃelivac̥] 'to fire'
- 

<sup>27</sup> It is interesting to see what happens with bases ending in a vowel. Predictably, the floating melody will have no position to dock onto. Possibly, the forms like *po-zna-ć* > *po-zna-wa-ć* 'to meet / SI' (not \**po-zn-ywa-ć*) could be explained this way.

<sup>28</sup> The capital 'I' in the representation stands for the element {I} which is the representation of the high front vowels.

e. *po-zna-wa-ć* [pɔznavac̥]  
 ‘to meet’



Most of the representations are unproblematic from the point of view of phonology and phonetic interpretation. The floating melody {I} attaches to the vocalic site, if it may, which may be accompanied by a process of {I}-spreading into the preceding onset. This is expected in the case of velar stops (15b), and absolutely surprising in (15c).

Below we compare two different approaches to the problem of the velar spirant. One of them assumes that there are two different velar spirants and identical phonological derivation. The alternative presented in this paper will suggest that what appears to be an identical phonological derivation may in fact be a coincidence, and that there is no need to postulate two different phonological objects yielding the velar spirant. As a consequence, however, a different representation of the suffix may be required. Let us begin with the former view.

In Gussmann's (2007) proposal, it will be recalled, there are two phonological objects which yield a phonetic velar spirant [x], namely, /x<sub>1</sub>/ and /x<sub>2</sub>/. The former behaves unlike other velars but produces the patterns with surface [xi], which are felt to be native. This is the case both word-internally, e.g. *chyba* [xiba] ‘perhaps’, and across some morpheme boundaries, e.g. *stuch-y* [swuxi] ‘rumour, pl.’, in which the spirant remains velar in front of [i]. The other object, /x<sub>2</sub>/, behaves like the velar stops in that it is palatalized, but the pattern is now felt to be non-native, e.g. *histeria* [çisterja] ‘hysteria’. Gussmann accounts for the unusual behaviour of the spirant in *pod-stuch-iwać* [pɔtswuçivat̥c̥] ‘overhear, SI’, as opposed to *stuch-y* [swuxi] ‘rumour, pl.’ in (12), by proposing that the derivation of the Secondary Imperfective aspect in such cases involves not only a selection of the *-ywa-/-iwa-* suffix, but also a morphophonological replacement of the stem-final consonant /x<sub>1</sub>/ with /x<sub>2</sub>/. The replacement is meant to ensure that the suffix will interact with the stem-final spirant in the same fashion as with the velar stops, thus also capturing the obvious connection between [iva] and [iɪva] as surface forms of one suffix.

However, this analysis suffers from a few flaws. Most of all, it assumes that the only way to get a palato-velar spirant in Polish is by deeming it phonologically velar and expecting it to undergo a regular innovation in front of [iɪva], just as the other velars do before the retracted [i] vowel. Thus, in order to account for the observed behaviour of the spirant in line with the other native velar consonants, the native spirant must be replaced with its non-native congener. This is

a paradox. If the sequence [çi] is felt to be foreign elsewhere in the phonology of Polish, it is difficult to expect the non-native /x<sub>2</sub>/ to exhibit a native process of palatalization. Finally, the analysis assumes that [ç] should be a result of phonological interaction with the following nucleus.

In our view, there is an alternative, even though it might appear to be less attractive at first. An analysis which allows for a distinction between a truly phonological and a merely phonetic shift from [x] to [ç]. Let us begin by noting a well known fact from Polish that the velar spirant can be palatalized in a perfectly native fashion in Polish. That is, its palatalization is felt to be perfectly native. This happens across word boundary if the following word begins with the vowel [i]. It will have become obvious that we are talking about the independent (word-initial) [i] discussed in (13c) and (14b) above.

In regular speech which is devoid of pauses, the strings *stuch i głos* [swuç i gwɔs] ‘hearing and voice’ or *trzech igieł* [tʃɛç iʃɛw] ‘three needles, gen.’ yield exactly the same palato-velar spirant [ç] as in *pod-stuch-iwać* [pɔtswuçivac̥] ‘overhear, SI’, or the non-native *histeria* [çisterja] ‘hysteria’. In such sandhi / phrase level contexts, the notorious native velar spirant patterns with the velar stops, and it would probably be wrong to assume that to do so, the spirant is first morphophonologically replaced with the phonologically velar congener /x<sub>2</sub>/, as it supposedly is in the SI derivation. Rather, it appears as phonetically soft in this context – unless a pause is introduced<sup>29</sup> – because it occurs before an independent [i] vowel. Recall that the vowel is independent in the sense that it does not require any support from the preceding soft consonant, which does not mean that it does not share its properties with an onset, a different onset.

To maintain our claim that there is only one phonological object that yields [x] in *duch-y* [duxɨ] ‘ghost, pl.’ and [ç] in *pod-stuch-iwać* [pɔtswuçivac̥] ‘overhear, SI’, we must assume that the spirant will be palatalized only before the independent [i], which must now be assumed to appear not only word-initially, but also suffix-initially in some suffixes, notably, in [iva]. In other words, it must be somehow ensured that at least in the case of the velar spirant the suffix *-ywa-/-iwa-* will be pronounced as [iva] for independent reasons.<sup>30</sup> Let us assume that this is correct. Under this assumption, the distribution of the independent [i] is broadened.

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<sup>29</sup> Note that, in SI derivatives, there is no question of pauses, as these are not introduced between morphemes in morphologically complex words, but between words.

<sup>30</sup> Intuitively, this is a bad move. If the suffix [iva] has an independent [i], as in word-initial position, then we automatically lose the connection between this shape of the SI suffix and the other allomorph, that is [iva].

(16) The distribution of the independent [i] in Polish

- a. word-initially
- b. suffix-initially in some suffixes (e.g. [iva])<sup>31</sup>

These two contexts can be illustrated by two respective instances where we are able to obtain the string [...çi...] in native sounding cases.

- (17) a. *trzech igieł* [tʃɛç iʃɛw] 'three needles, gen.'  
 b. *pod-słuch-iw-ać* [pɔɫswuçivatɕ] 'to overhear, SI'
- |   |   |
|---|---|
| $\dots V \quad C_1 \quad V_1 \# \quad C_2 \quad V_2 \quad C \dots$<br>                                     <br>t ʃ ɛ    x            - << I    ʃɛw<br>[ç] | $\dots V \quad C_1 \quad V_1 + \quad C_2 \quad V_2 \quad C \quad V \quad \dots$<br>                                     <br>pɔɫswu    x            - << I    v    a    ɕ<br>[ç] |
|---|---|

The native string [...çi...] can be found across word boundaries as well as across some suffix boundaries, and is always a result of the independent [i]. Note that the palatalization [x] > [ç] in (17) is not described as {I}-spreading to the relevant consonant, but as a mere phonetic interpretation of the consonant in front of the independent [i].<sup>32</sup> In other words, there is {I}-spreading in (17a) and (17b), but the melody spreads to C<sub>2</sub>, the empty onset of the next word or morpheme, not to C<sub>1</sub>, which holds the spirant. The so called palatalization [x] > [ç] is not a case of phonological but a case of phonetic, articulatory, palatalization.

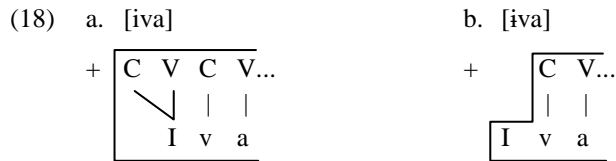
The velar spirant is not the only consonant in Polish that is subject to phonetic palatalization of this type. The same effects as in (17a) are observed with all hard consonants, e.g. *chleb i woda* [xlɛp<sup>ɨ</sup> i vɔda] 'bread and water', and *bok i przód* [bɔc i pʃut] 'side and front'. With the velar and labial consonants the effect of phonetic palatalization is indistinguishable from the phonological or lexical palatalization in *bok-i* [bɔci] 'side, pl.' and *piwo* [p<sup>ɨ</sup>ivɔ] 'beer', respectively. This idea will be further developed below. Let us first look at the consequence of the alternative analysis of [...çiva...] that we are pursuing here.

Given the possibility that the derivation of, e.g. *pod-słuch-iw-ać* [pɔɫswuçivatɕ] 'overhear, SI' involves a suffix with an independent [i], that is, possessing its own syllabic structure, we must again ask the question if [iva] and [i<sup>h</sup>va] are in-

<sup>31</sup> Recall that apart from *-iwać*, the velar spirant is also palatalized before a native *-in-*, e.g. *monarcha* [mɔnarxa] 'monarch, masc.' – *monarchini* [mɔnarçɨni] 'monarch, fem.', and, unsurprisingly, before non-native *-ista*, *-izm*, *-ita*, e.g. *anarchista* 'anarchist', *anarchizm* 'anarchism', *lechita* 'Lech Poznań's footballer'. Thus, there are also other candidates for this structure.

<sup>32</sup> The idea that some cases of assimilation may be purely interpretational rather than phonological is not new (e.g. Harris 2003).

deed phonologically conditioned allomorphs of one suffix. From the above discussion it appears that they are in fact two lexically distinct suffixes, although the difference is structural, not melodic. The *-iwa-* suffix has one CV pair more (18a), while the *-ywa-* suffix begins with a floating {I} melody, which, similarly to the plural ending, attaches to the final nucleus of the base.



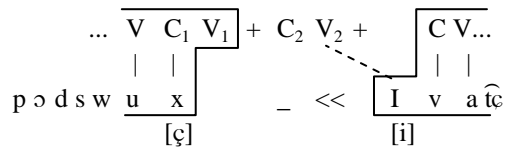
The obvious problem with the presence of two representations of this SI suffix is that all the attested forms, including the phonetic [iva], can be derived by regular phonology from the suffix in (18b). All except the cases with the velar spirant, that is. Thus, the structure in (18a) would be needed only for the derivation of [...çiva...]. Of course, we may assume that the morphology selects (18a) for all the velar consonants regardless of their phonological character, but this would be wishful thinking. Thus, the net result of our alternative proposal to that of Gussmann (2007) is that the SI derivatives based on stems ending in a velar spirant are still exceptional. The difference lies in the fact that it is not the selection of a different spirant that is involved, but a selection of a different representation of the suffix. However, in both cases we are dealing with the same phonology and indeed phonetics.

Traditionally, the exceptional behaviour of the velar spirant in the derivation of Secondary Imperfectives is referred to as a case of analogical extension (e.g. Stieber 1973: 114). This idea was rightly criticized by Nitsch (1931), who had been the proponent of this explanation (Nitsch 1909: 417). Indeed, analogy does not explain why [iva] was extended to the velar spirant, while other regular affixation yields [...xi]. However, if we accept that some sort of analogy, for whatever reason, decided that all velars had to behave uniformly in SI derivation, then it is quite understandable why the extension affected the spirant and not the velar stops. Unlike word-internally, where a few exceptions with [ki, gi] are found, these strings are impossible at morpheme boundaries, or in sandhi contexts, where the following front high vowel always creates strings [c#i, ʃ#i] and never [k#i, g#i]. This is because the following word could only begin with the tense, independent [i]. On the other hand, [çi] as an alternative to [xi] freely appears in sandhi, in other cases of affixation, e.g. *monarchini* [mɔnarçini] ‘monarch, fem.’, *masochizm* [masoçizm] ‘masochism’, and in a fair number of non-native forms word-internally, e.g. *histeria* [çisterja] ‘hysteria’. Thus, if velars should have been selected as a natural class, for whatever reason, and contrary to all the vast phonological and morphological evidence that velar stops do not

pattern with the velar spirant, then, unlike the velar stops, the velar spirant was ready to toe the line.

Thus, it seems that we do not understand why analogy, or whatever else it was, lumped all the velars together, but we may say that we understand why the levelling took this particular shape, that is, why [iva] was extended to the velar spirant and not [iva] to the velar stops. Given the above analysis, we are also able to speculate on how this analogical levelling could have been achieved without introducing extraneous mechanisms. It could be done by means of a morphological insertion of an extra CV, either in the lexical representation of the suffix (18a), which would then be selected only for the stems ending in a velar spirant, or between the stem and the suffix. The latter option requires further study and support, but it would allow us to maintain one representation of this SI suffix, that is, that of (18b).<sup>33</sup>

(19) *pod-stuch-iw-ać* [pɔtswuɕivac̥] ‘to overhear, SI’



The phonological interpretation of this extended structure is regular. The {I} melody links to  $V_2$  just as it does to  $V_1$  in the case of the other hard stems. The process of {I}-spreading to  $C_2$  takes place, and the sequence  $C_2V_2$ , a phonological /ji/, is phonetically interpreted as [i]. It is an independent [i], which palatalizes, or better, phonetically assimilates [x] to [ɕ]. Thus, the insertion of the extra CV structure renders this derivation analogical to syntactic sandhi in strings like *podstuch i podglądanie* [pɔtswuɕ i pɔdglɔndanɛ] ‘tapping and spying’.

#### 4. Extended application of the independent [i]

It would be interesting to see if this strategy of CV-insertion has a wider use in Polish morphology and phonology. Note that the net result of this operation is a particular phonetic outcome, which is not exactly phonological. We conclude the paper with a brief discussion of a possible use of the distinction we have

<sup>33</sup> Scheer (in prep.) develops a framework of interaction between phonology and morphology in which CV-insertion is one of the basic operations, if not the only possible operation that morphology can implement on phonological representation. CV insertion has also been widely used in Michalski (2009).

made between phonologically palatalized velars – by {I}-spreading – and phonetically palatalized ones, which are followed by the independent [i] (13c) and (17a). The phonetic palatalization seems to affect all hard consonants across the word-boundary. Interestingly, the labial and velar consonants (except the velar spirant), which are palatalized in this way, are parallel to the native word-internal patterns (20), while the velar spirant and coronal hard consonants seem to be parallel to the non-native word-internal patterns (21).

(20)

a. word-internal

*piwo* [p<sup>h</sup>i<sup>h</sup>vɔ] ‘beer’  
*trafić* [trafi<sup>h</sup>i<sup>h</sup>ɕ] ‘find one’s way’  
*karmić* [karmi<sup>h</sup>i<sup>h</sup>ɕ] ‘feed’  
*kiwać* [ci<sup>h</sup>vac<sup>h</sup>] ‘wave’  
*zginać* [zʒina<sup>h</sup>ɕ] ‘bend’

b. sandhi

*chleb i woda* [xlɛp<sup>h</sup> i vɔda] ‘bread and water’  
*trafi i pech* [tafi<sup>h</sup> i pɛx] ‘luck and bad luck’  
*dom i ogród* [dɔm<sup>h</sup> i ɔgrut]  
*bok i przód* [bɔc i pʃut] ‘side and front’  
*mózg i krew* [mɔsc i krɛf] ‘brain and blood’

(21)

a. word-internal

*histeria* [çisterja] ‘hysteria’  
*weekend* [wi<sup>h</sup>ikɛnt] ‘weekend’  
*butik* [but<sup>h</sup>ik] ‘boutique’  
*singiel* [s<sup>h</sup>iŋjɛl] ‘single’  
*Chicago* [ʃ<sup>h</sup>ikagɔ] ‘name of city’  
*Gucci* [gut<sup>h</sup>ʃi] ‘name’

b. sandhi

*duch i ciało* [duç i ɕɛawɔ] ‘spirit and body’  
*tył i przód* [tiw<sup>h</sup> i pʃut] ‘back and front’  
*brat i ja* [brat<sup>h</sup> i ja] ‘brother and I’  
*nos i oko* [nɔs<sup>h</sup> i ɔkɔ] ‘nose and eye’  
*mysz i kot* [mi<sup>h</sup>ʃ i kɔt] ‘mouse and cat’  
*smycz i obroża* [smi<sup>h</sup>ʃ i ɔbrɔʒa] ‘leash and collar’

Suppose the structural scheme, defining the independent [i] across boundaries, may be used in lexical representations of forms in which, for whatever reason, the vowel [i] must be expressed after consonants which cannot share the element {I} with the following nucleus in native vocabulary. The non-native feel of such structures would be due to the fact that a cross-boundary configuration is used in a ‘wrong place’, as a strategy to express word-internal strings of non-native origin.<sup>34</sup> Compare the simplified form of the SI derivative in (17b) with the non-native *histeria* [çisterja] ‘hysteria’.

<sup>34</sup> We call this strategy ‘cross-boundary’ not because a boundary is introduced inside words, but because there is an independent [i] with its own onset, a phonological /ji/.

- (22) a. *pod-słuch-iw-ać* [pɔɫswuɕivaɫɕ] 'overhear'  
 b. *histeria* [ɕisterja] 'hysteria'<sup>35</sup>
- |        |                |                |   |                |                |   |     |
|--------|----------------|----------------|---|----------------|----------------|---|-----|
| ... V  | C <sub>1</sub> | V <sub>1</sub> | + | C <sub>2</sub> | V <sub>2</sub> | C | ... |
| pɔɫswu | x              |                |   |                |                |   |     |
|        |                |                |   | /              |                |   |     |
|        |                |                |   | I              | v              | a | ɫɕ  |
- 
- |                |                |                |                |   |       |
|----------------|----------------|----------------|----------------|---|-------|
| C <sub>1</sub> | V <sub>1</sub> | C <sub>2</sub> | V <sub>2</sub> | C | ...   |
| x              |                |                |                |   |       |
|                |                | /              |                |   |       |
|                |                | I              | s              | t | ɕerja |

The relevant portion of the representation in both cases is almost identical. The only difference is the presence of a morpheme boundary in the SI form. The use of the independent [i] inside words to express the non-native character of particular strings is clearly an advantage of this analysis. It does not resort to special extraneous marking of the foreignness, or the specially marked segments. Simply, it uses a native strategy, which is transferred from the cross-boundary context into word-internal one.

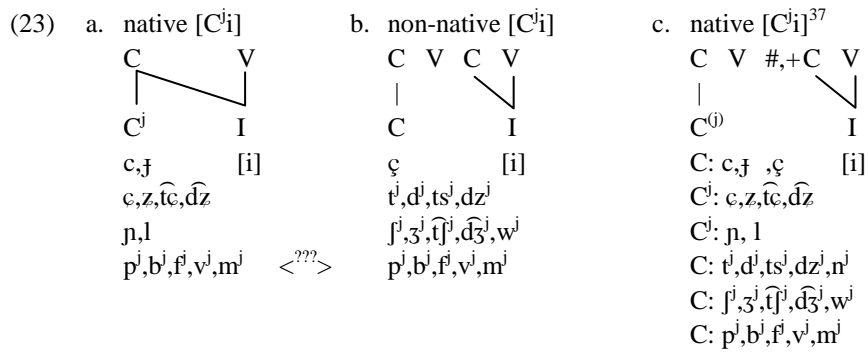
That word-internal [çi] could be a result of CV-insertion at the point when the strategy became available in Polish can be proved by the fact that these forms were introduced late into the system (more or less at the time of the establishment of [çiva]), and by the fact that modern Polish onomatopoeic *chichot* [çixɔɫ] 'chuckle' was in fact mysteriously derived from historical \**chychot*. In fact, at some stage two forms, *chychot* – 'devilish chuckle', and *chichot* – 'girl's giggle' were in use (Nitsch [1931] 1994:191; Boryś 2005: 59). Possibly, the lexical difference was due to the different structure, an extra CV. The structure in (22b) can be used to represent all the foreign sounding words like, *butik*, *Chicago*, *Gucci*, *singel*, *Zidane*, etc.<sup>36</sup>

Thus, the analysis of SI derivation of stems ending in a velar spirant by means of the independent [i] would not be just the story of the velar spirant. The strategy of CV-insertion could be said to extended to word-internal situation. We may assume that the strings [t<sup>i</sup>, d<sup>i</sup>, s<sup>i</sup>, z<sup>i</sup>, tʃ<sup>i</sup>, dʒ<sup>i</sup>, w<sup>i</sup>, ʃ<sup>i</sup>, ʒ<sup>i</sup>] just as [...çi...] correspond to one and the same structure in Polish, namely, a hard consonant followed by an independent [i], in which the softening of the consonant in question is merely phonetic. The different configurations are reiterated below.

<sup>35</sup> Thus, phonologically speaking we are really dealing with /pɔɫswuxjivaɫɕ/ and /xjisterja/ respectively.

<sup>36</sup> Whether the analysis can be extended to palatalized labials is a matter of further research. While the behaviour of palatalized labials parallels that of the coronals, there is no non-native feel to these forms, which may mean that these segments must be represented differently.





The structures in (23) show how ambiguous the phonetic sequence [C<sup>j</sup>i] can be in Polish.<sup>38</sup> This is due to the following fact. While the interpretation of the element {I} as [i] in a nucleus is indeed dependent on the presence of sharing with the preceding onset, as can be seen in all the structures in (23), only some cases of [C<sup>j</sup>i] involve a phonological presence of {I} in the overt consonant (23a). Even here, the sharing in the phonological representation is a result of two, separate phenomena: {I}-spreading in the case of the palato-velars [ci, ʃi], and some kind of conflation – an OCP effect – in the case of the independently soft [c, z, t͡ɕ, d͡z, ɲ, l]. Note that these consonants may also occur across word-boundaries (23c), in which case we assume that [ci, ʃi] do not contain the element {I} and the palatalization of all the velars is only phonetic – no element spreading. At any rate, all three velar consonants can uniformly be palatalized, that is, /k, g, x/ > [c, ʃ, ç], only if the structure in (23c) is assumed. To be more precise, this structure must be assumed at least for the verb stems ending in [x]. Likewise, we assume that the independently soft consonants [c, z, t͡ɕ, d͡z, ɲ, l] do not share {I} with the following words beginning with the independent [i], as in, e.g. *ktoś idzie* [ktɔɕ id͡zɛ] ‘someone is coming’, *stoń idzie* [swɔɲ id͡zɛ] ‘an elephant is coming. In other words, the surface phonotactic agreement [...C<sup>j</sup>i...] in such forms is an accident and not a result of sharing.

The word-internal non-native [C<sup>j</sup>i] strings in (23b) are viewed as lexically hard consonants. Their softness is phonetic and induced by the independent [i],

<sup>37</sup> In standard Polish, the voiced obstruents in word-final position will, of course, be devoiced.

<sup>38</sup> Not to mention the fact that [l] is hardly a soft consonant by phonetic standards. The presence of {I} in its representation is assumed on the basis of strings like [li], as well as on the basis of morphophonological alternations where it is paired with the phonetic object [w], as in, e.g. *był* [biw] ‘he was’ vs. *byli* [bili] ‘they were’. But it is not impossible that [li] has nothing to do with the presence of {I} in /l/, and is another case of phonetic assimilation, this time the consonant would determine the type of front vowel for articulatory reasons.

which is the structure found across boundaries. Whether the so called palatalized labials should be included in (23b) or in fact in (23a) is a matter of further research.

Note that (23c) is a mixed bag in which no distinction between native and non-native forms can be made. All the forms are perfectly native at phrase level, that is, when syntactic adjacency is at play.<sup>39</sup> This phonetic ambiguity, which is created at phrase level is the source of different interpretations, analogies, etc. The situation changes dramatically, when morphological adjacency is considered. At morpheme boundaries, the phonotactics is much stricter than both root-internally, and at the phrase level, but there is no paradox here. Word-internally, the apparent freedom of the occurrence of palatalized consonants obtains at a cost. Some of them are felt to be non-native. Yet, not impossible grammatically. This is due to the morphologically conditioned distribution of CV, which in surface terms translates into the distribution of the independent [i], which we summarize below.

- (24) The distribution of the independent [i] in Polish
- a. word-initially
  - b. suffix-initially in some suffixes (e.g. [iva])
  - c. word-internally in non-native vocabulary

## 5. Conclusion

A non-derivational analysis of the sound patterns involved in the derivation of Secondary Imperfectives in Polish imposes a new perspective on the status of melodic regularities with respect to their phonetic, phonological and morphophonological nature. Most of the vocalic and consonantal alternations in the stem must be viewed as morphophonological, either because the conditioning is directly morphological or due to the absence of obvious phonological causality. This reduced empirical bite from the point of view of phonology has interesting consequences with respect to the interaction between phonology proper and morphophonology on the one hand, and phonetic interpretation on the other. A clear distinction is made between phonetic and phonological palatalization of consonants which allows us to make claims as to the representation(s) of the SI suffix *-ywa-/-iwa-*. A concept of an independent [i] is introduced which may

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<sup>39</sup> A mixture of another kind is also involved here, in that we have independent lexical soft consonants /C<sup>j</sup>/s ([c, z, t̪c, d̪z, ɲ, l]), and lexically hard consonants of which all must be phonetically, that is, non-grammatically palatalized by the following independent [i]. It must be viewed as a mere articulatory effect.

have explanatory potential beyond the questions concerned with SI derivation. It is claimed that this structure may be utilized word-internally to mark non-native vocabulary involving the so called surface palatalization. The proposals require further research.

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