

# Some reflections on the classification of Polish verbs

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## ABSTRACT

In Polish a single category-less root may be found in two or more verbs which belong to different verbal classes. This observation suggests that the established approach to deriving the exponents of verbal classes in Polish, i.e. Czaykowska-Higgins (1998), was on the wrong track in assuming that the identity of thematic vowels is dependent on the specification of the root. This paper discusses several types of root-ambiguity and puts forward an alternative account in which it is the specification of the category-defining V-heads as well as the aspectual characteristics and argument structure that drive the exponence of Polish verbs. It is also postulated that the traditional account which assumes the existence of 8 verbal classes may be replaced with an approach which postulates the existence of 5 classes. I show that not only does such an approach capture certain affinities between Polish verbal classes, but also predicts which verb (sub)classes will never share one and the same root.

Key words: theme vowels, verbs, roots, Distributed Morphology, Polish

## 1. Introduction

The existing morphological classifications of Polish verbs are of roughly two kinds. The first kind are the traditional classifications by Polish linguists such as Szober (1948), Tokarski (1951, 1978) or Laskowski (1998), who distinguish from 9 to 11 verbal classes that are further divided into numerous subclasses. These studies might be thought of as purely descriptive and are characterized by taking into consideration only the morphological and morphophonological properties of a given verb without paying attention to its aspectual semantics or argument structure.

The inspection of the above approaches also shows that they aim at maximal descriptive exhaustivity. The conjunction of these two criteria leads to the multiplication of conjugation classes. Many differences within verb classes which are attributed to phonology and not morphology in the formal approaches to be discussed below, motivate the isolation of additional subclasses of verbs in the traditional approaches. For example, for Tokarski (1978:217) verbs *top-i-ć* /tɔpʲit͡ɕ/ ‘drown’ and *tworz-y-ć* /tfɔʒit͡ɕ/ ‘create’, are classified as belonging to two distinct subclasses due to the difference in the quality of the thematic vowel: /i/ in the former and /ɨ/ in the latter. For most formal approaches to the morphophonology of Polish the presence of thematic /i/ and /ɨ/ is a general phonological phenomenon and does not point to the necessity of the morphological distinction between the two groups of verbs. The distribution of /i/ and /ɨ/ in Polish is treated as predictable on the basis of the phonological environment, the former being an unbounded ‘elsewhere’ variant, the latter being attested following ‘hard’ consonants (see Laskowski 1975, Gussmann 1980, Rubach 1984).<sup>1</sup>

The second kind of classifications of Polish verbs attested in the literature are the formal generative approaches such as those presented in Laskowski (1975), Rubach (1984), Nykiel-Herbert (1986), Szpyra (1989), Rowicka and van der Weijer (1994), Czaykowska-Higgins (1998) or Jabłońska (2004, 2007). The authors of these analyses do not focus on descriptive exhaustivity to the same extent as the authors of the traditional Polish works do. It is rather the psychological plausibility and economy of the description that seem to be high on the agenda in the second kind of analyses. The questions relevant for the authors of such works are what generalizations about the working of Polish morphology and phonology speakers are capable of making when confronted with Polish data. How should these generalizations be formulated? What do they tell us about the general properties of morphology and phonology as psychologically real subcomponents of language?

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<sup>1</sup>Note that the claim whereby the distribution of /i/ and /ɨ/ in Polish is phonologically predictable does not necessarily entail the claim that the two segments are allophones of a single underlying phoneme and that one of them is not part of the lexical inventory of Polish vowels. In fact the formal generative approaches to Polish assume that the close unrounded vowels are independent lexical vowels.

The formal generative approaches recognize the existence of 8 verbal classes, i.e. they claim that the speakers of Polish confronted with the data isolate 8 relevant classes of verbs. The division is typically illustrated by presenting the forms of the infinitive. The said 8 classes are enumerated and exemplified in (1).

(1)

(a)  $\emptyset$ -verbs: *my(j)<sup>2</sup>- $\emptyset$ -ć* /mitɛ/ ‘wash’, *gnieś- $\emptyset$ -ć* /ɣnɛɛtɛ/ ‘smash’, *ciaq- $\emptyset$ -ć* /tɛɔ̃tɛ/ ‘cut’

(b) *nq*-verbs: *kop-nq-ć* /kɔpnɔ̃tɛ/ ‘kick’, *tup-nq-ć* /tupnɔ̃tɛ/ ‘trample’, *chud-nq-ć* /xudnɔ̃tɛ/ ‘become slim’

(c) *a*-verbs: *plak-a-ć* /płakate/ ‘cry’, *laskot-a-ć* /łaskɔtate/ ‘tickle’, *łap-a-ć* /łapate/ ‘catch’

(d) *i*-verbs: *gub-i-ć* /gubite/ ‘lose’, *leczy-y-ć* /ɛtʃite/ ‘cure’, *kończ-y-ć* /kɔɲtʃite/ ‘finish’

(e) *e*-verbs: *krzycz-e-ć* /kʃitʃetɛ/ ‘shout’, *wiedzi-e-ć* /vʲɛdzɛtɛ/ ‘know’, *siedzi-e-ć* /ɛɛdzɛtɛ/ ‘sit’

(f) *ej*-verbs: *głupi-e(j)-ć* /ɣłupʲɛtɛ/ ‘become stupid’, *łysi-e(j)-ć* /łʲɛɛtɛ/ ‘become bald’, *siwi-e(j)-ć* /ɛivʲɛtɛ/ ‘become grey-haired’

(g) *aj*-verbs: *koch-a(j)-ć* /kɔxate/ ‘love’, *szloch-a(j)-ć* /ʃłɔxate/ ‘weep’, *mach-a(j)-ć* /maxate/ ‘wave’

(h) *owa*-verbs: *tren-owa-ć* /trɛnɔvate/ ‘train’, *mal-owa-ć* /malɔvate/ ‘paint’, *brak-owa-ć* /brakɔvate/ ‘be lacking’

I think that the approach which isolates 8 major conjugation classes and derives most other subclasses (morpho)phonologically is on the right track. It is my conviction that linguistics should be primarily interested in the nature of generalizations about language that speakers are able to make and of those that they are unable to make. At the same time, I think that assuming that the speakers of Polish are capable of packing the bulk of the data that they encounter when acquiring the language into 8

<sup>2</sup> In Polish the palatal glide /j/ is not licensed before consonants. I will assume that this is due to the inviolable status of a markedness constraint \*/j/;Coda. The presence of /j/ at the end of words and before vowel-alternation sites is due to the presence of empty syllabic positions after /j/ in these contexts (see Gussmann 2007). Moreover, the vast majority of the literature on Polish morphophonology assumes that what is realized as the labio-velar semi-vowel [w] on the surface is underlyingly a velarized lateral /ɬ/. The transcription convention I use is faithful to this abstract interpretation.

conjugation classes is stopping midway. In what follows I will argue that the data from the morphophonological alternations together with the evidence from the argument structure and aspectual characteristics of certain Polish verbs leads to further reduction in the number of verbal classes attested in Polish. I will claim that it is possible and desirable to reduce the number of verbal classes in Polish to 5. In section 2 of this study I will discuss the relevant aspects of the formal account of Polish verb classes presented in Czaykowska-Higgins (1998) and argue that the relevant account encounters problems when confronted with the fact that one and the same root in Polish may be found in more than one verb. In section 3 I will postulate that the verbal classes in Polish should rather be defined by features marked on category-defining V-heads. I also bring up some morphophonological and morpho-syntactic arguments in favour of the conflation of the classes of  $\emptyset$ -verbs with *nq*-verbs, *e*-verbs with *ej*-verbs and *aj*-verbs with *owa*-verbs. Section 4 concludes by underlying certain desirable empirical consequences of the approach postulated in this study.

## 2. Czaykowska-Higgins' (1998) approach and the shrinking role of the root

Since the conjugation class a given verb belongs to does not impact the truth value of the proposition in which the given verb is found and does not trigger specific presuppositions or entailments, it is justified to claim that the conjugation class is a purely Phonological Form (PF) related property. This basic observation has been the basis of the Distributed Morphophonology-based account of Polish conjugational or verbal classes found in Czaykowska-Higgins (1998). Czaykowska-Higgins (1998: 26,42) assumes the following morphological composition of Polish verbs:

(2)

[vw<sub>[DS]</sub> (PRE) [v√ROOT] VS1<sub>[DS]</sub> VS2-TM-(P/N) vw]

The abbreviations 'VW' and 'DS' stand for Verb Word and Derivational Stem: chunks of the Polish verb assumed in Czaykowska-Higgins' work. TM stands for Tense Marker and P/N for Person and Number.

Czaykowska-Higgins (1998) assumes that Polish thematic elements realize Verbalizing Suffixes (VS) introduced into the structure post-syntactically in the Morphological Structure component. Here it is not my aim to discuss the details of Czaykowska-Higgins' approach. The crucial aspect of her analysis is that the realization of the VS must make reference to the class features which constitute the lexical load of the roots. The roots are classified with respect to whether they appear with only one type of VS, both types of VS or with neither of them. Czaykowska-Higgins' (1998:45-46) classification of the roots is presented in (3).

(3)<sup>3</sup>

	Root	Feature specification	Thematic vowel
a.	√pis 'write'	[-VS1;+VS2;+1]	-a-
b.	√wid 'see'	[-VS1;+VS2;-1]	-e-
c.	√koch 'love'	[-VS1;+VS2]	-aj-
d.	√pas 'graze'	[-VS1;-VS2]	-Ø-
e.	√tok 'roll'	[+VS1;-VS2;+1]	-i-
f.	√gr 'heat'	[+VS1;-VS2;-1]	-ej-
g.	√bud 'build'	[+VS1;+VS2]	-ow-

In addition to the two binary features [+/-Verbalizing Suffix 1] and [+/-Verbalizing Suffix 2], Czaykowska-Higgins postulates the presence of an arbitrary feature [+/-1], necessary to distinguish between verbs in -a- and -e- and verbs in -i- and -ej-.

The realization statements that assign phonological content to VS refer to the feature marking of the roots and are presented in (4).

<sup>3</sup> Czaykowska-Higgins (1998:54) does not discuss the properties of *nq*-verbs which, as she claims, behave in a more complicated way aspectually and morphophonologically. She treats the verb *grzać* 'heat' (3f) as an *ej*-verb. In my opinion, *grzać* is a zero-verb (Ø-verb) with stem terminating in /j/. This is evidenced by the fact that unlike *grzać*, all -*ej*- verbs are change-of-state unaccusatives (sometimes referred to as 'degree achievements') and undergo an alternation between /a/ and /ɛ/ in masculine-personal forms in active verbal *l*-participles (see below for details).

(4)

- (a) VS1 → εj / ]<sub>+VS1,-1</sub>\_\_\_\_  
(b) → i / ]<sub>+VS1,+1</sub>\_\_\_\_  
(c) → əv / ]<sub>+VS1</sub>\_\_\_\_] <sub>+VS1,+1</sub>

- (d) VS2 → ε / ]<sub>+VS2,-1</sub>\_\_\_\_  
(e) → a / ]<sub>+VS2,+1</sub>\_\_\_\_  
(f) → aj / elsewhere

The thematic element *-owa-* (1h) is assumed to be bi-morphemic and composed of two separate morphemes *-ow-* /əv/ and *-a-* /a/. In addition to that, the *-ow-* itself must be assumed to carry the information which enforces the insertion of *-a-* as the realization of VS2.

Although there are several empirical and conceptual reservations that one might raise in relation to Czaykowska-Higgins' (1998) analysis, I would like to focus only on one particularly nagging empirical shortcoming.

Czaykowska-Higgins' analysis is designed for an idealized version of Polish in which one root gives rise to one verb. In reality, this is not the case. There are several types of alternations in which a single root gives rise to two (or more) verbs belonging to different classes.

The first such situation is related to the varying aspectual properties of Polish verbs. The most productive alternation of this kind is the alternation between semelfactive and processual verbs illustrated in (5).<sup>4</sup>

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<sup>4</sup>Another relevant example is the alternation between habitual and non-habitual forms of verbs. This alternation sometimes affects the class in unprefixated verbs such as *pi-Ø-ć* 'drink' - *pij-a(j)-ć* 'drink, hab.'. It is, however, much more productive in prefixated perfective/telic verbs. The habitual alternation is not treated as involving the change in the verb class by the authors working in the generative approaches. The situation is different in the traditional descriptive works by Polish authors, e.g. Laskowski (1998), who treat habitual formations as separate stems and treat them as belonging to different classes than the semantically related non-habitual verbs.

(5)<sup>5</sup>

	Root	Semelfactive	Process
a.	√KLEP	<i>klep-nq-ć</i>	<i>klep-a-ć</i>
b.	√GWIZD	<i>gwizd-nq-ć</i>	<i>gwizd-a-ć</i>
c.	√KRZYK	<i>krzyk-nq-ć</i>	<i>krzycz-e-ć</i>
d.	√SKRZYP	<i>skrzyp-nq-ć</i>	<i>skrzypi-e-ć</i>
e.	√STĘK	<i>stęk-nq-ć</i>	<i>stęk-a(j)-ć</i>
f.	√DMUCH	<i>dmuch-nq-ć</i>	<i>dmuch-a(j)-ć</i>
g.	√WAL	<i>wal-nq-ć</i>	<i>wal-i-ć</i>
h.	√TRĄB	<i>trąb-nq-ć</i>	<i>trąb-i-ć</i>

Semelfactives are perfective verbs which denote non-repetitive actions that lack duration (see Jabłońska 2004 and Bacz 2012 for more details). As visible in (5) they are typically marked with the thematic element *-nq-*. The vast majority of semelfactive verbs are transitive or unergative verbs. The corresponding processual verbs show exactly the same argument structure. This suggests that it is not the argument structure that must be referred to for the selection of an appropriate thematic element at spell-out for the verbs presented in (5). It is rather the property of being semelfactive that decides about the presence of *-nq-*. Although the semelfactive-processual alternation uncovers the insufficiency of the root-marking approach, it does not constitute a decisive piece of evidence against it. In fact, in the absence of the semelfactive marking the properties of the roots may be said to play the role in the exponence of the relevant verbs. To be precise, whether a given process verb employs thematic *-a-*, *-e-*, *-aj-* or *-i-* must be the lexical property of a given verb and might well be encoded on the root by the kind of marking postulated by Czaykowska-Higgins.

The second relevant kind of alternation proves to be more problematic for the root-marking account. The data in (6) illustrate the causative-inchoative alternation whereby one and the same root is attested in a transitive and an intransitive version of a verb.

<sup>5</sup> Glosses (top-down): Root: 'slap', 'whistle', 'scream', 'squeak', 'moan', 'blow', 'hit', 'toot'; Semelfactive: 'slap once', 'give a whistle', 'scream once', 'produce a single squeak', 'produce a moan', 'blow once', 'hit once', 'produce a single toot'; Process: 'slap', 'whistle', 'scream', 'squeak', 'moan', 'blow', 'hit', 'toot'.

(6)<sup>6</sup>

	Root	Causative	Inchoative
a.	√BIEŁ	<i>biel-i-ć</i>	<i>biel-e(j)-ć</i>
b.	√CZERN	<i>po-czern-i-ć</i>	<i>po-czerni-e(j)-ć</i>
c.	√STAR	<i>po-starz-y-ć</i>	<i>po-starz-e(j)-ć się</i>
d.	√CHUD	<i>od-chudz-i-ć</i>	<i>chud-ną-ć</i>
e.	√MOK	<i>mocz-y-ć</i>	<i>mok-ną-ć</i>
f.	√GŁUCH	<i>o-głusz-y-ć</i>	<i>o-głuch-ną-ć</i>

Note that many inchoative verbs in Polish are marked with the thematic element *-ną-* whose behaviour is, unfortunately, not discussed by Czaykowska-Higgins. Note also that it is not an option to assume that a single root may be marked for two distinct sets of features, e.g. [+VS1;-VS2;+1] and [+VS1;-VS2;-1] as a single morpheme cannot be marked for contradictory feature values, e.g. [-1] and [+1].

To account for the alternation between the transitive causative *i*-verbs and inchoative unaccusative verbs, the realizational statements postulated in (4) would have to be enriched with the information concerning the ‘flavour’ of the categorizing V-head:  $V_{\text{CAUSE}}$  in the causative verbs and  $V_{\text{BECOME}}$  in the inchoatives (see e.g. Harley 2009). Alternatively, one could make the realizational statements sensitive to the presence of the external argument-introducing projection. On the assumption that the external argument is introduced in the specifier of the Voice Phrase (see Kratzer 1996, Schäfer 2008, Alexiadou et al. 2015) one could assume that the realizational statements for causative verbs may refer to the presence of Voice, while the inchoative unaccusative verbs, not having Voice-head in their structure, are deprived of such a reference.

In fact the two strategies have been employed by Jabłońska (2004, 2007), whose nanosyntactic account rests on the claim that *-ej-* realizes the low Result layer while the *-i-* is the realization of the higher Process or Initiator verbal layers. Importantly, Jabłońska’s account does not refer to the feature marking of roots, which suggests that the marking postulated by Czaykowska-Higgins is spurious. In fact, Jabłońska (2004, 2007) also

<sup>6</sup> Glosses (top-down): Root: ‘white’, ‘black’, ‘old’, ‘slim’, ‘wet’, ‘deaf’; Causative: ‘whiten’, ‘blacken’, ‘make older’, ‘make slim’, ‘make wet’, ‘deafen’; Inchoative: ‘become white’, ‘become black’, ‘grow old’, ‘become slim’, ‘become wet’, ‘become deaf’.



has to take into consideration the properties of roots as *-i-* and *-ej-* are not the only thematic elements realizing the Process and Result layer. Those verbs in which the Process/Initiator layer is realized by *-aj-* or *-owa-* must be differentiated from those which utilize *-i-*. Similarly, the inchoative verbs which employ *-ej-* to realize the Result layer in Jabłońska's account must be differentiated from the ones that utilize *-nq-*. As far as I can see, in Jabłońska's approach, the only way for the spell-out mechanism to know whether a given layer is realized as *-i-* or *-aj-*, *-owa-*, etc. and *-ej-* or *-nq-* is by referring to the idiosyncratic properties of roots.

The discussion presented so far shows that the approach which assumes that it is exclusively the feature marking of the root that decides about the type of thematic element found in a given verb encounters insurmountable problems when confronted with the simple fact that in Polish a single root may be found in more than one verb from more than one verbal class. It has also been suggested that aspect and argument structure/V-flavour properties of a verb may be used to disambiguate the contexts in which a single root is found in the environment in which more than one thematic element could be available for insertion.

If root ambiguity attested in Polish is observed only in the cases of aspect-related alternations and the causative-inchoative alternation, maximally three pieces of information are sufficient to decide about the thematic element attested in each and every verb: (i) the specification of the root; (ii) aspectual type (semelfactive or otherwise), (iii) V-flavour/argument structure. On the assumption that thematic elements in Polish are the realization of a categorizing head V, the context for the realization of V must include at least the root. At the same time, reference to the aspectual context or the presence of Voice/specification of the V itself may also be required. (7) illustrates the types of entries necessary to account for the exponence of the verbal classes of Polish when the semelfactive-processual and causative-inchoative alternations are taken into consideration.

(7)

(a) V ↔ aj

(b) V ↔ i/ε/a/ɔva/∅ / √ROOT \_\_\_\_

(c)  $V \leftrightarrow n\check{s} / \_ Asp_{SEM}$ (d)  $V_{CAUSE} \leftrightarrow i$ (e)  $V_{CAUSE} \leftrightarrow aj/\text{ɔ}va/a/\emptyset / \sqrt{ROOT} \_$ (f)  $V_{BECOME} \leftrightarrow \varepsilon j$ (g)  $V_{BECOME} \leftrightarrow n\check{s} / \sqrt{ROOT} \_$ 

Let us assume that affix *-aj-* is the default realization of the V-head (7a). The realization of V in other non-causative verbs calls for the reference to the type of the root a given verb is composed of (7b). All semelfactive verbs utilize the thematic element *-nq-* /*nš*/, hence the only reference required to account for the presence of this affix in semelfactives is the reference to the aspectual head that introduces semelfactive semantics (see 7c). I will take *-i-* to be the default realization of causative verbs (7d). At the same time, it is not true that all causatives in Polish utilize *-i-* as the thematic affix. Verbs such as *równ-a(j)-ć* ‘level, even out’, *pras-owa-ć* ‘flatten’ or *łam-a-ć* ‘break’, *po-thuc* ‘break, shatter’ are also causatives. Hence, it is necessary to postulate another entry for  $V_{CAUSE}$ : one that makes reference to the roots that the relevant verbs are based on (7e). As I have mentioned above, since the change-of-state unaccusatives (inchoatives) may be marked with affixes *-ej-* or *-nq-* the reference to the roots is necessary to decide which of the two affixes is to be inserted even if one, quite arbitrarily, assumes that *-ej-* is the default realization of  $V_{BECOME}$  (see 7f).

It must be made clear that the ‘ $\sqrt{ROOT}$ ’ to which the reference is made in (7) stands for sets of roots or sets of feature specifications carried by roots, possibly similar to the ones employed in Czykowska-Higgins (1998). In fact entries such as (7b) are sets of disjunctive entries referring to sets of roots as their environments (see 8 = 7b).

(8)

(a)  $V \leftrightarrow i / \{ \sqrt{GUB} \text{ ‘lose’}, \sqrt{CHOD} \text{ ‘walk’}, \sqrt{KRA\check{G}} \text{ ‘surround’}, \textit{etc.} \} \_$ (b)  $V \leftrightarrow \varepsilon / \{ \sqrt{WIS} \text{ ‘hang’}, \sqrt{KRZYK} \text{ ‘scream’}, \sqrt{WID} \text{ ‘see’}, \textit{etc.} \} \_$

- (c)  $V \leftrightarrow a$  / { $\sqrt{\text{KAZ}}$  ‘order’,  $\sqrt{\text{PLAK}}$  ‘cry’,  $\sqrt{\text{LAP}}$  ‘catch’, *etc.*} \_\_\_\_  
 (d)  $V \leftrightarrow \text{ova}$  / { $\sqrt{\text{MAS}}$  ‘massage’,  $\sqrt{\text{KUP}}$  ‘buy’,  $\sqrt{\text{PARK}}$  ‘park’, *etc.*} \_\_\_\_  
 (e)  $V \leftrightarrow \emptyset$  / { $\sqrt{\text{PLET}}$  ‘weave’,  $\sqrt{\text{WIEZ}}$  ‘carry’,  $\sqrt{\text{GNIET}}$  ‘knead’, *etc.*} \_\_\_\_

Similar disjunctive sets are represented in (7e).

One thing that the analysis outlined in (7) and (8) illustrates quite clearly is that the morpho-syntactic analysis of Polish verbs and their morphological analysis do not go hand in hand. Morpho-syntactic classes of verbs, i.e. classes that show the same argument structure properties, may belong to different morphological classes.

The system presented in (7) might also be argued to be highly inefficient in that it relies on the storage of extremely long lists of roots.

Moreover, it is important to realize that the account outlined above is adequate only if one root can be found in only one of the sets found in (8). If a single root can be found, e.g. in the sets (8a) and (8d), the grammar has no means to decide if the exponent of the V-head is *-i-* /*i*/ or *-owa-* /*ova*/. That is, unless the two verbs constructed in this way differ in the argument structure.

In fact, however, Polish possesses cases of root-ambiguity in which the identity of the thematic element cannot be inferred on the basis of argument structure or aspectual differences. Some examples of the relevant kind are provided in (9).

(9)<sup>7</sup>

Root	Verb1	Verb class	Verb 2	Verb class
a. $\sqrt{\text{KRAK}}$	<i>krak-a-ć</i>	<i>a-verb</i>	<i>krak-a(j)-ć</i>	<i>aj-verb</i>
b. $\sqrt{\text{KLASK}}$	<i>klask-a-ć</i>	<i>a-verb</i>	<i>klask-a(j)-ć</i>	<i>aj-verb</i>
c. $\sqrt{\text{TRAT}}$	<i>s-trac-i-ć</i>	<i>i-verb</i>	<i>s-trat-owa-ć</i>	<i>owa-verb</i>
d. $\sqrt{\text{DAR}}$	<i>ob-darz-y-ć</i>	<i>i-verb</i>	<i>ob-dar-owa-ć</i>	<i>owa-verb</i>
e. $\sqrt{\text{LUP}}$	<i>lup-i-ć</i>	<i>i-verb</i>	<i>lup-a-ć</i>	<i>a-verb</i>
f. $\sqrt{\text{RUCH}}$	<i>wy-rusz-y-ć</i>	<i>i-verb</i>	<i>wy-ruch-a(j)-ć</i>	<i>aj-verb</i>
g. $\sqrt{\text{DRG}}$	<i>drż-e-ć</i>	<i>e-verb</i>	<i>drg-a(j)-ć</i>	<i>aj-verb</i>

<sup>7</sup> Glosses (top-down): Verb 1: ‘caw, jinx’, ‘clap’, ‘lose’, ‘grant’, ‘mug’, ‘move out’, ‘shiver’; Verb 2: ‘caw, jinx’, ‘clap’, ‘trample’, ‘grant’, ‘crash’, ‘shag’, ‘vibrate’.

The number of roots which are found in *a*-verbs and *aj*-verbs, such as (9a) and (9b) above, is relatively high. Such verbs usually do not involve a change in the meaning of the verb and may in fact be viewed as free variants.<sup>8</sup>

Pairs of root-sharing verbs are also very often marked with exponents *i-* and *-owa-*. Most such verbs differ in meaning. In fact the pair *ob-darż-y-ć* - *ob-dar-owa-ć* (9d), both of which mean ‘grant, give’, is quite exceptional.

Roots found in pairs of verbs from other classes (9e-f) are much less well-attested.

The verbs from the pairs in (9) do not differ in the type of arguments they co-occur with or their Aktionsart. This has rather unfortunate consequences for the analysis outlined above: the grammar lacks means to decide which thematic affix should be utilized in those verbs. In the section that follows I propose an account in which the identity of the thematic elements does not rely on the properties of the roots.

### 3. An alternative account

The aim of this section is two-fold. For one thing, I will argue for an approach to the exponence of verbal classes in which the identity of thematic elements inserted in a given environment is dependent on the marking of categorizing verbal heads, rather than the marking of the roots. Secondly, I will argue that the number of verbal classes in Polish may be reduced to 5.

Let us assume that the category-defining V-heads in Polish may be lexically marked for two classificatory features [+/- $\alpha$ ] and [+/- $\beta$ ]. Such V-heads merge with roots. The classificatory features are PF-interpretable features which percolate up the tree. It is the marking introduced by the V-heads that drives the exponence of Polish verbs.

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<sup>8</sup> The surface forms of *a*-verbs and *aj*-verbs do not differ in the infinitive and the paradigms of their active *ł*-participles used in expressing past-tense (among other things). They differ only in non-past tense paradigms where *a*-verbs undergo palatalization (see below) and where *aj*-verbs, quite exceptionally, mark the 1<sup>st</sup> person singular with *-m*, while the 3<sup>rd</sup> person plural, marked with the vowel *-q /ɔ/*, reveals the presence of the underlying /j/ in the thematic element.

The table in (10) below summarizes the V-head marking attested in the 5 classes.

(10)

Thematic affix	$\emptyset/nq$	$aj$	$i$	$e/ej$	$a$
Specification of the head	$[-\alpha,-\beta]$	$[+\alpha,-\beta]$	$[-\alpha,+\beta]$	$[+\alpha,+\beta]$	none

Before I discuss the motivation behind the conflation of  $\emptyset$ -verbs with  $nq$ -verbs,  $e$ -verbs with  $ej$ -verbs and  $aj$ -verbs with  $owa$ -verbs, let me briefly outline the approach to exponence assumed in this study.

As it is probably implied by the discussion presented so far, I assume a late insertion approach to realization: the spell-out operation re-writes hierarchical morpho-syntactic structures as linearized phonological exponents. Following the approach presented in Halle and Marantz (1993), Halle (1997), Embick and Noyer (2007), Embick (2010), among many others, I will assume a bottom-up Superset Principle approach to exponence. The exponence starts with the earliest merged morpheme (the root). Only exponents which mention features or heads properly or improperly included in the relevant syntactic structure may be inserted. The cases of conflict for insertion are resolved in favour of the best-specified exponent. Unlike the classic versions of Distributed Morphology, the current analysis assumes that a single exponent may realize more than one syntactic head (see Jabłońska 2007; Caha 2009).

The exponents are inserted cyclically in accordance with the phase-based approach to derivation (Chomsky 2001, Embick 2010). Phase heads, i.e.  $v$  and  $C$  for Chomsky (2001), categorizing heads containing cyclic domains for Embick (2010) or Voice-heads, as assumed here, are not realized at the same cycle as the exponents of the material in their complement. If the winning vocabulary item includes the phase head, the insertion is postponed till the following cycle is completed.

### 3.1. The conflation of $\emptyset$ -verbs with $nq$ -verbs

The eight verbal classes isolated in the studies enumerated at the beginning of section 2 may be reduced to 5 by conflating certain pairs of

verb classes on the basis of their morphophonological and morpho-syntactic properties.

The first pair of verb classes that may be conflated are  $\emptyset$ -verbs (or athematic verbs) and *nq*-verbs. Both classes undergo morphophonological palatalization in all cells of the non-past paradigm but the 1<sup>st</sup> person singular and the 3<sup>rd</sup> person plural. This is illustrated on the bases of a semelfactive verb *kop-nq-ć* ‘kick once’ and a causative *thu* ‘break’.

(11) Non-past paradigms of *kop-nq-ć*<sup>9</sup> ‘kick once’ and *thu* ‘break’

	Singular	Plural
1 <sup>st</sup> person	<i>kop</i> -/n/- <i>ɛ</i>	<i>kop</i> -/ɲ/- <i>e-my</i>
	kick-TH-PRS.1SG	kick-TH-PRS-1PL
	<i>thu</i> /k/- <i>ɛ</i>	<i>thu</i> /tʃ/- <i>e-my</i>
2 <sup>nd</sup> person	break-PRS.1SG	break-PRS-1PL
	<i>kop</i> -/ɲ/- <i>e-sz</i>	<i>kop</i> -/ɲ/- <i>e-cie</i>
	kick-TH-PRS-2SG	kick-TH-PRS-2PL
3 <sup>rd</sup> person	<i>thu</i> /tʃ/- <i>e-sz</i>	<i>thu</i> /tʃ/- <i>e-cie</i>
	break-PRS-1SG	break-PRS-2PL
	<i>kop</i> -/ɲ/- <i>e</i>	<i>kop</i> -/n/- <i>q</i>
	kick-TH-PRS.3SG	kick-TH-PRS.3PL
	<i>thu</i> /tʃ/- <i>e</i>	<i>thu</i> /k/- <i>q</i>
	break-PRS.3SG	kick-PRS.3PL

If one makes an assumption that athematic and *nq*-verbs form a single class, one is of course compelled to account for the presence of exponent *-nq-* in some of the verbs from the relevant class vis-à-vis its absence in other verbs.

At this point it is important to note that the presence of *-nq-* is irregular even in the canonical *nq*-class. Semelfactive verbs show the exponent in the non-past forms as well as the active *l*-participles, while change-of-state unaccusative show *-nq-* only in the non-past paradigm. This distribution is illustrated in (12) below.

<sup>9</sup> I treat exponent *-nq-* /nɔ̃/ as containing a floating back rounded nasal vowel which is realized only before consonants. The details of the analysis see Zdziebko (2017).

(12) *l*-participle paradigms of *kop-nq-ć* ‘kick once’ and *chud-nq-ć* ‘become slim’

Pers.	Gen.	Singular	Gen.	Plural			
1 <sup>st</sup>	Masc.	<i>kop-nq-t-em</i> kick-TH-PTCP-1SG.M <i>chud-t-em</i> slim-PTCP-1SG.M	Vir.	<i>kop-nę-l-iśmy</i> <sup>10</sup> kick-TH-PTCP-1PL.V <i>chud-l-iśmy</i> slim-PTCP-1PL.V			
		Fem.		<i>kop-nę-t-am</i> kick-TH-PTCP-1SG.F <i>chud-t-am</i> slim-PTCP-1SG.F	Non-vir.	<i>kop-nę-t-yśmy</i> kick-TH-PTCP-1PL.NV <i>chud-t-yśmy</i> slim-PTCP-1PL.NV	
				2 <sup>nd</sup>		Masc.	<i>kop-nq-t-eś</i> kick-TH-PTCP-2SG.M <i>chud-t-eś</i> slim-PTCP-2SG.M
	Fem.		<i>kop-nę-t-aś</i> kick-TH-PTCP-2SG.F <i>chud-t-aś</i> slim-PTCP-2SG.F				Non-vir.
		3 <sup>rd</sup>	Masc.		<i>kop-nq-t</i> kick-TH-PTCP <i>chud-t</i> slim-PTCP		
				Fem.	<i>kop-nę-t-a</i> kick-TH-PTCP-3SG.F <i>chud-t-a</i> slim-PTCP-3SG.F	Non-vir.	
Neu.	<i>kop-nę-t-o</i> kick-TH-PTCP-3SG.N <i>chud-t-o</i> slim-PTCP-3SG.N						

<sup>10</sup>I provide a simplified version of the glosses for gender, number and person information as it is not vital for the discussion presented in the paper. In general, person information is not part of the verb itself in the active verbal *l*-participles utilized to express past tense in Polish. They are rather marked on a phonologically unpronounced light verb that realizes Tense. I also ignore the alternation between *-nq-* /nɔ̃/ and *-ne-* /nɛ̃/, the former of which is attested in the masculine forms of the semelfactive paradigm.

The above examples show that the presence of the exponent *-nq-* in active *l*-participles is dependent on the aspectual properties of relevant verbs. Only semelfactives possess the relevant exponent in *l*-participles.

Furthermore, verbs such as transitive *kraść* ‘steal’ and unaccusative *paść* ‘fall’ do not utilize *-nq-* in the infinitive but use it in the non-past paradigm.<sup>11</sup>

Finally, there are many prototypical  $\emptyset$ -verbs which do not utilize exponent *-nq-* at all. These are mostly transitive verbs, with the exception of *tyć* ‘grow fat’ and *gnić* ‘rot’. Elsewhere I have argued that the presence of *-nq-* in a given verb may be argued to be dependent on how much of the verbal structure is realized by the stem exponent. The following table adopted from (Zdziebko 2017: 602), summarizes the preponderance of exponent *-nq-* in different subclasses of  $\emptyset/nq$ -verbs.

(13)<sup>12</sup>

	Infinitive	Forms in <i>-nq-</i>			
		Non-past	Imperative	Infinitive	passive <i>l</i> -participle
a.	<i>kopnąć</i>	<i>-nq-</i>	<i>-nq-</i>	<i>-nq-</i>	<i>-nq-</i>
b.	<i>zmoknąć</i>	<i>-nq-</i>	<i>-nq-</i>	<i>-nq-</i>	-
c.	<i>ucichnąć</i>	<i>-nq-</i>	<i>-nq-</i>	<i>-nq-</i>	-
d.	<i>upaść</i>	<i>-nq-</i>	<i>-nq-</i>	-	-
e.	<i>zgnić</i>	-	-	-	-

On the assumption that the morpho-syntactic structure of Polish verb is the template presented in (13) disregarding the prefix, different subclasses may be expressed by vocabulary items found in (14).

(14)

[[[[[[[[[ $\sqrt{\text{ROOT}}$  V] Asp $_{\Delta}$ /SEM] (Voice)] (Prt)] ViewAsp] Tns] Agr]

Semelfactives and change-of-state verbs are assumed to differ in the specification of the Asp-head, the latter being represented as Asp $_{\Delta}$ , which stands for change-of-state semantics.

<sup>11</sup> In addition, Polish has verbs which possess free variants of infinitives marked with *-nq-* and unmarked with this exponent, e.g. *ciec* - *ciek-nq-ć* ‘leak’ and a few others.

<sup>12</sup> Glosses (top-down): ‘kick’, ‘become wet’, ‘become quiet’, ‘fall’, ‘rot’.



(15)

(a)  $\sqrt{\text{KOP}} \leftrightarrow /k\text{ɔp}/$ (b)  $\{\sqrt{\text{MOK}}, (V_{[-\alpha, -\beta]}, \text{Asp})_i\} \leftrightarrow /m\text{ɔk}/ / \_ \text{Prt}_{[+\text{act}]_i}$ (c)  $\{\sqrt{\text{CICH}}, (V_{[-\alpha, -\beta]}, \text{Asp})_i\} \leftrightarrow /t\text{ɛix}/ / \_ \left\{ \begin{array}{l} \text{Prt}_{[+\text{act}]_i} \\ \text{Prt}_{[-\text{act}]_i} \end{array} \right\}$ (d)  $\{\sqrt{\text{PAD}}, (V_{[-\alpha, -\beta]}, \text{Asp})_i\} \leftrightarrow /p\text{ad}/ / \_ \left\{ \begin{array}{l} \text{Prt}_{[+\text{act}]_i} \\ \text{Prt}_{[-\text{act}]_i} \\ \text{Inf}_i \end{array} \right\}$ (e)  $\{\sqrt{\text{GNIJ}}, V, \text{Asp}\} \leftrightarrow /g\text{nij}/$ 

The realizational statements presented in (15) correspond to the subclasses presented in (13). The class (15a) = (13a) uses the stem only to realize the acategorial root. In subclass (15b) = (13b) the stem, here exemplified by the form /mɔk/, normally realizes the root. In active participle it realizes the root, the V-head and the Asp-head. Subclass (15c) = (13c) differs from subclass (15b) = (13b) in that in this subclass the stem realizes the  $\sqrt{\text{ROOT-V-Asp}}$  sequence also in the passive participle. Additionally, in subclass (15d) = (13d) the stem realizes the relevant sequence also in the infinitive. Subclass (15e) = (13e) always realizes the  $\sqrt{\text{ROOT-V-Asp}}$  sequence by means of the stem exponent.<sup>13</sup>

Additionally, the following exponents of functional heads must be postulated for the analysis to be complete.

<sup>13</sup> Transitive  $\emptyset$ -verbs, such as *pić* 'drink' or *ciąć* 'cut', are specified for  $\{\sqrt{\text{ROOT}}, V, \text{Asp}, \text{Voice}\}$ .

(16)

$$(a) \{(V_{[-\alpha,-\beta]})_i, \text{Asp}_{\Delta/\text{SEM}}, (\text{Voice})\} \leftrightarrow /n\delta/ / \_ \left\{ \begin{array}{l} [+sp,-pl]_i^{14} \\ [-part,+pl]_i \\ \text{Inf}_i \\ \text{Prt}_{[+act]_i} \end{array} \right\}$$

$$(b) \{(V_{[-\alpha,-\beta]})_i, \text{Asp}, \text{Voice}\} \leftrightarrow \emptyset / \_ \left\{ \begin{array}{l} [+sp,-pl]_i \\ [-part,+pl]_i \\ \text{Inf}_i \\ \text{Prt}_{[+act]_i} \end{array} \right\}$$

$$(c) V_{[-\alpha,-\beta]} \leftrightarrow [\text{pal}]$$

Vocabulary item (16a) realizes the sequence composed of a V-head and a change-of-state or semelfactive Asp-head, unless it has already been realized by the stem, and the Voice-head, if present. On the other hand, the same sequence is realized as  $\emptyset$  in other transitive verbs (see 16b). The V-head is realized by exponents  $/n\delta/$  or  $\emptyset$  in the 1<sup>st</sup> person singular, 3<sup>rd</sup> person plural, the infinitive and active *l*-participle. Elsewhere, it is realized as an autosegment whose integration triggers palatalization of the following consonant (see 16c). The details of such an integration have been discussed in Zdziebko (2017) and will not be presented here.

The consequence of the realizational statements presented in (15) and (16) are that verbs which utilize the stem to realize only the root, i.e. subclass (15a) = (13a), will realize the V-Asp-Voice sequence by means on exponent  $-nq-$   $/n\delta/$ , if they carry the relevant aspectual specification in both the non-past tense forms and in the active *l*-participle. Other subclasses will utilize  $-nq-$   $/n\delta/$  in restricted set of contexts illustrated in table (13) above.

The above account shows that the exponence of *nq*-verbs and athematic verbs does not call for separate marking of the two subclasses: the difference between them boils down to accounting for the fact that only semelfactive and (most) change-of-state unaccusatives in the *nq*/ $\emptyset$ -

<sup>14</sup>I assume the category of person to be decomposed into two features:  $[+/-sp(\text{eaker})]$  and  $[+/-part(\text{icipant})]$ . The 1<sup>st</sup> person is specified as  $[+sp,+part]$ . The 2<sup>nd</sup> person carries the values  $[-sp,+part]$  and the 3<sup>rd</sup> person is specified  $[-sp,-part]$ . Polish is a two-number language which utilizes the feature  $[+/-plural]$ . For the sake of simplicity, I will assume that Polish participles are marked with three gender features in the singular:  $[\text{masculine}]$ ,  $[\text{feminine}]$  and  $[\text{neuter}]$ , and one binary feature in the plural:  $[+/-m(\text{asculine})-\text{pers}(\text{onal})]$ .

class utilize exponent *-nq-* and that, within the *nq*-subclass the different verbs show this exponent in different number of environments. In fact it can safely be said that the extent to which a given verb is a *nq*-verb or a  $\emptyset$ -verb depends on the number of environments in which the stem exponent realizes the V-Asp sequence (see 13a-e).

### 3.2. Conflating the *e*-class with the *ej*-class

The second pair of verb classes which can arguably be reanalyzed as a single class are *e*-verbs (1e) and *ej*-verbs (1f). All the verbs marked with thematic exponent *-ej-* / $\epsilon j$ / are degree achievement unaccusatives. At the same time no *e*-verb shows such aspectual and valency properties. As the morpho-syntactic properties of the two classes of verbs are complementary, it is possible to consider *e*-verbs and *ej*-verbs to belong to the same class and analyse its members as differing in the presence/absence of degree achievement semantics and the Voice-head.

This view is strengthened by the fact that only *e*-verbs and *ej*-verbs show a morphophonological alternation between /a/ and / $\epsilon$ / in the masculine-personal forms of active *l*-participle paradigms (see 17).

(17)<sup>15</sup>

Non-virile Forms	Virile Form
(a) <i>e</i> -verbs	
<i>myśl</i> -/a/- <i>l</i> -y- <i>śmy</i>	<i>myśl</i> -/ $\epsilon$ /- <i>l</i> -i- <i>śmy</i>
think-TH-PTCP-NVIR-1PL	think-TH-PTCP-VIR-1PL
<i>jęcz</i> -/a/- <i>l</i> -y- <i>ś</i> - <i>cie</i>	<i>jęcz</i> -/ $\epsilon$ /- <i>l</i> -i- <i>ś</i> - <i>cie</i>
moan-TH-PTCP-NVIR-2PL	moan-TH-PTCP-VIR-2PL
<i>cierpi</i> -/a/- <i>l</i> -y	<i>cierpi</i> -/ $\epsilon$ /- <i>l</i> -i
suffer-TH-PTCP-NVIR-3PL	suffer-TH-PTCP-VIR-3PL
(b) <i>ej</i> -verbs	
<i>po-siwi</i> -/a/- <i>l</i> -y- <i>śmy</i>	<i>po-siwi</i> -/ $\epsilon$ /- <i>l</i> -i- <i>śmy</i>
a little-grey-TH-PTCP-NVIR-1PL	a little-grey-TH-PTCP-VIR-1PL

<sup>15</sup> Glosses (top-down, non-virile and virile forms): ‘we thought’, ‘you moaned’, ‘they suffered’, ‘we went grey’, ‘they went dumb’, ‘you became stupid’.

<i>z-barani</i> -/a/- <i>l-y</i>	<i>z-barani</i> -/ε/- <i>l-i</i>
TEL-ram-TH-PTCP-NVIR-3PL	TEL-ram-TH-PTCP-VIR-3PL
<i>z+głupi</i> +/a/+ <i>l+y+ś+cie</i>	<i>z+głupi</i> +/ε/+ <i>l+i+ś+cie</i>
TEL-stupid-TH-PTCP-NVIR-2PL	TEL-stupid-TH-PTCP-VIR-2PL

Although the alternation between /a/ and /ε/ has traditionally been analysed as a phonological process (see e.g. Gussmann 1980, Rubach 1984), I have argued against such an analysis on the grounds of it being exceedingly abstract without yielding the desired results (see Zdziebko 2017). The presence of the alternation in the class of *e*- and *ej*-verbs is most likely a consequence of the particular shape of vocabulary items rewriting pieces of the functional sequence in these particular classes of verbs. Importantly, for such an account to hold *e*-verbs and *ej*-verbs should form a natural class.

The vocabulary items relevant in the realization of the *e/ej*-verbs *zgrubieć* ‘become thick’ and *widzieć* ‘see’ are presented below.

(18)

(a)  $\sqrt{\text{GRUB}} \leftrightarrow /grub/$

(b)  $\sqrt{\text{WID}} \leftrightarrow /vjid/$

(c)  $V_{[+\beta]} \leftrightarrow [pal]$

(d)  $\left\{ \begin{array}{l} \text{Asp}_{[+\beta]}, (\text{Voice}) \\ | \\ [(\Delta)_i] \end{array} \right\} \leftrightarrow \left\{ \begin{array}{l} /εj/ \text{ / } \_ \\ /a/ \end{array} \right\} \left\{ \begin{array}{l} [+masc-pers.] \\ \text{Inf} \\ \text{Imp}_i \\ [-past]_i \end{array} \right\}$

(e)  $\left\{ \text{Asp}_{[(-\alpha)_i, +\beta]}, \text{Voice}, (\text{Tns}) \right\} \leftrightarrow /i/ \text{ / } \_ \left\{ \begin{array}{l} [-sp, -pl] \\ [+part, +pl] \\ \text{Inf}_i \\ \text{Prt}_{[+\text{act}]_i} \end{array} \right\}$

(f)  $\left\{ (\text{Voice}), \text{Tns} \right\} \leftrightarrow \left\{ \begin{array}{l} /ε/ \\ /ɔ/ \text{ / } \_ [-part, +pl] \end{array} \right\}$

Exponents (18a-b) realize the roots, while exponent (18c) induces palatalization. Exponent (18d) is responsible for the /a/-/ɛ/ alternation and states that all verbs from *e/ej*-class realize the functional sequence as *-ej-/ɛj/* in the infinitive and the plural virile forms. In addition to that, change-of-state unaccusatives utilize exponent *-ej-/ɛj/* in the imperative and non-past tense paradigm. Elsewhere the relevant heads are realized as /a/. Exponent (18e) realizes the higher functional sequence including Tense-head as /i/ in the 2<sup>nd</sup> and 3<sup>rd</sup> person singular and the 1<sup>st</sup> as well as the 2<sup>nd</sup> person plural in *e*-verbs.<sup>16</sup> In addition *i*-verbs, i.e. verbs marked with features [-α,+β], utilize exponent *-i-* in the infinitive and the active *l*-participle. The general exponent of the Tns-head in Polish is *-e-/ɛ/*. In the 3<sup>rd</sup> person plural, Tense is realized as *-q-/ɔ̃/* (18f). The former exponent is found in the 1<sup>st</sup> person singular of the non-past tense paradigms in *e/ej*-class and *i*-class and in all other non-past paradigms except for *aj*-verbs and *owa*-verbs, to which I turn now.

### 3.3. The unification of *aj*- and *owa*-classes

Following Czaykowska-Higgins (1998) and Łazorczyk (2010) I will analyze exponent *-owa-/ɔva/* as bi-morphemic. To be precise, I will take it to be a combination of exponents *-ow-/ɔv/* and *-aj-/aj/*. I also postulate that *aj*-verbs (1g above) and *ow+aj*-verbs (1h) form a single class, i.e. share the specification of the V-head. The difference between the two subclasses is in the size of the structure realized by the exponent of the root. Whereas, in *ow+a(j)*-verbs the stem realizes only the acategorial root, the subclass in *-aj-* utilizes the stem to realize the root and the categorizing head. The exponence of the two subclasses is summarized below on the example of verbs *budować* ‘build’ and *mrugać* ‘blink’.

(19)

(a)  $\sqrt{\text{BUD}} \leftrightarrow /bud/$

(b)  $\{\sqrt{\text{MRUG}}, V_{[+\alpha,-\beta]}\} \leftrightarrow /mruɡ/$

<sup>16</sup> In the 1st person singular and the 3rd person plural of the non-past paradigm the *i*-verbs and *e*-verbs realize the Asp-Voice sequence as an autosegment that triggers Hardening of palatalized consonants deriving the output of Iotation a.k.a. J-Palatalization (see Laskowski 1975, Gussmann 1980, Rubach 1984 for a linear rule-based accounts of the process and Rubach and Booij 2001 for a stem-allomorphy account).

- (c)  $V_{[+\alpha,-\beta]} \leftrightarrow /ov/$
- (d)  $\{\text{Asp}_{[+\alpha,-\beta]}, \text{Voice}\} \leftrightarrow \left\{ \begin{array}{l} /aj/ \\ /a/ / \_\_[-\text{part},-\text{pl}] \end{array} \right\}$
- (e)  $\{V_{[+\alpha,-\beta]}, \text{Asp}, \text{Voice}\} \leftrightarrow /uj/ / \_\_ \left\{ \begin{array}{l} [-\text{past}] \\ \text{Imp} \end{array} \right\}$
- (f)  $\text{Tns} \leftrightarrow \emptyset / /aj/ \_\_$

Vocabulary item (19a) realizes the root of the *owa*-verb *budować*, while (19b) realizes the root and the V-head of the verb *mrugać* ‘blink’. Entry (19c) realizes the V-head in *owa*-subclass. Exponent *-ow-* /*ov*/ is not attested in *aj*-subclass since entry (19c) is bled by entries realizing the root and the V-head analogous to (19b). Vocabulary item (19d) realizes the Asp-Voice sequence in the relevant verbs. In the *owa*-subclass the relevant vocabulary item is going to be used only in the infinitive and the *l*-participle since in the non-past tense and the imperative this subclass utilizes entry (19e) which bleeds entry (19d) in those contexts but is itself bled by entry (19b) and corresponding entries in all *aj*-verbs. Finally, the Tense-head is realized as  $\emptyset$  in the environment of exponent *-aj-* (19f).

### 3.4. *i*-verbs and *a*-verbs

Much of the exponence of *i*-verbs has been covered in section 3.2. on the occasion of discussing the properties of *e/ej*-verbs. In fact *i*-verbs and the subclass of *e*-verbs share exponent *-i-* in the 2<sup>nd</sup> and 3<sup>rd</sup> person singular and the 1<sup>st</sup> and 2<sup>nd</sup> person plural of non-past tense paradigm. In addition, *i*-verbs employ this exponent in the active *l*-participle paradigm and in the infinitive. All these facts have been taken into consideration in the formulation of vocabulary item (18e) repeated here as (20).

- (20)
- $$\{\text{Asp}_{[-\alpha]i,+\beta}, \text{Voice}, (\text{Tns})\} \leftrightarrow /i/ / \_\_ \left\{ \begin{array}{l} [-\text{sp},-\text{pl}] \\ [+part,+\text{pl}] \\ \text{Inf}_i \\ \text{Prt}_{[+\text{act}]i} \end{array} \right\}$$

The stem exponents of *i*-verbs realize the root while the category-defining V-head is realized as a palatalizing autosegment.

Verbs from the *a*-class are characterized by the presence of palatalization throughout their non-past tense paradigm. This is illustrated in (21) on the basis of the non-past paradigms of verbs *lizać* ‘lick’ and *plakać* ‘cry’.

(21) Non-past paradigms of the verbs *li/z/-a-ć* ‘to lick’, *pla/k/-a-ć* ‘to cry’

	Singular	Plural
1 <sup>st</sup> person	<i>li/z/-e</i>	<i>li/z/-e-my</i>
	lick-PRS.1SG	lick-PRS.1PL
	<i>pla/tʃ/-e</i>	<i>pla/tʃ/-e-my</i>
2 <sup>nd</sup> person	<i>li/z/-e-sz</i>	<i>li/z/-e-cie</i>
	lick-PRS.2SG	lick-PRS.2PL
	<i>pla/tʃ/-e-sz</i>	<i>pla/tʃ/-e-cie</i>
3 <sup>rd</sup> person	<i>li/z/-e</i>	<i>li/z/-e</i>
	lick-PRS.3SG	lick-PRS.3PL
	<i>pla/tʃ/-e</i>	<i>pla/tʃ/-e</i>

The exponence of the unmarked *a*-class is summarized in (22) below.

(22)

$$\begin{array}{l}
 \text{(a) } \sqrt{\text{LIZ}} \leftrightarrow /liz/ \\
 \text{(b) } \{V, \text{Asp}, \text{Voice}\} \leftrightarrow \left\{ \begin{array}{l} [\text{pal}]_2 \\ /a/ \end{array} \right. / \_ \left\{ \begin{array}{l} \text{Prt}_{[+\text{act}]} \\ \text{Inf} \end{array} \right\} \left. \right\}
 \end{array}$$

Entry (22a) realizes the root of the verb *lizać* ‘lick’, whose paradigm has been included in (21). The functional sequence is normally realized as a palatalizing autosegment and as *-a-* /a/ in the active *l*-participle and the infinitive. The palatalizing autosegment, whose exact identity will not be discussed here, is marked as [pal]<sub>2</sub> to differentiate it from the palatalizing

autosegments attested in other verbal classes. In fact the palatalization associated with the non-past paradigm of *a*-verbs usually produces different outputs than the one attested in  $\emptyset/nq$ -verbs, *e/ej*-verbs and *i*-verbs.

#### 4. Gains and predictions

For the sake of summarizing this study, let me point to certain empirical advantages it offers.

The marking presented in (10) above and repeated in (23) for readers' convenience successfully captures relevant affinities between the verbal classes.

(23)

Thematic affix	$\emptyset/nq$	<i>aj</i>	<i>i</i>	<i>e/ej</i>	<i>a</i>
specification of the head	[- $\alpha$ , - $\beta$ ]	[+ $\alpha$ , - $\beta$ ]	[- $\alpha$ , + $\beta$ ]	[+ $\alpha$ , + $\beta$ ]	none

For instance, [- $\alpha$ ]-verbs, i.e.  $\emptyset/nq$ -verbs and *i*-verbs, realize Secondary Imperfective with exponent *-aj-* /aj/, while all other classes utilize exponent *-i/yw-* /iv/ (24).

(24)<sup>17</sup>

Telic Infinitive	Secondary Imperfective Infinitive
(a) [- $\alpha$ ]-verbs	
<i>od-gryź-ć</i> /ɔdgrɨɕtɕ/	<i>od-gryz-a(j)-ć</i> /ɔdgrɨzɨtɕ/
off-bite-INF	off-bite-TH.SI-INF
<i>roz-budź-i-ć</i> /rɔzbudɕitɕ/	<i>roz-budz-a(j)-ć</i> /rɔzbudɕɨtɕ/
apart-wake-TH-INF	apart-wake-SI.TH-INF
(b) non-[- $\alpha$ ]-verbs	
<i>od-pis-a-ć</i> /ɔtpɨsɨɕtɕ/	<i>od-pis-yw-a-ć</i> /ɔtpɨsɨvɨɕtɕ/
back-write-TH-INF	a little-back-write-SI-TH-INF
<i>ob-gad-a(j)-ć</i> /ɔbgadɨɕtɕ/	<i>ob-gad-yw-a(j)-ć</i> /ɔbgadɨvɨɕtɕ/
over-chatter-TH-INF	over-chatter-SI-TH-INF
<i>prze-krzycz-e-ć</i> /pʃɛkʃɨɕɨtɕ/	<i>prze-krzyk-iw-ć</i> /pʃɛkʃɨɕɨvɨɕtɕ/
across-shout-TH-INF	across-shout-SI-TH-INF

<sup>17</sup> Glosses (top-down): 'bite', 'arouse', 'write back', 'talk over', 'shout louder'.



Moreover, only [+β]-verbs, i.e. *i-verbs* and *e/ej-verbs*, show consonant mutation known as palatalization in all forms of the non-past and past paradigms.

Additionally, defining verbal classes by means of features encoded on V-heads and the conflation of the classes postulated in this study makes an interesting prediction as to which classes of verbs may host one and the same root. Namely, the account presented here predicts that one and the same root may never be found in two verbs belonging to the classes whose conflation is postulated here. To be precise, we predict that it is impossible for a single root to be found in a  $\emptyset$ -verb and a *nq*-verb, in an *ej*-verb and *e*-verb and an *aj*-verb and *owa*-verb. This is the case as, according to the approach postulated here, the exponence of verbal classes in Polish is crucially dependent on the specification of V-heads, which, by hypothesis, is the same in  $\emptyset$ -verbs and *nq*-verbs, *ej*-verbs and *e*-verbs as well as *aj*-verbs and *owa*-verbs. Importantly, the prediction made by the analysis is borne out. No root is found in the pairs of subclasses defined by the same specification of the V-head.

At the same time not every root is merged with each type of V-head. This is however, not a problem for a syntactic approach to word-formation as category selection, in the relevant cases of root-selection, is a matching system and hence, as emphasized by Borer (2014), it is redundant by definition.

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