Polish prefix stacking redux[*]

Bartosz Wiland (A. Mickiewicz University, Poznań)

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Abstract: The chapter focuses on describing the formal properties of multiple aspectual prefixation in Polish, as in *po-na-ścinać* 'cut something down in large quantity, one by one'. This corner of Polish grammar is characterized by the density of facts, which range from perfectivizing properties of aspectual prefixes to attested and unattested prefix stacking patterns. This work attempts to challenge a subset of these facts and argues that they can be captured under certain assumptions about the composition of the syntactic functional sequence and the prefix formation mechanism proposed in Starke (2018) and explored in some other works on Nanosyntax.

1. Introduction

The paper is concerned with Polish verbal aspectual prefixes like in (1), which can stack together on the verb stem, as in (2).[1]

(1) a. na-zrywać jabłek
CUML-pick.INF apples.GEN
'pick apples in bulk'

b. po-zrywać jabłka
DIST-pick.INF apples.ACC
'pick apples one by one'

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[1] The chapter uses the following list of abbreviations for Polish aspectual prefixes: INCP = inceptive, TERM = terminative, COMPL = completive, PERD = perdurative, DELIM = deliminative, DIST = distributive, CUML = cumulative, SAT = saturative, RES = restitutive, EXC = excessive.

(2) po-na-zrywać jabłek
DIST-CUML-pick.INF apples.GEN
'pick apples in bulk one by one'

The goal of this chapter is to revisit and highlight the formal properties of multiple aspectual prefixation in Polish, partially discussed in Wiland (2012), and attempt to derive them with the Nanosyntactic prefix formation mechanism (cf. Starke 2018).

The aspectual prefixes, sometimes labeled as 'super-lexical' or 'outer' following Svenonius (2004), are often distinguished from the so-called 'lexical' or 'inner' prefixes like *roz-* or *w-*. Unlike the aspectual prefixes, the latter have spatial meanings and often form lexical idioms with the verb they merge with, as for instance in:

(3) a. roz-siać mak (na polu)
THROUGH-sow poppy.ACC on field
'spread poppy (on a field)'
b. w-łożyć papierosa do ust
IN-put cigarette.ACC to mouth
'put a cigarette in the mouth'

The term 'lexical' or 'inner' refers to the proximity of the prefix to the lexical verb in a strand of analyses where super-lexical prefixes originate higher than the VP, while lexical prefixes originate lower, inside an articulate VP (e.g., Svenonius 2004, Romanova 2004 and Tatevosov 2008, among others). In contrast, aspectual prefixes are considerably more semantically regular and, similarly to adverbs, they modify the verb they combine with rather than form new concepts. The scope of this chapter is limited to aspectual prefixes and leaves lexical prefixes aside. In particular, the chapter focuses on describing the formal properties of multiple aspectual prefixation in Polish. The chapter argues that the relevant facts can be captured with certain essential assumptions about the composition of the functional sequence and the prefix formation mechanism proposed in Starke (2018) and explored in some other works on Nanosyntax.

The chapter is organized as follows. Section 2 provides the basic facts about verbal prefixes in Polish. Section 3 briefly describes the distributional properties of individual aspectual prefixes and their co-occurrence restrictions and requirements with respect to basic syntactic and semantic properties of the verb phrases they come with. Section 4 discusses the constraints on multiple prefixation. Section 5 offers an analysis of these facts, which explores

the Nanosyntactic prefix formation mechanism. Section 6 is the conclusion.

2. Aspectual prefixes

Polish verbs are morphologically distinguished between imperfective and perfective, where perfective forms are often marked with a prefix. This can be illustrated with the following pairs of infinitive verb forms, which use different prefixes to mark perfectivity.

(4) a. jeść – z-jeść
‘eat’ IPFV ‘eat’ PFV
b. pić – wy-pić
‘drink’ IPFV ‘drink up’ PFV
c. kosić – s-kosić
‘mow’ IPFV ‘mow’ PFV
d. rwać – u-rwać
‘tear’ IPFV ‘tear down’ PFV
e. gubić – z-gubić
‘lose’ IPFV ‘lose’ PFV

These prefixes are sometimes called ‘purely perfectivizing’ as they do not otherwise change the conceptual meaning of the verb. Next to these, there is a small class of verbs whose perfective forms are not construed with a prefix but, instead, with a suppletive root, such as:

(5) a. brać – wziąć
‘take’ IPFV ‘take’ PFV
b. mówić – powiedzieć
‘speak’ IPFV ‘speak’ PFV
c. widzieć – zobaczyć
‘see’ IPFV ‘see’ PFV
d. oglądać – obejrzeć
‘watch’ IPFV ‘watch’ PFV

Along the purely perfectivizing prefixes seen in (4), there exists a class of aspectual prefixes, which – along the perfectivizing function – also provide specific meanings for the verb phrase. They are listed in Table 1, which is a version of the classification in Wiland (2012).

DISTRIBUTIVE	po	myć	‘wash up (the dishes)’
DELIMINATIVE	po	tańczyć	‘dance a little’
SATURATIVE	na	jeść się	‘eat to the full’
CUMULATIVE	na	gotować	‘cook a lot of sth’
RESTITUTIVE	prze	pisać	‘rewrite’
EXCESSIVE	prze	krzyczeć	‘shout louder than sb’
PERDURATIVE	prze	siedzieć	‘sit beyond some period of time’
COMPLETIVE	do	kończyć	‘finish up’
ADDITIVE	do	kroić	‘cut more of sth’
TERMINATIVE	od	śpiewać	‘sing sth to its end’
ATTENUATIVE	pod	dusić	‘stew a little’
INCEPTIVE	za	kochać się	‘fall in love’

Table 1. Polish aspectual prefixes.

Just like in the case of purely perfectivizing prefixes in (4), the addition of an aspectual prefix to an imperfective verb root results in the perfectivization of the verb in a tensed form. This can be illustrated with the following minimal imperfective – perfective pairs of verbs in the past tense:[2]

(6) a. Jan mył naczynia.
Jan washed.IPFV dishes.ACC
‘Jan was washing the dishes.’

b. Jan po-mył naczynia.
Jan DIST-washed.PFV dishes.ACC
‘Jan washed the dishes.’

(7) a. Basia śpiewała tę piosenkę.
Basia sang.IPFV that song.ACC
‘Basia was singing that song.’

[2] Apart from prefixes, perfective verb forms in Polish are also formed with suffixes, as in the case of semelfactives like *kop-nąć* ‘give a kick’, as well as with suppletive verb roots, as in the case of *wróc-i-ć*, IPFV – *wrac-a-ć*, PFV ‘return’. For discussions of the ways perfectivity is constructed in Polish see, for instance, Bogusławski (1963), Grzegorczykowa (1997), Nagórko (1998), and Willim (2006).

b. Basia od-śpiewała tę piosenkę.
Basia TERM-sang.PFV that song.ACC
'Basia sang that song.'

It is important to point out that the addition of adverbial modifiers like 'in an hour' to verbs with aspectual prefixes is not a reliable diagnostic for perfectivity.[3] For instance, as shown in (8), verbs with the saturative *na-* will be felicitous with both 'in an hour' and 'for an hour' and, as shown in (9), verbs with the excessive *prze-* will resist the modification with either.

(8) Basia na- {tańczyła / gotowała / śpiewała} się ˇprzez / ˇw godzinę.
Basia SAT danced cooked sang REFL for in hour

(9) Jan prze-krzyczał Basię *przez / *w godzinę.
Jan EXC-shouted Basia.ACC for in hour
'Jan shouted louder than Basia for/in an hour.' (intended)

Instead, what indicates that all aspectual prefixes produce perfective verb forms is the fact that they behave just like purely perfectivizing prefixes when they appear with verbs with present tense inflections, with which they express future time reference.[4] This can be illustrated with the following:

(10) a. Basia z-je pizzę.
Basia PFV-eat.PRS pizza.ACC
'Basia will eat/will have eaten pizza.'
b. Jan wy-pije piwo.
Jan PFV-drink.PRS beer.ACC
'Jan will drink/will have drunk beer.'

(11) a. Basia się na-tańczy.
Basia REFL SAT-dance.PRS
'Basia will dance/will have danced to the limits.'

[3] In this respect, Polish aspectual prefixes behave in a way similar to aspectual prefixes in Czech and Russian (see Filip 1992, 1993, 2000).

[4] For a discussion and analysis of (lexically) present tense perfective verb forms that express future time reference in Polish see Błaszczak et al. (2014).

b. Jan prze-krzyczy Basię.
Jan EXC-shout.PRS Basia.ACC
'Jan will shout/will have shouted louder than Basia.'

Examples in (10) and (11) include present tense-inflected verbs but these examples differ with respect to the class of prefixes they include: the examples in (10) have purely perfectivizing *z-* and *wy-* while the examples in (11) have aspectuals: the saturative *na-* and excessive *prze-*. Examples in both (10) and (11) express the future time reference, which – assuming this to be a reliable diagnostic – indicates that aspectual prefixes are perfectivizing.

The other essential property of individual aspectual prefixes is that they appear with specific types of verb phrases. These co-occurrence restrictions and requirements encompass the argument structure as well as specific semantic properties of the subevent denoted by the verb phrase (e.g., its plurality). What follows is a brief description of the distributional properties of the (subset of) aspectual prefixes that is going to be relevant to the remainder of the chapter.[5]

3. Distributional properties of aspectual prefixes

3.1. Distributive *po-*

Generally, distributive predicates are those that involve plural participants that are individually involved in the action. More specifically, a verb with a distributive *po-* must include a plural domain of its application. This requirement can be satisfied with a plural NP object of transitives and (an underlying object of) unaccusatives, as in (12a) and (13a). Sentences with verb phrases with a single object and a distributive *po-* are ill-formed, as shown in the (b) examples.

(12) a. Jan po-mył naczynia.
Jan DIST-washed dishes.ACC
'Jan washed up the dishes.'

[5] One aspectual prefix that this chapter is not concerned with, and which is not listed in Table 1, is *pod-* as in *pod-kradać* 'steal a bit', which is synretic with a locative preposition 'under', as in *pod stołem* 'under a table.LOC' and shows a certain degree of idiosyncracy. A thorough discussion of *pod-* would take the discussion that is relevant to the purposes of this chapter too far afield.

b. *Jan po-mył naczynię.
Jan DIST-washed dish.ACC
'Jan washed up a dish.'

(13) a. Królowie po-marli.[6]
kings.NOM DIST-died
'The kings have died.'

b. *Król po-umarł.
king.NOM DIST-died.
'The king has died.'

As Piñón (2000) points out, this constraint can be also satisfied with a morpho-syntactically singular NP object that introduces a plural distribution for the event type denoted by the predicate, as in:

(14) a. Basia po-dziurawiła piłkę.
Basia DIST-made.holes ball.ACC
'Basia made holes in (each part of) the ball.

b. Mur po-pękał.
wall DIST-cracked
'(Each part of) the wall has cracked.' (Piñón's 2000 example 13)

Piñón (2000) also observes that the events denoted by a verb with a distributive *po-* must take place successively. This can be tested with the addition of *jeden po drugim* 'one after the second'. Enforcing simultaneous reading of the events with the addition of *naraz* 'at once'

[6] What indicates that the verb *umierać* is unaccusative is the fact that it can form an *l*-participle as in *po-mar-l-i królowie* 'dead kings'. Polish has three suffixes that form participles: *-l* (e.g., *wyblak-ł-y* 'faded'), *-n* (e.g., *gnębio-n-y* 'harassed'), and *-t* (e.g., *zabi-t-y* 'killed'). Cetnarowska (2000, 2002) argues that the ability to form *l*-participles is a diagnostic for what Levin and Hovav (1995) call 'deep unaccusativity', that is the kind of unaccusativity that reflects the lexical semantic property of the corresponding verb (as opposed to the other, 'surface unaccusativity', which shows some properties of unergatives). For a nanosyntactic analysis of the relation between unaccusativity and adjectival *l*-participles in Polish, see Taraldsen Medová and Wiland (2018).

results in ill-formedness:[7]

(15) a. Jan po-mył naczynia { jedno po drugim / *naraz }
Jan DIST-washed dishes.ACC one.NEU.ACC after second at.once
'Jan washed up the dishes one after another.'

b. Królowie po-marli { jeden po drugim / *naraz }
kings DIST-died one.MSC.ACC after second at.once
'The kings have died one after another.'

Also, Piñón (2000) notes that a distributive *po-* does not attach to stative verbs, as in:

(16) a. *Basia po-słyszała wszystkie dźwięki.
Basia DIST-heard all sounds.ACC
'Basia heard all the sounds.'

b. *Wszyscy po-stali w jednym miejscu.
everybody DIST-stood in one place
'Everybody stood in one place.'

These requirements do not apply to ordinary perfective forms (i.e., the ones constructed with a purely perfectivizing prefix). These can come with a singular object, the events can take place simultaneously, and be felicitously construed with stative verbs, as in, respectively:

[7] A distributive *po-* functions also as a free adnominal particle, in which case it provides a distributed quantity reading, which is similar to the English binominal *each* (cf. Safir and Stowell 1988), as in:

(i) Matka dała dzieciom po jednym jabłku. (naraz)
mother gave kids.DAT DIST one apple.DAT at.once
'Mother gave kids one apple each (at once).'

The difference between the verbal prefix and the adnominal *po*, however, is not limited to their placement in the verb phrase. The latter does not require a successive reading (as seen with a compatibility with *naraz* 'at once' in (i)) and can appear with objects of stative verbs, as e.g. in (ii).

(ii) Dzieci miały po dwa jabłka.
kids had DIST two apples
'The kids had two apples each.'

For other properties of the adnominal distributive *po* see, e.g., Łojasiewicz (1979) and Przepiórkowski (2014, 2015).

(17) a. Jan u-mył (jedno) naczynie.
Jan washed.PFV one dish.ACC
'Jan has washed up one dish.'

b. Król u-marł.
king died.PFV
'The king has died.'

(18) a. Jan u-mył wszystkie naczynia naraz.
Jan washed.PFV all dishes.ACC at.once
'Jan washed up all the dishes at once.'

b. Wszyscy królowie u-marli naraz.
all kings DIST-died at.once
'All the kings have died at once.'

(19) a. Basia u-słyszała wszystkie dźwięki.
Basia heard.PFV all sounds.ACC
'Basia heard all the sounds.'

b. Wszyscy u-stali w jednym miejscu.
everybody stood.PFV in one place
'Everybody stood/remained in one place.'

3.2. Deliminative *po-*

This prefix adds a short measure reading to the event denoted by the verb. With unergatives, the prefix is a marker of temporal delimitation as it describes events that last for a short time, e.g.:[8]

(20) Basia (trochę) { po-tańczyła / po-chodziła / po-malowała }.
Basia a.little DELIM-danced DELIM-walked DELIM-painted
'Basia danced / walked / painted a little.'

With transitives, the delimitation can apply to a measure of something else than time, for instance a measure of quantity. This is the case in (21), where the small amount reading applies to the salt itself, not to the duration of salting the soup:

[8] For analyses of deliminative *po-* as a marker of temporal delimitation see Piñón (1994) and for a similar analysis of *po-* in Russian see Filip (2000, 2005).

(21) Chciałbym to (trochę) po-solić.
want.1SG.SBJV it.CL.ACC a.little DELIM-salt
'I would like to add (a little bit of) salt to it.'

The deliminative *po-* does not attach to unaccusatives. The *po-* with the unaccusatives in (22) only has a distributive reading.

(22) a. Jabłka po-gniły.
apples DIST-rot
'The apples have rotten.'
b. Kwiaty po-więdły.
flowers DIST-wither.
'The flowers have withered.'

Unlike the distributive *po-*, the deliminative *po-* can attach to at least a subset of durative stative verbs, as for instance in:

(23) a. Jan po-był (trochę) sam.
Jan DELIM-be little alone
'Jan stayed alone for a little while.'
b. Jan po-spał (trochę) przed telewizorem.
Jan DELIM-slept little before TV
'Jan slept in front of a TV for a little while.'

To sum up the two *po*-s, a VP with a distributive *po-* must be a plural domain, the event denoted by a distributive *po-* takes place successively and, unlike 'purely perfectivizing' prefixes, it does not attach to stative VPs. In contrast, the deliminative *po-* marks a temporal delimination with unergatives and a delimination of a non-temporal property with transitives, as well as it can felicitously come a subset of durative stative verbs.

3.3. Saturative and cumulative *na-*

Both saturative and cumulative *na-* contribute a collectivizing (or 'a lot of') meaning to the verb phrase but differ with respect to their distribution.[9] The cumulative *na-* requires either a

[9] For this reason, the two are sometimes grouped together under a common label, e.g., accumulative in Filip and Carlson (2001), or cumulative in Žaucer (2010).

transitive verb with a plural or mass NP object (as in (24)), in which case it is object-oriented, or a non-reflexive intransitive verb which denotes an event with a plural distribution (as in (25)).

(24) a. Basia na-gotowała { pierogów / zupy }.
Basia CUML-cooked dumplings.GEN soup.GEN
'Basia has cooked a lot of dumplings/soup.'

b. *Basia na-gotowała.
Basia CUML-cooked

(25) Jan na-rozrabiał.
Jan CUML-brawled
'Jan brawled a lot.'

In contrast, the saturative *na-* requires a reflexive intransitive verb but will have no problem tolerating an optional internal argument, and it is subject-oriented, as in:[10]

(26) Basia na-gotowała się (pierogów / zupy).
Basia SAT-cooked REFL dumplings.GEN soup.GEN
'Basia has cooked (these dumplings/soup) to the limits.'

3.4. Restitutive *prze-*

Although labeled 'repetitive' in Wiland (2012) and in some other related works, the prefix contributes a restitutive reading (i.e., the one where an activity restores an earlier state) rather than a repetitive reading (i.e., the one where some activity happens that has happened before),

[10] As observed in Klimek-Jankowska and Błaszczak (2023), the contrast between object- and subject-orientedness with the two readings of *na-* also shows up with sentences like in (i), where the cumulative is naturally compatible with object-oriented result phrases (in (a)) while the saturative *na-* with a subject-oriented result phrase (in (b)).

(i) a. Strażnik na-biczował więźniów$_i$ [do nieprzytomności]$_i$.
guard.NOM CUML-flogged prisoners.GEN till unconsciousness
'The guard flogged the prisoners till they got unconscious.'

b. Strażnik$_j$ na-biczował się (więźniów) [do nieprzytomności]$_j$.
guard.NOM SAT-flogged REFL prisoners.GEN till unconsciousness
'The guard flogged the prisoners till he got unconscious.'

as in the following examples:

(27) a. Jan przе-malował pokój.
Jan RES-painted room.ACC
'Jan re-painted the room.'
b. Basia przе-budowała budę dla psa.
Basia RES-built hut.ACC for dog.GEN
'Basia re-built the doghouse.'

Restitutive *przе-* is incompatible with unergatives (as in, e.g., (28)) and unaccusatives (in (29)):[11]

(28) *Basia { przе-tańczyła / przе-kaszlała / przе-gwizdała }.
Basia RES-danced RES-coughed RES-whistled
'Basia *re-danced/*re-coughed/*re-danced.'
(29) *Kwiaty już { przе-więdły / przе-gniły / przе-bladły }.
flowers already RES-withered RES-rotted RES-got.pale
'The flowers *re-withered/*re-rotted /*re-turned pale.'

3.5. Excessive *przе-*

The prefix provides the reading whereby the subject's action expressed by the verb exceeds a certain point, as for instance in the following examples with unergatives and a transitive:[12]

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[11] The incompatibility of the restitutive *przе-* with unergatives makes it similar to the English restitutive *re-*, as in:

(i) * John { re-coughed / re-smiled / re-jumped }.

However, while *przе-* does not appear with unaccusatives, *re-* does as, for instance, in (ii) (see Horn 1980 and, among others, Marantz 2007, Holsinger 2008, and Lechner et al. 2015).

(ii) John { re-arrived / re-appeared / re-emerged }.

[12] Janda (1988: 333) describes a comparable Russian prefix *pere-* as a marker indicating the crossing of a boundary of an ideal or canonical action expressed by the verb. In a similar way, Kagan (2011: 171–172) treats the excessive *pere-* as a relator of a degree obtained in the course of an event to a functional standard. This is compatible with the fact that, like in Russian, Polish verbs with the excessive *przе-* are felicitous with degree modifier phrases that measure the distance between the two degrees, as in:

(30) a. Basia się prze-jadła.
Basia REFL EXC-ate.
'Basia has overeaten.'
b. Jan prze-płacił (za to).
Jan EXC-paid for it
'Jan overpaid (for it).'

(31) Basia prze-grzała mieszkanie.
Basia EXC-heated apartment.ACC
'Basia overheated the apartment.'

With certain ergative verbs, like e.g., *krzyczeć* 'shout', the prefix is obligatory in the sense that a prefix-less variant of the relevant verb exists only as an intransitive, as shown in the (c) examples of the following triplets:

(32) a. Basia prze-krzyczała Jana.
Basia EXC-shouted Jan.ACC
'Basia shouted louder than Jan did.'
b. *Basia prze-krzyczała.
Basia EXC-shouted
c. Basia krzyczała.
Basia shouted
'Basia was shouting.'

(33) a. Jan prze-gadał swojego brata.
Jan EXC-talked his brother.ACC
'Jan talked louder than his brother.'
b. *Jan prze-gadał.
Jan EXC-talked
c. Jan gadał.
Jan talked
'Jan was talking.'

(i) Jan prze-płacił (za to) dwieście euro.
Jan EXC-paid for it two.hundred euro
'Jan overpaid two hundred euros (for it).'

3.6. Perdurative *prze-*

The prefix signals the completion of a measure of duration that is expressed by the temporal object, as in:

(34) a. Musimy prze-czekać { burzę / deszcz / ten zły okres }.
must.1PL PERD-wait storm.ACC rain.ACC this bad time.period.ACC
'We must wait till this storm/rain/bad time is over.'

b. Trzeba prze-trwać { ten nudny wykład / te reklamy }
have.to PERD-last this boring lecture.ACC these commercials.ACC
w spokoju.
in calm
'We have to sit through this boring lecture/these commercials calmly.'

The temporal object can denote a measure unit itself, especially when it comes with a demonstrative pronoun:

(35) a. Musimy prze-czekać { tę godzinę / ten tydzień }.
must.1PL PERD-wait this hour.ACC this week.ACC
'We must wait through this hour/this week.'

b. Trzeba prze-trwać te piętnaście minut w spokoju.
have.to PERD-last these fifteen minutes in calm
'We have to survive through these fifteen minutes calmly.'

To sum up the situation with the two prefixes *na-* and the three prefixes *prze-*, it is similar to what we saw with the two *po*-s earlier: within their respective sets, the syncretic prefixes differ from one another not only semantically but also with respect to co-occurrence requirements about the VP such as argument structure, the presence or absence of a reflexive *się*, or the object's case.

3.7. Terminative *od-*

Similarly to the perdurative *prze-*, this prefix also denotes the completion of a measure of duration which is denoted by the object. Unlike the former, however, the terminative *od-* denotes the completion of a measure of duration in its entirety, from its beginning till its end:

(36) a. Musimy od-czekać piętnaście minut.
must.1PL TERM-wait fifteen minutes
'We must wait (the full) 15 minutes.'

b. Trzeba od-śpiewać tę zwrotkę.
have.to TERM-sing this verse.ACC
'We have to sing this verse (from the beginning till its end).'

c. Jan musi od-siedzieć swój wyrok.
Jan must.3SG TERM-sit his sentence.ACC
'Jan must serve his sentence.'

d. Basia chce od-tańczyć poloneza i pójść do domu.
Basia want.PRS.3SG TERM-dance polonaise.ACC and go.INF to home
'Basia wants to dance the polonaise and go home.'

The prefix is incompatible with unergatives, as for instance in:

(37) a. Basia chce tańczyć.
Basia want.PRS.3SG dance.INF
'Basia wants to dance.'

b. *Basia chce od-tańczyć.
Basia want.PRS.3SG TERM-dance.INF

(38) a. Jan klęczał.
Jan kneel.PST.3SG
'Jan was kneeling.'

b. *Jan od-klęczał.
Jan TERM-kneel.PST.3SG

3.8. Completive *do-*

The prefix adds the expression of completion to the activity denoted by the verb, as in (39), and can also be felicitously used in context where the completion occurs after a break, as in (40).

(39) a. Jan do-pił piwo.
Jan COMPL-drank beer.ACC
'Jan finished drinking the beer.'

b. Basia do-kończyła czytać bajkę.
Basia COMP-finished read.INF fairy.tale.ACC
'Basia has finished reading a fairy tale.'

(40) a. Jan do-pije piwo kiedy indziej.
Jan COMPL-drank beer.ACC when other.time
'Jan will finish drinking the beer some other time.'

b. Basia do-kończyła czytać bajkę po przerwie na papierosa.
Basia COMP-finished read.INF fairy.tale.ACC after break on cigarette
'Basia finished reading a fairy tale after a cigarette break.'

The prefix can appear with at least some unaccusatives and unergatives, as for instance in, respectively, (41) and (42), and with a verb *tańczyć*, which takes a cognate object (in (43)).

(41) Zaczekajmy, aż ten słomiany miś do-gnije sobie do końca.
wait.IMP.2PL when this straw teddy.bear COMPL-rot self till end
'Let's wait until this straw teddy bear rots down completely.'

(42) Jan do-biegł (w końcu) do mety.
Jan COMPL-ran in end to finish.line.GEN
'Jan has (finally) reached the finish line.'

(43) Basia musiała do-tańczyć poloneza z Janem.
Basia must.PST COMPL-dance.INF polonaise.ACC with Jan.INST
'Basia had to finish to dance the polonaise with Jan.'

The addition of a completive *do-* to the verb does not affect the requirement that the verb's object must be accusative:

(44) Jan pił piwo.
Jan drank beer.ACC
'Jan drank beer.'

This contrasts with the additive *do-*, as shown below.

3.9. Additive *do-*

The prefix provides the additive (or 'more of') reading that applies to the verb's object, as in the (a) examples in the following:

(45) a. Basia do-lała wina.
Basia ADD-poured wine.GEN
'Basia poured more wine.'

b. Basia lała wino.
Basia poured wine.ACC
'Basia poured wine.'

(46) a. Jan do-kroił kiełbasy.
Jan ADD-cut sausage.GEN
'Jan cut some more sausage.'

b. Jan kroił kiełbasę.
Jan cut sausage.ACC
'Jan cut some sausauge.'

In contrast to the completive *do-*, the additive *do-* requires the object to come in genitive case. As seen in the (b) examples in (45)–(46), the object of the verb without the prefix comes in accusative.

While the additive *do-* is generally incompatible with intransitives, as for instance in (47), it is possible to use it with few unergative verbs like, e.g., *do-płacić* 'pay more' in (48).

(47) a. *Wino do-lało (się).
wine.NOM ADD-poured REFL
'More wine was flowing.' (intended)

b. *Kiełbasa do-kroiła (się).
sausage.NOM ADD-cut REFL
'More sausage got sliced.' (intended)

(48) Jan musiał do-płacić.
Jan must.PST ADD-pay.INF
'Jan had to pay more.'

With pronominal objects, *do-* can be ambiguous between completive and additive, as for instance in:[13]

[13] The ambiguity is dissolved when modifiers that are specific to both readings are included in the sentence, as in:

(49) Musisz to do-śpiewać.
must.2SG it.ACC COMPL/ADD-sing.INF
a. ‘You must finish singing it.’
b. ‘You must add it to your singing’ (where ‘it’ can stand for an extra verse).

3.10. Inceptive *za-*

The prefix indicates the beginning of the action or state expressed by the verb. It merges mostly with unergative (as in (50)) and ergative verbs (in (51)) with an experiencer argument (cf. Willim 2020).

(50) a. Jan się (nagle) za-niepokoił.
Jan REFL suddenly INCP-concerned
‘Jan has (suddenly) become concerned.’
b. Basia się za-kochała.
Basia REFL INCP-loved
‘Basia fell in love.’

(51) a. Hałasy z sąsiedniego mieszkania za-niepokoiły Jana.
noises.NOM from adjoining apartment.GEN INCP-worried Jan.ACC
‘The noises from the adjoining apartment got Jan worried.’
b. Dzieła Augusta Rodina za-fascynowały Jana.
works.NOM Auguste Rodin.GEN INCP-fascinated Jan.ACC
‘Jan got fascinated by the works of Auguste Rodin.’

With a subset of unergatives, *za-* can be ambiguous between the inceptive and a purely perfectivizing prefix, as for instance in:

(i) a. Musisz to do-śpiewać do końca.
must.2SG it.ACC COMPL-sing.INF till end
‘You must finish singing it till the end.’
b. Musisz to do-śpiewać do refrenu.
must.2SG it.ACC ADD-sing.INF to chorus
‘You must add it and sing it with the chorus.’

(52) Basia (w końcu) za-tańcz-y-ł-a.
Basia in end PFV/INCP-dance-TV-PRT-AGR
a. ‘Basia finally started to dance.’
b. ‘Basia finally danced.’

3.11. Interim summary

We have seen that the aspectual prefixes exhibit a range of co-occurrence requirements involving argument structure, the reflexive clitic *się*, or the semantic type and case of objects. In essence, these constraints resemble certain other well-known co-occurrence requirements in syntax like, e.g., negative concord or genitive of negation, where the presence of a specific element in a syntactic domain requires the presence of another specific element elsewhere in the same domain. For instance, just like the merger of the additive *do*- requires the merger of the genitive in the VP, in negative concord structures, the merger of a NEG element requires the merger of another NEG element in the clause.

Given that such a parallelism is on the right track, proposing a uniformed syntactic account of co-occurrence requirements is beyond the purpose of this contribution.[14] Instead, in the remainder of the chapter, I will concentrate on formal properties of multiple prefixation.

4. Multiple prefixes

4.1. Constraints on stacking

Polish verbs allow for multiple prefixes, with up to three aspectual prefixes occuring together, as in:

(53) a. Sekretarka po-na-prze-pisywała się listów.
secretary DIST-SAT-RES-wrote REFL letters.GEN
‘The secretary has been re-writing the letters to the limits.’
b. Basia po-na-do-krajała kiełbasy.
Basia DIST-CUML-ADD-cut sausage.GEN
‘Basia has cut more sausage in bulk.’

The basic condition for a verb phrase with multiple prefixes to be well-formed is that it jointly

[14] An immediate candidate for an account of the co-occurrence requirements between the aspectual prefixes and other ingredients of the VP is, thus, the extension of Starke’s (2024) derivation of negative conconrd in French in terms of derivational backtracking.

meets the requirements of the individual prefixes. Thus, in (53a), the non-stative verb and the plural NP object ('letters') satisfy the condition of the distributive *po-*. The presence of an internal argument satisfies the requirement of restitutive *prze-*. While the saturative *na-* primarily merges with intransitive reflexive verbs, it has no problem tolerating an ergative internal argument.[15] In turn, (53b) satisfies the additive *do-*'s requirement that the verb must be transitive. The fact that it is non-stative and comes with a plural NP ('sausages') meets the requirements of both the distributive *po-* and the cumulative *na-*.

There two other major constraints on multiple aspectual prefixes, reported in Wiland (2012), are as follows:

(54) a. Syncretic prefixes do not stack with each other.
b. Stacked prefixes must respect the order: *po-* > *na-* > *prze-*

4.2. Prefix syncretism and stacking

The generalization about the interaction of syncretism and multiple prefixation in (54a) applies to all four syncretic prefixes listed in Table 1, i.e., *po-*, *na-*, *prze-*, and *do-*. In other words, the following prefix sequences result in ill-formedness:[16]

(55) a. *po-po-
b. *na-na-
c. *prze-prze-

[15] Cf. example (26) in section 3.3.

[16] The only relevant instances of the sequences of syncretic prefixes that I have managed to find in a corpus search using the National Corpus of Polsh (NKJP with a Poliqarp search engine, URL: http://nkjp/poliqarp, last access: 10th August 2023) were examples like *po-podziwiać* 'admire a little bit, inf.' or *po-pocieszać* 'comfort somebody a little bit, inf.', that is forms which include an aspectual prefix *po* added to a verb that begins with a '*po*' sequence that is not a genuine prefix (as in the denominal verb *podziwiać* 'admire', linked to the noun *podziw* 'admiraction'). Nevertheless, this statement needs to be qualified in the case of *pocieszać* 'comfort somebody', which exists along a reflexive verb *cieszyć się* 'be happy'. These two verbs represent different, albeit related, concepts. However, since aspectual prefixes preserve the basic meaning of the verb – as, e.g., in *po-cieszyć się* 'be happy for a little time' – the initial sequence '*po*' in *pocieszać* 'comfort somebody' comes out as part of the root rather than a genuine prefix *po*. Thus, a form like *po-pocieszać* 'comfort somebody a little bit' does not constitute a relevant counter-example to the **po-po-* generalization.

d. *do-do-

The ill-formedness occurs even when the verb phrase jointly meets the requirements of both syncretic prefixes. The syncretic prefixes whose requirements regarding the verb's transitivity and the type of the object overlap are the distributive and the deliminative *po*-s and the repetitive and the excessive *prze*-s. Both *po*-s will co-occur with a plural object but despite that, they cannot come together, as shown in:[17]

(56) a. *Basia po-po-soliła ziemniaki.
Basia DIST/DELIM-salted potatoes.ACC
'Basia added a little salt to the potatoes (each in turn).' (intended)
b. *Dzieci po-po-kolorowały kolorowanki.
Kids DIST/DELIM-colored coloring.pages.ACC
'The kids added a little more colors to the coloring pages.' (intended)

Regarding the restitutive and the excessive *prze-*, both will co-occur with transitives with the accusative object but never together, as in:

(57) a. *Basia prze-prze-grzała mieszkanie.
Basia RES/EXC-heated apartment.ACC
'Basia overheated the apartment again.' (intended)

[17] Wiland (2012) lists examples like *po-po-w-kładać* 'put sth in one by one' or *po-po-w-nosić* 'carry in one by one'. These examples appear to include a *po-po-* sequence in front of a 'lexical' (or 'inner') locative prefix *w-* 'in'. However, they do not constitue a genuine counterexample to the **po-po-* generalization, either, since they appear to be best analyzed as involving lexical idioms [*po-w-kładać*] 'put sth in' and [*po-w-nosić*] 'carry sth in'. What indicates that these forms act like lexical idioms is the fact that they can be prefixed with *na-* as in *na-*[*po-w-kładać*] 'put is a lot of sth' or *na-*[*po-w-naszać*] 'carry in a lot of sth'. These are the only instances that are possible to be construed with *na-* before *po-* (otherwise, *po-* will always need to precede *na-*, in agreement with (54b)), which can arguably follow from the situation where *na-* 'sees' [*po-w-kładać*] and [*po-w-naszać*] as lexical idioms rather than structures construed with *po-*.

It is important to point out that the existence of sequences like in *po-po-w-kładać* or *po-pocieszać* (as discussed in the previous footnote) also indicates that the ban on stacking syncretic prefixes cannot be due to haplology. If syllabic dissimilation was at play, we would expect it to be insensitive to lexical idioms or morphological constituency, contrary to what we observe.

b. *Jan prze-prze-krzyczał Basię.
Jan RES/EXC-shouted Basia.ACC
'Jan overshouted Basia again.' (intended)

The two *na*-s have different co-occurence requirements, with the cumulative *na*- merging with a transitive verb with a plural or a mass NP object and the saturative *na*- with intransitives and ergatives (cf. section 3.3). Hence, their inability to stack together is, by itself, arguably unexpected. In turn, the two *do*-s have different requirements regarding the object's case: the addition of the completive *do*- to a transitive verb does not affect case, while the addition of the additive *do*- does in that it requires genitive (cf. sections 3.8–3.9). Examples with the two *do*-s are ill-formed with any case on the object, as in:

(58) a. *Jan do-do-pił { piwo / piwa }
Jan COMPL/ADD-drank beer.ACC beer.GEN
'Jan drank up more beer till the end.' (intended)
b. *Basia do-do-kroiła { chleb / chleba }
Basia COMPL/ADD-sliced bread.ACC bread.GEN
'Basia finished slicing up more bread.' (intended)

4.3. Stacking orders

Regarding the constraint in (54b), the fact that when stacked, the prefixes must respect the relevant order is seen not only in examples like in (53) with all three prefixes but also in examples with two of them.

- *po-* > *na-*

(59) distributive > saturative
Dzieciaki po-na-jadały się surowej jarzębiny.
kids DIST-SAT-ate REFL raw mountain.ash.ACC
'The kids have (each) eaten raw mountain ash to the limits.'

(60) distributive > cumulative
Jan po-na-ścinał gałęzi.
Jan DIST-CUML-cut branches.ACC
'Jan has cut the tree branches in bulk (one by one).'

(61) deliminative > cumulative

Jan po-na-zrywał (trochę / sporo) trawy dla królików.
Jan DELIM-CUML-pluck a.little a.lot grass.GEN for rabbits
'Jan has plucked'

The combination of the deliminative *po-* and the saturative *na-* results in ill-formedness, as for instance in (62):

(62) deliminative > saturative (unattested)

*Basia po-na-tańczyła (się).
Basia DELIM-SAT-danced REFL
'Basia danced a lot a little.' (intended)

An immediate reason that comes to mind why this combination is ill-formed is that it is due to different requirements regarding the type of the verb phrase between the two prefixes. Namely, the deliminative *po-* merges with non-reflexive unergatives (understood here as the ones that come without *się*) while the saturative *na-* merges with reflexive intransitives (cf. section 3.3). Arguably, this incompatibility can be enhanced by a semantic conflict between delimitation and saturation, which provide opposite readings.[18]

- *po- > prze-*

[18] The reverse order saturative > deliminative is also ill-formed, as shown in (i).

(i) *Basia na-po-tańczyła (się).
Basia SAT-DELIM-danced REFL
'Basia danced a lot a little.' (intended)

In turn, the requirement that the deliminative *po-* merges with unergatives without *się* while the saturative *na-* merges with reflexive intransitives is illustrated with the following examples:

(ii) a. Basia po-tańczyła (*się).
Basia DELIM-danced REFL
'Basia danced a little.'

b. Basia na-tańczyła *(się).
Basia SAT-danced REFL
'Basia danced to the limits.'

(63) distributive > restitutive

Po-prze-budowali wszystkie drogi dojazdowe.
DIST-RES-built all roads.ACC access
'They have re-built all access roads (one by one).'

(64) distributive > excessive

Basia po-prze-grzewała wszystkie pokoje.
Basia DIST-EXC-heated all rooms.ACC
'Basia has overheated all the rooms.'

(65) distributive > perdurative

Jan po-prze-siadywał wszystkie swoje wyroki w fatalnych warunkach.
Jan DIST-PERD-serve all his sentences in appalling conditions
'Jan served all his sentences in appalling conditions.'

A well-formed merger of the deliminative and the restitutive is hard to obtain since the first primarily comes with unergatives while the second does not (cf. section 3.4). The deliminative *po-* can come with transitives, in which case the short measure reading applies to the object rather than to the duration of the event (cf. section 3.2). The *po-* in the following example is at best ambiguous between the deliminative and the distributive:

(66) deliminative > restitutive (possibly unattested)

Krawcowa (jedynie odrobinę) po-prze-rabiała twoje ubrania.
seamstress only minimally DELIM?/DIST-RES-did your clothes.ACC
'The seamstress has (only minimally) altered your clothes.'

In turn, despite congruent requirements regarding the argument structural properties of the verb phrase, the combination of the deliminative and the excessive results in ill-formedness, as for instance in (67), the result which is possibly due to the conflict in the semantic import of these two prefixes.[19]

[19] The reverse order excessive > deliminative produces an even stronger ill-formedness:

(i) *Basia prze-po-soliła zupę.
Basia EXC-DELIM-salted soup.ACC
'Basia oversalted the soup a little.' (intended)

(67) deliminative > excessive (unattested)

*Basia po-prze-soliła zupę.
Basia DELIM-EXC-salted soup.ACC
'Basia oversalted the soup a little.' (intended)

Likewise, the combination of the deliminative and the perdurative results in ill-formedness, too:

(68) deliminative > perdurative (unattested)

*Musimy po-prze-czekać tę burzę.
must.1PL DELIM-PERD-wait this storm.ACC
'We must wait through this storm a little.' (intended)

- *na- > prze-*

(69) saturative > restitutive

Uczniowie na-prze-pisywali się tyle niepotrzebnie.
students SAT-RES-wrote REFL so.much unnecessarily
'The students have rewritten so much to the limits unnecessarily.'

(70) saturative > excessive

Wychowawczyni na-prze-krzykiwała się swoich podopiecznych (aż do bólu gardła).
tutor SAT-EXC-shouted REFL her pupils.ACC till to pain throat
'The tutor shouted at her pupils (until her throat hurt).'

(71) saturative > perdurative

Jan na-prze-siadywał się w knajpach pod nieobecność Basi.
Jan SAT-PERD-sat REFL in pubs while absence.ACC Basia.GEN
'Jan would sit a lot in pubs during Basia's absence.'

(72) cumulative > restitutive

Uczniowie na-prze-pisywali tyle tych zadań niepotrzebie.
students CUML-RES-wrote so.many these tasks.acc unnecessarily
'The students have rewritten so many of these tasks unnecessarily.'

(73) cumulative > excessive

Basia jak zwykle na-prze-salała wszystkich dań.
Basia as usually CUML-EXC-salted all dishes.GEN
'Basia as usually has oversalted all the dishes.'

The combination of the cumulative and the perdurative is rather ill-formed, as in:

(74) cumulative > perdurative (unattested)

*?Na-prze-czekali już zbyt wiele {godzin / burz}.
CUML-PERD-waited already too many hours.ACC storms.ACC
'They have already waited through too many hours/storms.' (intended)

Possibly, this incompatibility can stem from the conflict regarding the type of the object required by the two prefixes: while the cumulative *na-* requires a plural or mass object, the perdurative *prze-* requires the temporal object (cf. section 3.6).

On the proviso that the unattested combinations of the aspectual prefixes can be independently controlled for, the stacking patterns can be generalized in the following manner:

(75) DIST, DELIM > SAT, CUML > RES, EXC, PERD
po- *na-* *prze-*

This description, however, must be updated in a way that captures two more observations. They are discussed in the following section.

4.4. An internally non-stacking subclass

The first observation is that there exists a subset of prefixes that systematically do not stack with one another. The list includes (all the readings of) *prze-* and *do-*, the terminative *od-*, and the inceptive *za-*. No combinations of these prefixes are possible, in any order, as illustrated with the following examples in (b):

(76) a. (i) do-solić
ADD-salt
'add more salt'

(ii) prze-solić
EXC-salt
'add too much salt'

b. *do-prze-solić / *prze-do-solić

(77) a. (i) do-biec
COMPL-run
'complete a run'
(ii) prze-biec
PERD-run
'cover some distance running'

b. *do-prze-biec / *prze-do-biec

(78) a. (i) od-czekać
TERM-wait
'wait until some measure of time'
(ii) prze-czekać
PERD-wait
'wait for a measure of time'

b. *od-prze-czekać / *prze-od-czekać

(79) a. (i) za-tańczyć
INCP-dance
'start to dance'
(ii) prze-tańczyć
PERD-dance
'dance for a measure of time'
(iii) od-tańczyć taniec
TERM-dance dance.ACC
'dance until the end of a dance'
(iv) do-tańczyć (do końca)
COMPL-dance till end
'dance until the end (of a duration of a measure of time)'

b. *za-prze-tańczyć / *prze-za-tańczyć
*od-do-tańczyć / *do-od-tańczyć
*od-za-tańczyć / *za-do-tańczyć
*od-prze-tańczyć / *prze-od-tańczyć
*do-prze-tańczyć / *prze-do-tańczyć

This situation differs from the one seen in (67) and (68), where the deliminative *po-* does not form a felicitous combination with the excessive and the perdurative *prze-* since, as suggested there, the 'short duration' of the deliminative conflicts with the 'extensive' meaning of the excessive and the perdurative. The combination of the distributive *po-* with all three readings of *prze-*, however, is felicitous (as shown in (63)–(65)). In the case of the subclass considered that comprises *prze-*, *od-*, *do-* and *za-*, no reading of any prefix is exempted from the 'no stacking with each other' generalization. In turn, when stacked with *po-* and/or *na-*,

these prefixes will come exclusively after them, as seen in (53) or in:[20]

(80) a. Basia po-do-salała wszystkie potrawy.[21]
Basia DIST/DELIM-ADD-salted all dishes.ACC
'Basia added a little salt to all the dishes (to each in turn).'

b. Kandydat na-do-pisywał fikcyjnych nazwisk do swojej listy poparcia.
candidate CUML-ADD-wrote fictitious names.ACC to his list support
'The candidate added (lots of) fictitious names to his support list.'

c. Wszystkie siostry po-za-kochiwały się w młodszych chłopakach.
all sisters DIST-INCP-loved REFL in younger boys
'All the sister fell in love with younger boys (each in turn).'

d. Jan na-od-siadywał się dosyć niesprawiedliwych wyroków.
Jan SAT-TERM-sat REFL enough unfair verdicts.GEN
'Jan has served enough unfair sentences in jail.'

This observation calls for the update to the generalization in (75) in the form of the following, more accurate statement:

(81) DIST, DELIM > SAT, CUML > RES, EXC, PERD, TERM, COMPL, ADD, INCP
po- *na-* *prze-, od-, do-, za-*

4.5. No dependent aspectual prefixes

The other insight concerns the fact that – on the condition that we control for the selectional restrictions of aspectual prefixes – the aspectual prefixes can be added to the verb stem independently of each other, as for example in:

[20] This holds true also of a purely perfectivizing reading of *za-*, as in *za-parzyć kawę* 'make coffee, PFV' (whose imperfective form is a prefixless verb as in *parzyć kawę* 'make coffee, IPFV'), as in:

(i) Basia po-za-parzała im kawy.
Basia DIST-PERF-made they.DAT coffee.GEN
'Basia made coffee for (each of) them in turn.'

[21] The form *po-do-salała* 'add salt, PST.FEM.3SG' in this example is ambiguous between the deliminative ('a little') and the distributive reading. This is unsurprising since the deliminative *po-* can appear with a plural NP object, which is obligatorily required by the distributive *po-* (cf. section 3.2).

(82) a. Jan rozrabiał.
Jan brawled.
'Jan brawled.'

b. Jan na-rozrabiał.
Jan CUML-brawled
'Jan brawled a lot.'

c. Jan po-rozrabiał.
Jan DELIM-brawled
'Jan brawled a little.'

d. Jan po-na-rozrabiał.
Jan DELIM-CUML-brawled
'Jan brawled a lot to a little extent.'

We see that while *po-* and *na-* can be stacked together on the verb stem (in (82d)) and (82c), they can both felicitously modify the verb independently (in (82b,c)).

This situation can be compared to the English example like e.g. (*un*)-(*pre*)-*meditated*, where *un-* and *pre-* can appear independently of each other but when both are merged they must respect the specific order (cf. **pre-un-meditated*).[22] The generalization in (81) should be, thus, updated again with brackets that mark optionality:

(83) (DIST, DELIM) > (SAT, CUML) > (RES, EXC, PERD, TERM, COMPL, ADD, INCP)
po- *na-* *prze-, od-, do-, za-*

4.6. Summary of the challenges for a syntactic analysis

Let us summarize the major challenges for a syntactic analysis of multiple aspectual prefixation in Polish.

The first task is to capture the fact that despite all the different semantic contributions of aspectual prefixes, the addition of any of them results in the perfectivization of the verb in a tensed form, as seen in (6b), repeated below:

[22] Thanks to M. Starke (p.c.) for bringing this kind of parallelism with a relevant subset of English examples to my attention.

(84) Jan po-mył naczynia.
Jan DIST-washed.PFV dishes.ACC
'Jan washed the dishes.'

The second task is to accommodate the fact that the merger of the prefixes must respect the order recapped in (83).

The third task is to establish that there are no dependent prefixes, in the sense that the merger of an outer prefix does not depend on the merger of an inner prefix (the situation marked with the brackets in (83)).

The fourth task is to capture the fact that the prefixes within each bracket do not stack with each other.

5. Analysis

5.1. The functional sequence

Assuming the central tenet of Nanosyntax whereby lexical items realize syntactic constituents and the 'one feature per one syntactic head' dictum, the general analysis of aspectual prefixes is based on the premise that they lexicalize regions of an articulate syntactic sequence.[23] A version of the functional sequence that is argued in Wiland (2012) to correspond to the merge position of individual aspectual prefixes is given in Fig. 1 (on the next page).

The bottom of this sequence includes an articulate verb phrase, represented here simply as the VP. Depending on its internal ingredients such as Cause, Process, or State functors, the VP represents individual concepts like 'dance', 'sit', etc.[24]

[23] The idea that each syntactic head encodes exactly one grammatical feature has been sometimes referred to as a strong cartographic thesis (see, e.g., Cinque and Rizzi 2008: 50) and has been an essential assumption in Nanosyntax (see Starke 2009 and other subsequent works in this framework).

[24] For a proposal about the syntactic representation of lexical conceptual meaning in terms of an articulate verb phrase see for instance Ramchand (2008a), whose analysis is compliant with the understanding of the VP in this sequence.

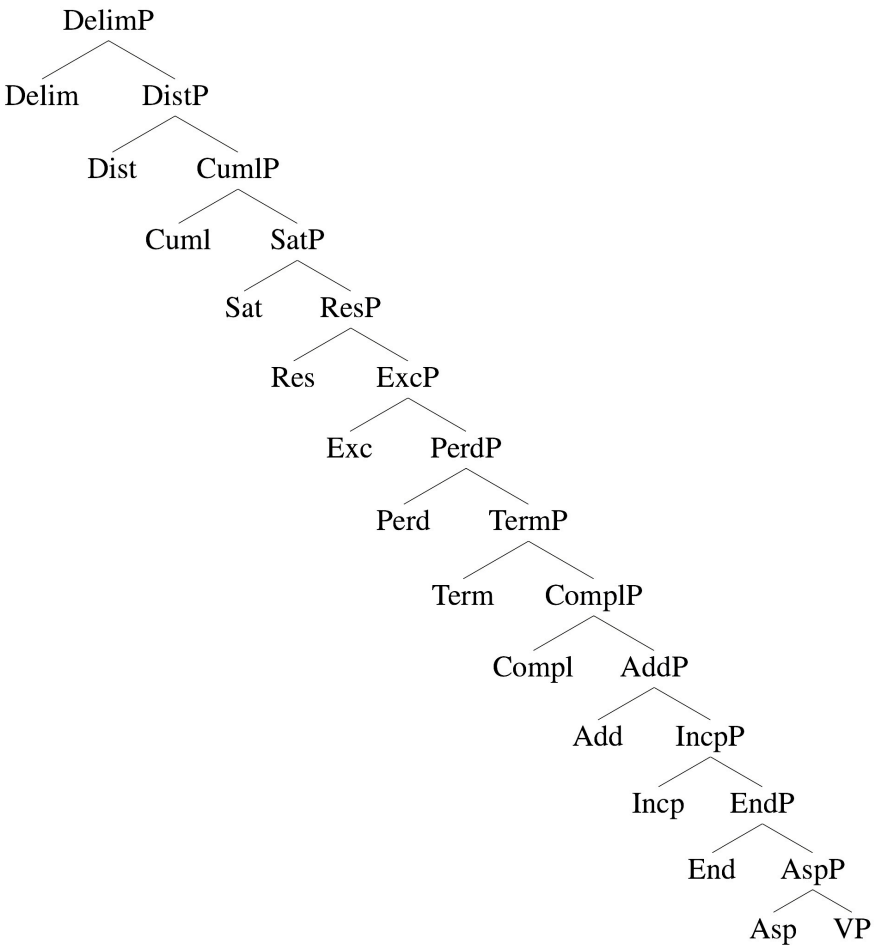

Figure 1. Functional sequence.

The Asp feature is what turns the concept denoted by the VP into a subevent, of which it can be expressed how it extends over time. This Asp feature, thus, corresponds to a functor that adds an event time to a concept in approaches to the grammar of tense that are based on two variables, *event time* and *reference time*, the latter one supplied by the T feature(s), which are merged above the aspectual sequence shown in Fig. 1.[25] In this sense, the Asp used here is a close equivalent of Ramchand's (2008b) Asp head projected on top of vP in the temporal analysis of Russian verbs with aspectual prefixes. However, unlike in Ramchand's (2008b) analysis where individual aspectual prefixes in Russian occupy the specifier of AspP, the current proposal is that they lexicalize the individually projected features on top of Asp.[26]

[25] There are a number of specific semantic analyses that explore the idea that tense semantics is constructed with two variables, the event time and reference time, such as Klein (1994), Giorgi and Pianesi (1997), Demirdache and Uribe-Etxebarria (2000), Stowell (1996) or Ramchand (2008b).

[26] In Fig. 1, the part of the fseq above the VP represents only the features of aspectual prefixes and does not include other features of the clause, which get lexicalized as suffixes on the verb root as theme

The first feature projected on top of Asp, End, introduces the event boundary. With the tense feature merged higher up in the sequence, the subevent constituent with the End will become interpreted as perfective.[27] In contrast, the constituents without the End will be interpreted as imperfective. Such a setup allows us to represent imperfective and perfective verb roots as syntactic trees that differ in size, as in:

(85) a. verb root of an imperfective verb form: [Asp [VP]]
b. verb root of a perfective verb form: [End [Asp [VP]]]

This size difference can be observed with the class of verbs shown in (5), whose perfective forms are not construed with a prefix but with a suppletive root. With phrasal lexicalisation, we can represent the different roots of the imperfective *bra-ć* 'take-INF' and the perfective *wzią-ć* 'take-INF' (as seen in (5a)) as in Fig. 2 and Fig. 3.

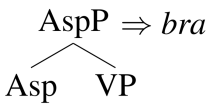

Figure 2. Representation of an imperfective verb root *bra-* 'take'.

vowels or the so-called 'secondary imperfective' (SI) *-yw* (as seen, e.g., in (53a) *po-na-prze-pis-yw-a-ł-a*). There have been specific proposals about how to accommodate these suffixes in the fseq together with the prefixes such as, e.g., Jabłońska (2004) or Klimek-Jankowska and Błaszczak (2023). If we adapt proposal in Klimek-Jankowska and Błaszczak (2023) to the fseq in Fig. 1, the SI marker should lexicalize the area above ResP and below SatP. I do not explore this issue further and, instead, for the purposes of this work, I simply assume that the requirement that certain aspectual prefixes or their combinations require the presence of the SI is another instance of a co-occurrence requirement, similar to those discussed in section 3.

[27] The term 'End' is borrowed from Starke's (2021) syntactic representation of perfectivity in English. Within the approach to temporal interpretation that is based on a separate event time and reference time, without the presence of the latter, a subevent constituent that contains the End feature will not uniformly result in the perfective interpretation. This is seen, for instance, in the contrast between the imperfective infinitive *za-tańczy-ć* 'dance', which does not have the tense feature (i.e., *reference time*), and the perfective past *za-tańczy-ł* 'dance, 3SG' or perfective future *za-tańczy* 'dance, 3SG', which both have the tense feature(s)(i.e., they have *reference time*).

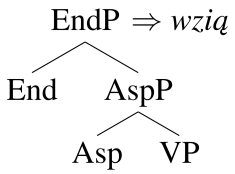

Figure 3. Representation of a perfective verb root *wziąć-* 'take'.

Regarding the higher aspectual features that range from the Inceptive to the Delim(inative), it must be emphasized that their order – at least in certain areas of the sequence – is merely deduced from prefix order and inferred from semantic compositionality rather than obtained on the basis of cross-linguistic syncretisms, the most reliable diagnostic for feature hierarchy in Nanosyntax. In particular, while the ordering between the prefixes summarized in (83) provides a clear guideline about the relative position of the individual prefixes, the ordering between the features the syncretic prefixes realize remains merely stipulated. That is, the DELIM=DIST syncretism of *po-* will follow either from the ordering Delim > Dist (as indicated in Fig. 1) or from the reverse order, Dist > Delim. The same applies to other syncretic prefixes: the CUML=SAT *na-*, the RES=EXC=PERD *prze-*, and the COMPL=ADD *do-*. The comparative data from selected Slavic languages, shown in Table 2, provides a very limited answer to this issue with syncretisms targeting very similar areas of the paradigm.

DELIM	DIST	CUML	SAT	RES	EXC	PERD	TERM	COMPL	INCP	
po	po	na	na	prze	prze	prze	od	do	za	Polish
po	po	na	na	pere	pere	pro	ot	do	za	Russian[28]
po	po	na	na	pere	pere	pere	vid	do	za	Ukrainian[29]
po	po	na	na	pře	pře	pro	od	do	za, u	Czech[30]
po	po	na	–	pre	pre	–	do	iz	za	Bulgarian[31]

Table 2. Syncretisms of aspectual prefixes in selected Slavic languages.

Nevertheless, one area of the comparative paradigm that sheds light on the ordering is a non-syncretic perdurative *pro* in Russian and Czech. Assuming the *ABA generalization,

[28] On the basis of Babko-Malaya (1999), Romanova (2004), and Tatevosov (2008).

[29] On the basis of the data obtained from Nataliya Shvets and Anastasiia Vyshnevska (p.c.).

[30] On the basis of Biskup (2018, to appear).

[31] On the basis of Istratkova (2004). The saturative and the perdurative prefixes whose function fits those in the other Slavic languages in Table 2, are claimed in Istratkova (2004) not to exist in Bulgarian.

whereby syncretism targets only neighboring cells of a paradigm (cf. Bobaljik 2012 and Caha et al. this volume), the perdurative can either precede or follow the syncretic pair RES=EXC. The choice to place the Perd(urative) below the Res(titutive) and the Exc(essive) in the sequence in Fig. 1 is informed by its semantic proximity to the lower part of the sequence, i.e., the Term(inative), rather than to the higher Sat(urative) and the Cumulative. Semantically, possibly with an exception of the Add(itive), the part of the functional sequence between End and Sat forms a temporal progression, which includes the initiation of the action (Incp), reaching the end of its measure of duration (Compl), and completing the measure of duration in its entirety, from the beginning to the end (Term). The difference between the Term(inative) and the Perd(urative) is that the latter applies to a measure of duration expressed by a temporal object (as in *prze-czekać burzę* 'wait through the storm' seen in (34)). While the Add(itive), which provides the 'more of' reading, does not appear to readily fit in this region of the sequence, it is nevertheless syncretic with the Comp(letive) (as in the additive *do-lać* 'pour more' in (45) and the completive *do-pić* 'finish to drink' in (39)).

With these caveats, let us proceed to the discussion how the lexicalization of the proposed sequence in Fig. 1 allows us to capture the stacking facts.

5.3. The internally non-stacking subclass: *za-*, *do-*, *od-*, and *prze-*

While a small class of Polish suppletive roots seen in (5) lexicalizes the 'perfectivizing' EndP jointly with the imperfective base [Asp [VP]] as shown in Fig. 3, the vast majority of Polish verb roots do not.[32] Let the root *tańcz* 'dance, IPFV' serve as a relevant example, whose perfective form is *za-tańcz* 'dance, PFV/INCP' (as seen in (52)). Instead, in these verbs, the EndP is lexicalized as the prefix. Such a situation follows from the Lexicalization Algorithm, whose last resort step (in (86c)) results in the formation of a complex left branch (see Starke 2018 and much subsequent work on prefixes in Nanosyntax).

(86) Lexicalization Algorithm

a. Step 1: 'stay' (add a feature F and lexicalize the constituent 'as is').

b. Step 2: 'move' (evacuate the node merged in the previous cycle and lexicalize

[32] The term 'perfectivizing' is placed here in single quotation marks since the constituent with the event boundary introduced by the End will only be interpreted as perfective with the addition of tense feature(s) higher up in the clause.

the remnant constituent).[33]

c. Step 3: ‘subderive’ (remove F from the mainline derivation and build a constituent comprising F, merge it with the mainline derivation and lexicalize).

Adopting the minimal representation of a perfective verb root as in Fig. 3, if neither ‘stay’ nor ‘move’ results in a successful lexicalization of the End feature, then, in agreement with step 3 of this lexicalization procedure, the End is removed from the mainline derivation and a subderivation containing the End gets formed. (As a result of the removal of the End from the mainline derivation, the syntactic representation returns to its ‘imperfective’ stage of the AspP size, as in Fig. 2). Assuming that each merge is binary, the subderivation with the End must include at least one other feature. For present purposes, let us assume the following rule about the choice of this other feature as the base for the binary merge:

(87) In order to spawn the subderivation, provide the last lexicalized feature in the mainline derivation as the base for the binary merge. If that fails, provide the feature lexicalized at the previous cycle in the mainline derivation and retry.

According to this rule, in order to open an auxiliary workspace, we must first try to do so by providing the last successfully lexicalized feature from the mainline derivation, that is the Asp, in our case.[34] The two trees, thus, look as in the following:

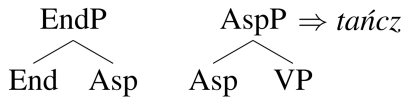

Figure 4. Subderivation (left) vis-à-vis the mainline derivation of the root (right).

Upon the merger of the subderived tree with the mainline (i.e., the imperfective constituent

[33] ‘Move’, in fact, consists of a list of specific movements: successive cyclic (or spec-to-spec) movement, complement movement, and subextraction from within the specifier node (this last type of movement recently argued for to be part of the lexicalization procedure in Wiland 2019 and Starke 2022). Although the application of these specific types of evacuation movements is ordered in the lexicalization procedure (see, for instance, Caha et al. this volume, for details), they all result in the formation of a suffix and are, hence, subsumed here under a common label. Distinguishing between them is irrelevant to the present discussion of the prefixes.

[34] For other versions of what can serve as the base feature see Caha (2019) or Wiland (2019).

tańcz ‘dance’), it becomes the projecting (labeling) complex left branch and gets lexicalized as *za*, deriving the perfective structure *za-tańcz* ‘dance, PFV/INCP’, as illustrated in Fig. 5.

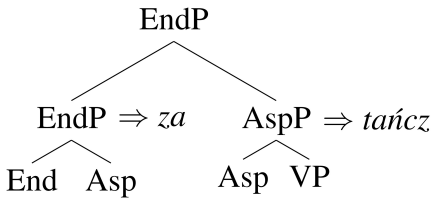

Figure 5. Merger of the subderivation with the root *tańcz* ‘dance’ and its lexicalization as *za*.

Recall from (52) that *za-tańcz* produces verb forms that are ambiguous between purely perfective and inceptive. The most natural way to explain this ambiguity with the sequence in Fig. 1 is to treat the purely perfectivizing *za-* seen in Fig. 5 as a syncretic subset structure of an inceptive *za-*. Such a possibility will hold if *za-* has the lexical entry in Fig. 6.

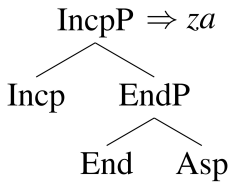

Figure 6. Lexical entry for *za*.

This is so since the use of an exponent of a lexical item (LI) to realize a constituent that corresponds to the LI’s subset structure follows from the Superset Principle given in (88), which regulates a post-syntactic lexical insertion in Nanosyntax.

(88) The Superset Principle (Starke 2009)
An exponent of a LI is inserted into a syntactic node if the LI’s entry has a subconstituent that matches that syntactic node.

On the strength of this principle, the exponent of *za* that is specified as in Fig. 6 will be able to lexicalize two subtrees. The subset structure seen in Fig. 5 as a pure perfectivizer and, following the merger of Incp with the subderivation, its superset structure in Fig. 7 as an inceptive marker.

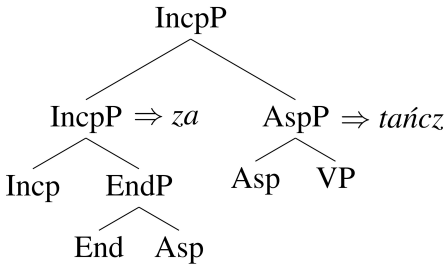

Figure 7. Merger of Incp in the subderivation and its lexicalization as *za*.

In other words, given the sequence in Fig. 1 and the fact that *za-* serves both as a pure perfectivizer and the inceptive marker, the *za-* in the latter reading has a one notch larger structure than in the former.

Note that an essential feature of all aspectual prefixes is that they perfectivize the verb in its tensed form. This fact can be captured if the lexical entries for all aspectual prefixes have the same foot that contains the perfectivizing End, as in the representation of individual prefixes from the 'internally non-stacking subclass' in Fig. 8.

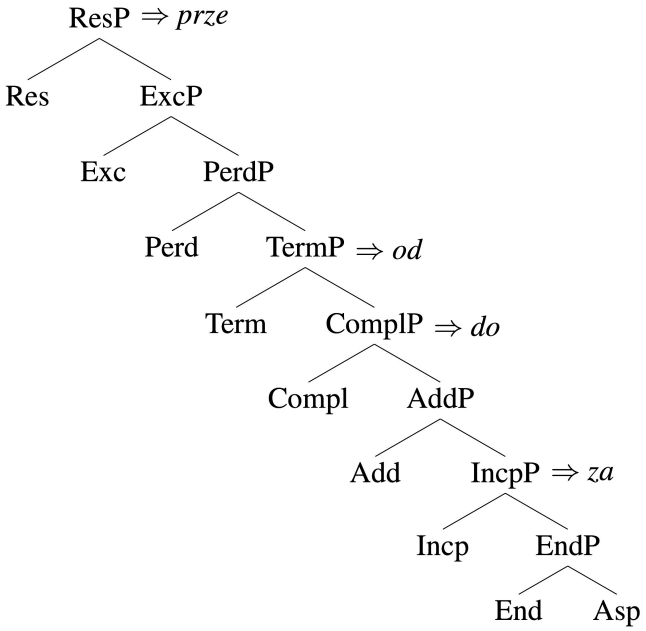

Figure 8. Relative sizes of *za-*, *do-*, *od-*, and *prze-*.

Such a structure is obtained by the incremental addition of the features in the subtree whose output observes the sequence in Fig. 1. The merger of the features above the inceptive *za-* will be realized as different markers: *do-*, *od-*, and *prze-*. This is an effect of Cyclic Over-ride, the principle whereby an exponent of a LI that matches a bigger tree will always supersede the exponent of a LI that matches its subconstituents. That is, both the additive and completive *do-*

will over-ride *za-*, the terminative *od-* will over-ride *do-*, and all three syn-sem structures – the perdurative, the excessive, and the restitutive – that are realized as *prze-* will over-ride *od-*. If this reasoning is on the right track, then it provides a natural answer to the question why the prefixes in this set do not stack with each other.

It is important to point out a technological caveat that is relevant to the prefixes as represented in Fig. 8. Namely, the merger of the higher features on top of each other in a single complex left branch follows from the conjecture in Starke (2018), whereby once the subderivation of the complex left branch is opened, it will continue to be available for the merger of new features for as long as necessary (possibly as a consequence of a derivational economy). The opposite scenario would hold that each lexicalization of a feature that requires the formation of a complex left branch results in spawning *its own* complex left branch. It is easy to see why this latter scenario does not hold and is illustrated in Fig. 9 on the example of an unattested lexicalization of the purely perfectivizing *za-* and the inceptive *za-*.

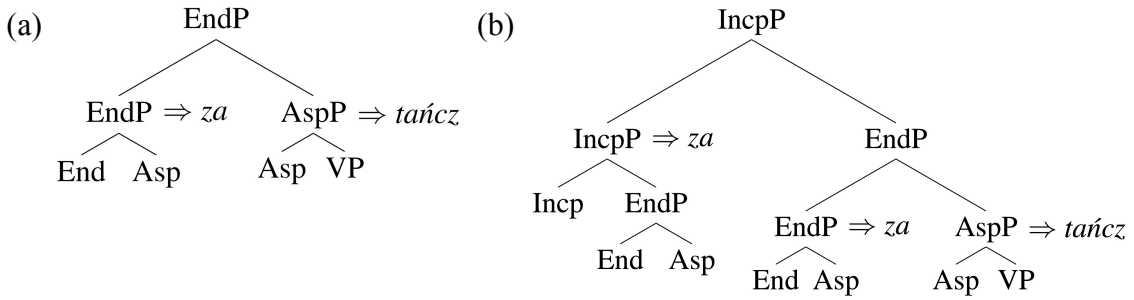

Figure 9. Unattested lexicalization of the inceptive *za-* with two complex left branches.

In such a scenario, in (a), the perfectivizing EndP gets merged with the mainline derivation and becomes lexicalized as the subset structure of *za-* (i.e., same derivational stage as shown in Fig. 5). Next, in (b), the lexicalization of the Incp feature requires the opening of a new complex left branch, its subsequent addition to the structure created previously, and lexicalization as the superset structure of *za-*. The resulting structure in (b) is an unattested **za-za-tańcz*, leaving us with the representation like in Fig. 8 as a preferred derivational option, the one where the complex left branch is available for the addition of higher features in the sequence for as long as necessary.

5.4. *Na-* and *po-*

Na- and *po-* can stack with each other as well as with the prefixes of the 'internally non-stacking

subclass' (*za-*, *do-*, *od-*, *prze-*). This indicates that *na-* and *po-* neither over-ride the prefixes of the internally non-stacking subclass nor each other. In other words, the lexical entries for *na-* and *po-* do not fully contain the lexical entries for the prefixes in Fig. 8. Such impossible lexical entries for *na-* and *po-* (marked with *) are illustrated in Fig. 10.

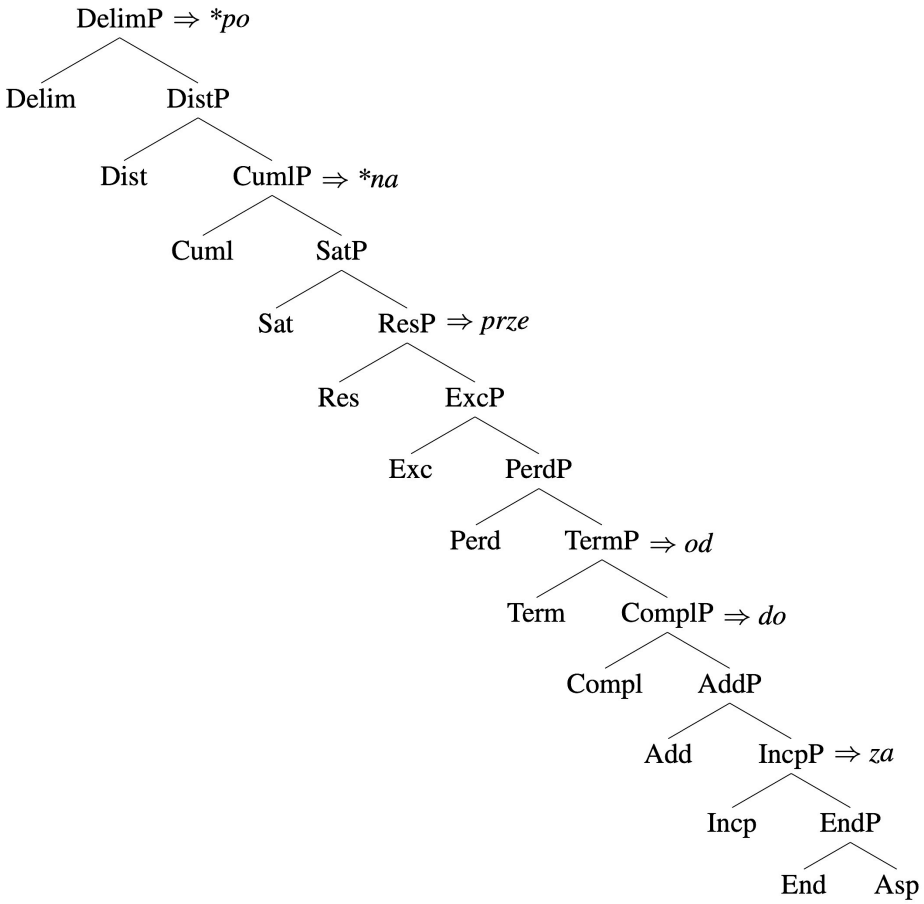

Figure 10. Impossible lexical entries for *na-* and *po-* indicated with an asterisk.

If the entries for *na-* and *po-* looked like in Fig. 10, they would over-ride all the smaller prefixes in the sequence, contrary to fact.

Instead, the stacking scenario generalized in (83) suggests a different possibility, the one compatible with the lexical entries for *na-* and *po-* as given in Fig. 11.

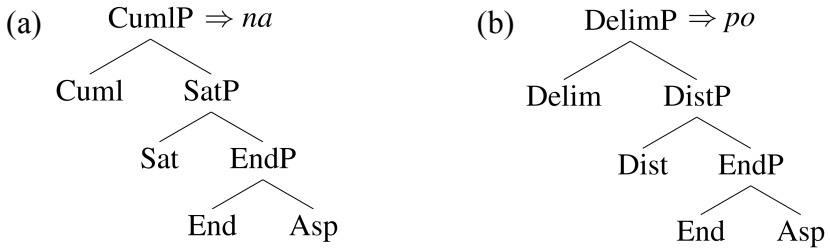

Figure 11. Lexical entries for *na* and *po*.

Both entries have the same perfectivizing EndP at the bottom but other than that, they include only the features specific to their readings: Sat and Cuml in *na-* and Dist and Delim in *po-*.[35] In this way they differ from the internally non-stacking class of prefixes described in Fig. 8, which are dervided by incremental mergers of the features of the functional sequence proposed in Fig. 1. To put it differently, *na-* and *po-* include the gaps, that is their formation does not include the 'middle' features of the functional sequence that are present in the representations of the inceptive *za-*, *od-*, *do-* and *prze-*.[36]

5.5. Stacking

The fact that all aspectual prefixes have the End feature at the foot of their lexical entries means that their formation as complex left branch will in each case need to include the base feature

[35] The order of Cuml > Sat in Fig. 11 (a) and Delim > Dist in (b) observes the proposed functional sequence in Fig. 1 but, as discussed in section 5.1, nothing in particular speaks in favor of these orders and against Sat > Cuml and Dist > Delim, respectively. Both orders derive the syncretic readings of *na-* and *po-*, the fact that they perfectivize the verb, and that they can stack according to the generalization in (83).

[36] A situation where grammatical categories include gaps in the functional sequence are fairly common. For instance, let us assume with much of current work on syn-sem structure of agentive and unaccusative verbs that the first include an extra 'Cause' feature – labelled variously like, e.g., 'the little *v*' or 'Initiator'. Then, a (simplified) functional sequence of a past tense form of an agentive verb like *made* will look like in (i-a) and a functional sequence of a past tense form of an unaccusative verb like *fell* will look like in (i-b).

(i) a. [PastT [Cause [V]] => *made*
b. [PastT [V]] => *fell*

Both syntactic representations are lexicalized by simplex forms (roots) and *fell* realizes the sequence that has a gap in 'Cause'.

Asp as well, which is needed for the binary merge of the End. This happens in agreement with the rule in (87), whereby a failure to build a constituent that matches an existing LI with the last successfully lexicalized feature in the mainline derivation as its base requires trying out a lower feature for the base. Let the example of a verb root with three prefixes *po-na-prze-pis-* as seen in (53-a), repeated below, serve as an illustration.

(89) Sekretarka po-na-prze-pis-yw-a-ł-a się listów.
secretary DIST-SAT-RES-wrote-TV1-TV2-PRT-AGR REFL letters.GEN
'The secretary has been re-writting the letters to the limits.'

Continuing with the assumption that an imperfective verb root like *pis-* 'write' lexicalizes the sequence in Fig. 1 up to AspP (as seen in Fig. 2 or 4), the lexicalization of the higher features will require the formation of a complex left branch (since these features do not end up lexicalized as suffixes, which are the output of 'move' in (86)). According to (87), it will be spawned with Asp, the last feature lexicalized by the root (i.e., exactly as in Fig. 4). The merger of higher features up to Res will result in the formation of *prze-pis-* 'rewrite' as in Fig. 12.

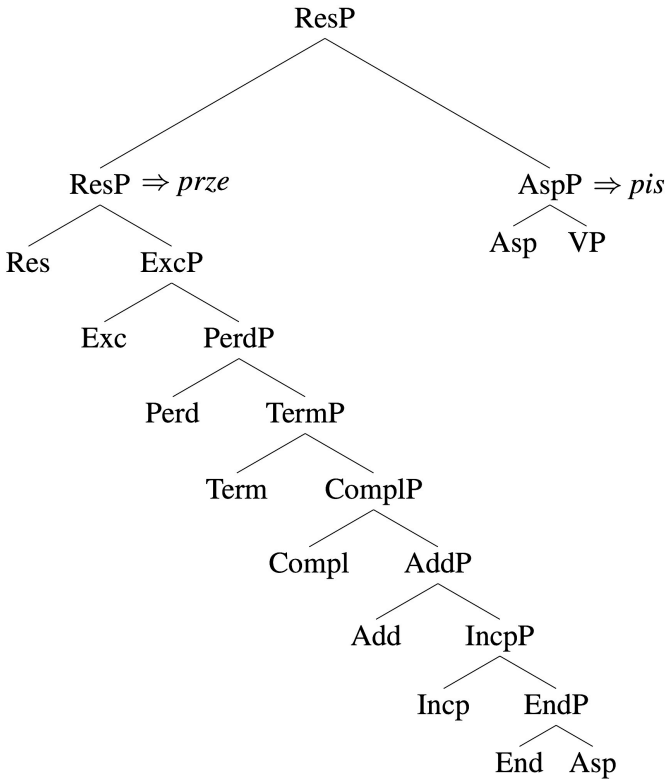

Figure 12. Lexicalization of *prze-pis-* 'rewrite'.

Also the next feature in line, the Sat(urative) requires lexicalization as the prefix but a different

one than the one seen in Fig. 12. This is because the structure [Sat [ResP]] does not match any existing LI (as discussed in the previous section). Thus, a new workspace must be opened with the last lexicalized feature in the mainline derivation, in agreement with (87).

If we assume that upon the merger of ResP *prze-* with the Asp *pis-* the "mainline derivation" continues to remain to be the latter, the last lexicalized feature that gets provided for the opening of the new complex left branch is exactly the same as for *prze-*, that is Asp. The formation of the saturative will therefore include the merger of the End feature and the Sat (with gaps in the middle) and it will get realized as *na-* as the subset lexicalisation of its lexical entry in Fig. 11 (a), as in Fig. 13.

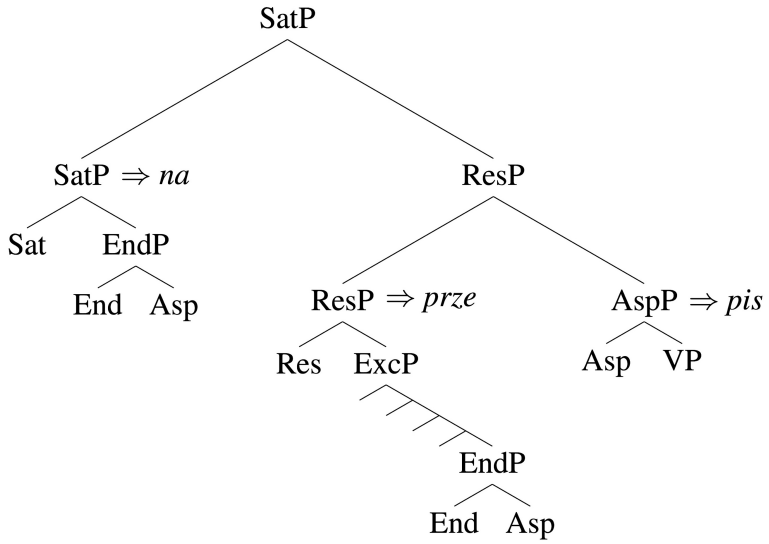

Figure 13: Lexicalization of *na-prze-pis-* 'rewrite to the limits'.

The fact that it is the mainline derivation that provides the base feature for the formation of the complex left branch derives the fact that the presence of a particular aspectual prefixes is not determined by the existence of a different aspectual prefix. That is, the *na-pis-* sequence as in (90), is derivable without the reliance on the merger of the inner restitutive prefix *prze-*.

(90) Sekretarka na-pis-a-ł-a się listów.
secretary SAT-write-TV-PRT-AGR REFL letters.GEN
'The secretary wrote the letters to the limits.'

The situation repeats with the addition of the Dist feature that forms the distributive *po-*, the most external prefix, the stage illustrated in Fig. 14.

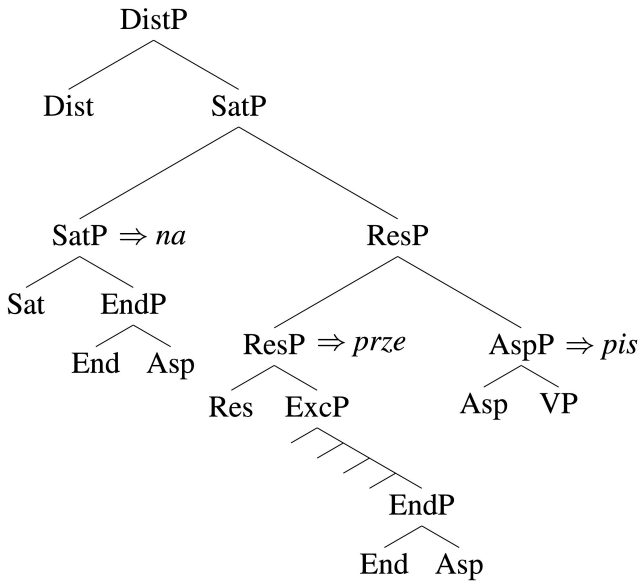

Figure 14. Merger of Dist with *na-prze-pis-* 'rewrite to the limits'.

The inability to lexicalize Dist by the application of the two initial steps of the Lexicalization Algorithm, 'stay' and 'move' in (86), requires the opening of an additional workspace. Again, the last successfully lexicalized feature in the mainline derivation is provided: the Asp from the *pis-* branch. The formation of the distributive will include the merger of the End feature and Dist (with gaps in the middle) and it will get realized as *po-* as the subset lexicalisation of its lexical entry in Fig. 11 (b), resulting in the final structure in:

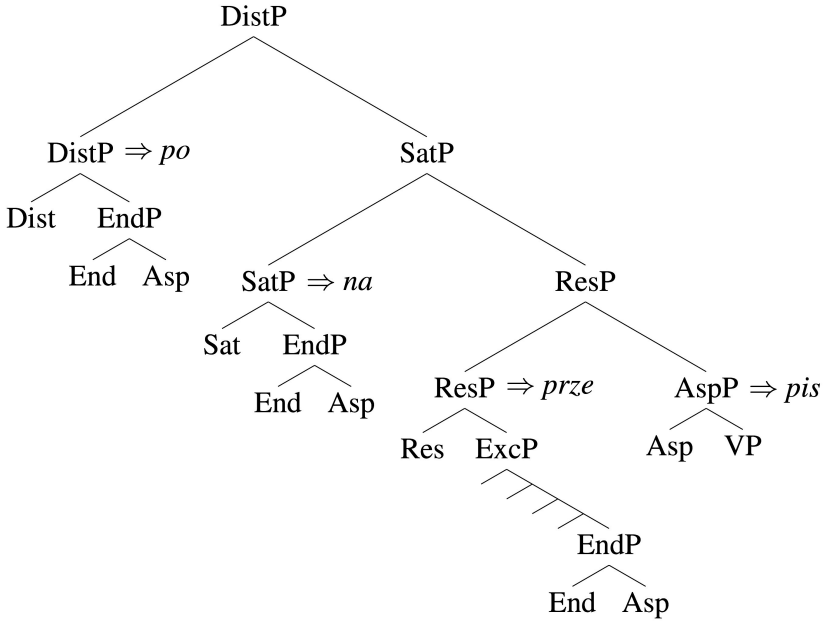

Figure 15. Lexicalization of *po-na-prze-pis-* 'rewrite (the plural number of sth) to the limits'.

Like in the case of previous prefixes, the formation of *po-* depends on the last successfully lexicalized feature in the mainline, not in inner prefixes, which derives its independence from *na-* and *prze-* attested in a well-formed sequence *po-pis-* as, for instance, in:

(91) Sekretarka po-pis-a-ł-a listy do wszystkich urzędów.
secretaty DIST-write-TV-PRT-AGR letters.ACC to all offices
'The secretary wrote letters to all the offices.'

6. Conclusion

In this chapter, we have looked in certain detail at the formal properties of multiple aspectual prefixes in Polish verbs. In particular, we have described and zoomed in on the following facts:

(i) all aspectual prefixes perfectivize the verb in a tensed form
(ii) stacked prefixes must conform to a specific order
(iii) syncretic prefixes do not stack with each other
(iv) there exists a subset of prefixes, which includes also nonsyncretic ones, whose members do not stack with each other
(v) there are no dependent prefixes (the presence of one prefix does not condition the presence of another)

We have attempted to capture these facts using the Nanosyntactic approach to the relation between lexicalization of grammatical features and prefixation. We have argued that, with certain essential assumptions about perfectivization and the overall shape of the functional sequence, the mechanism of prefix formation proposed in Starke (2018) and explored in certain other works in this framework provides a useful tool in explaining the relevant properties of Polish multiple prefixes.

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