



Database of aspect triplets in Polish, Czech and Russian: presentation, considerations and case studies

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Abstract

The article discusses the significance of (bi-imperfective) aspect triplets in the aspect systems of Slavic languages, concerning both their status in the contemporary stages and their significance in the evolution of these systems. From either of these perspectives, the determination of aspect triplets crucially hinges on the role assigned to Natural Perfectives, i.e. perfective stems whose prefixes show some semantic overlap with meaning components of unprefixes (i.e. simplex) imperfective stems. Another crucial point to be accounted for is whether secondary imperfectives (IPFV2), i.e. stems derived with suffixes from prefixed perfective stems, really oust imperfective simplex stems (IPFV1) in their lexical relation to Natural Perfectives. A closer look at diachronic facts shows that this need not be the case; in fact, it has often not been the case, and a triplet relation between two imperfective stems and a perfective stem (with the latter serving as semantic and morphological pivot) is by no means deemed to be instable.

These general points provide the background for the presentation of a comprehensive database of potential aspect triplets in Polish, Czech and Russian from 1750 to 2020. This database provides a tool necessary for the study of aspect triplets from a diachronic perspective, i.e. with an account of their dynamics. Apart from methodological issues connected to the creation of such a database, the article also gives insights into possible ways of how the database may open the door for in-depth studies. The database can also be used as an expanded list of Natural Perfectives in Czech, Polish, and Russian since 1750, as well as a starting point for investigations of near synonyms (also in applications for language learners).

In general, aspect triplets constitute a rather heterogeneous class. This corresponds to intricacies which, to a large extent, repeat those known from debates about aspect pairs and which show aspect triplets to be a gradable concept (just as are aspect pairs). Heterogeneity, and gradability, is caused by the degree at which IPFV1 and IPFV2 stems tend toward complementary functions of imperfective stems and, jointly with this, whether both stems show an identical range of polysemy and valency patterns. Moreover, IPFV1 stems may differ as for the number of triplets they enter into, which, in turn, depends on their meaning range. Other factors relevant for a subclassification of aspect triplets are related to (i) their “age”

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and provenance (based on inherited Slavic roots vs borrowings, time of borrowing), and, in this connection, (ii) attestation rates of triplets over time, which are the best available proxy for the persistence of aspect triplets. Moreover, one may consider (iii) comparative token frequencies of the imperfective stems in a triplet and (iv) the productivity of particular prefixes, together with suffixes. The mentioned parameters have been changing, and a closer view at the dynamics of aspect triplets discloses insights into hitherto less prominent properties of the architecture of the whole aspect system in Slavic languages.

1 Introduction

The binary opposition between perfective (pfv.) and imperfective (ipfv.) aspect in Slavic is based on stem derivation (see Sect. 2). Apart from biaspectual verbs, which stand out as exceptions to the division into these two classes of verb stems, a stumbling block to the system properties of the aspect opposition have been so-called aspect triplets, more precisely: cases in which a pfv. stem has two morphologically related ipfv. stems at once with which it is able to form an aspect pair (e.g., Pol. *tworzyć*^{IPFV} – *stworzyć*^{IPFV} – *stwarzać*^{IPFV} ‘create, produce’). Aspect triplets have been viewed as a challenge to assumptions about a system in which grammatical properties (i.e. functional distribution and constraints) correspond to form-related (i.e. morphological) distinctions as neatly as possible. Some of such assumptions concern aspect pairs, whose role for the system is important; nonetheless, their significance should not be overestimated. Moreover, to some extent, aspect pairs are the outcome of aspect triplets. The latter can be seen as an inevitable by-product of the properties of stem derivation whose different patterns have been variously productive over time and the results of which often stay in the language for a long time. Simultaneously, aspect triplets need not vanish, and they may arise time and again, for instance on the basis of newly borrowed verb roots (as in, e.g., Pol. *barykadować się*^{IPFV} – *zabarykadować się*^{IPFV} – *zabarykadowywać się*^{IPFV} ‘barricade oneself’).

This article pursues two aims. First, we want to present the structure and content of a diachronic database of aspect triplets in Polish, Czech and Russian (<http://www.diaspol.uw.edu.pl/>). This database is a necessary tool for the empirical verification of hypotheses concerning the role of, and changes in, inventories of potential aspect triplets in these languages. Second, we want to discuss some insights that may be derived from a first inspection of this database, and to identify some methodological issues for which the database supplies previously unavailable information. In this context we also point out results from a number of case studies.

Jointly, the two aims help improve an empirical and theoretical assessment of the status of aspect triplets. In general, this assessment supports recent research arguing that aspect triplets are an inextricable ingredient of the Slavic aspect system; they are, in fact, indispensable in its development. Above that, however, we hope to point out additional facets that allow for a more adequate understanding of (some of) the intricacies of the aspect system of Slavic languages. These shall here be briefly addressed against the backdrop of principled questions of the morphology—lexicon interface as well as of the dynamics of change. Presumably, a joint account of these facets helps explain the persistence of central parts of the grammatical system of Slavic languages.

We start with a partial outline of the Slavic aspect system, which seems necessary to evaluate the significance of aspect triplets (Sect. 2). Against this background we present the database and discuss some critical issues that influenced its design (Sect. 3). We then discuss first insights and dwell upon properties that are relevant for an assessment of aspect triplets

and of diverse problems emerging from their analysis (Sect. 4). The article closes with a summary and an outlook (Sect. 5).

Some editorial remarks are to be made. We practically refrain from glossing, but aspect will be indicated by upper case ^{IPFV} and ^{PFV}, respectively, with a differentiation between primary and secondary imperfective stems: ^{IPFV1} and ^{IPFV2}. Morphological derivation will be indicated by a double arrow ($\Rightarrow$), a simple arrow ($\rightarrow$) indicates the reading of a linguistic expression. Abbreviations of corpora are listed at the end of the references section, other sources are indicated directly with the examples. Examples without indicated sources are constructed.

2 On the architecture of the PFV:IPFV opposition in Slavic languages

A proper evaluation of the role of verbal prefixes and suffixes for aspect requires an understanding of the general architecture of the Slavic PFV:IPFV opposition (Sect. 2.1), in particular clarifications around the notions of ‘boulder’ and ‘telicity’ (Sect. 2.2). Subsequently, the conditions for, and status of, aspect pairs will be explained (Sect. 2.3), before we spell out the premises for the rise of aspect triplets (Sect. 2.4).

2.1 General properties

The aspect system of Slavic languages is based on a practically binary distinction between perfective (pfv.) and imperfective (ipfv.) stems, and in their majority these stems are related to each other by morphological means. These properties characterize this system as depending on stem derivation, while it simultaneously bears properties of grammatical classification. Since a full appraisal and justification of this double characterization of the Slavic aspect system would by far exceed the limits of this contribution, we have to restrict ourselves to a condensed account of the essentials, also in terminology, that pertain to the role of aspect pairs and aspect triplets.¹

To start with, the core feature of perfectivity (pfv. aspect resp. pfv. stems) amounts to setting boundaries to a situation (see Sect. 2.2). Importantly, this does not mean that the boundary must be in any way implied by the verbal predicate or the semantics of the clause. That is, perfectivity must not be equated with telicity, as there are two types of boundaries: those which are inherent, i.e. implied, or even entailed, by predicates or clausal semantics (e.g., *He closed the door* $\rightarrow$ boundary entailed, *He was closing the door* $\rightarrow$ boundary implied, but not reached), and those which only delimit the temporal duration of some eventuality (e.g., *She observed the seagulls (for a while)*). The former kind of boundary characterizes telic predicates, and pfv. aspect asserts that the respective boundary has been reached;² usually, the endpoint inherent to telic predicates (or clause semantics) is prominent anyway, and this matches the boundedness function of pfv. aspect. By contrast, the latter, simply temporal

¹A comprehensive sketch of the architecture of Slavic aspect is provided in Wiemer (2022). Important elements of it that are relevant for the current purpose are detailed in Wiemer et al. (2020a) and, primarily from a diachronic perspective, in Wiemer (2017) and Wiemer and Seržant (2017, Sect. 3). Largely, the conception advocated for here unites insights from Breu (2000, 2021), Lehmann (1999) and other ‘radical selection theories’ of aspect (cf. Sasse, 2002), and from Plungjan (2011). See also further references in the text below.

²Note that implying a boundary does not mean that this boundary is reached (and that this would be asserted by the predicate). An inherent boundary may be defocused if, for instance, the focus is on a process, or on preparatory phases, leading to that implicit endpoint (see Sect. 2.2). Many authors (also among those referred to in this survey) are not very careful in making these distinctions.

kind of boundary is characteristic of atelic predicates. Since they have no inherent boundary, they need to be marked additionally to be conceived of as bounded, and this is what pfv. aspect does to them. Both types of boundaries are clearly distinguished by Croft (2012, pp. 77–80): atelic activities simply terminate; they may be just temporally delimited, and if this is marked explicitly, they are ‘t-bounded’. By contrast, predicates with some inherent endpoint (*telos*) are ‘q-bounded’ (i.e. limited by the quality of the eventuality as denoted by the respective predicate). In Slavic aspectology, pfv. stems that mark ‘t-boundedness’ are known as ‘delimitatives’; Janda (2007) dubs them ‘Complex Acts’. In Russian and Polish, they are usually prefixed with *po-* (e.g., Russ. *rabotat* ⇒ *po-rabotat* ‘work’, *begat* ⇒ *po-begat* ‘run around’, Pol. *gawędzić* ⇒ *po-gawędzić* ‘chat’, *machać* ⇒ *po-machać* ‘wave’). We will further use the distinction between t- and q-boundedness when we return to the role of prefixes and of telicity (see Sect. 2.2).

As concerns morphology, in Slavic, the relations between pfv. and ipfv. stems are based on common and productive derivational patterns:³ one of them consists in the prefixation of an unprefixated (= simplex), or primary imperfective (IPFV1), stem (see (1)), the other in the addition or alternation of a suffix (see fn. 13) on already prefixed stems (see (2)). The absolute majority of simplex (IPFV1) stems belong to ipfv. aspect, and the stems derived from them by prefixes are almost always pfv. Correspondingly, the derivation of another ipfv. stem via suffixation from a pfv. stem (= IPFV2) is called secondary imperfectivization.

Russian

IPFV1	PFV	IPFV2
(1) <i>pis-a-t</i> ⇒	<i>na-pis-a-t</i>	‘write’
(2)	<i>pere-pis-a-t</i> ⇒ <i>pere-pis-yva-t</i>	‘rewrite’

These derivational patterns mark changes of aspect membership, although for reasons that lie beyond these morphological techniques. First of all, regardless of their “derivational history”, stems acquire their pfv. or ipfv. status from their largely complementary distribution over sets of contexts and constraints. These are defined grammatically (e.g., co-occurrence restrictions with tense markers, with phasal verbs, or with modal auxiliaries) or pragmatically (e.g., triggering of presuppositions, type of illocution); cf. Wiemer (2008, 2015), Wiemer and Seržant (2017, pp. 243–255), Wiemer et al. (2020a, Sects. 2–3) and the detailed description for Polish in Łaziński (2020a). All finite and non-finite verb forms (infinitives, participles, action nouns) are derived from these stems. Therefore, derivational patterns like those in ((1)–(2)) make the aspect opposition transparent and regular in morphological terms. However, verb stems are assigned to pfv. or ipfv. aspect in accordance with their distribution over grammatical and pragmatic functions and restrictions (see above); these extend far beyond actionality distinctions that determine the core of any aspect system (i.e. distinctions between bounded and unbounded situations, between events and processes or states, etc.) and motivate its rise at early stages. Thus, largely complementary sets of stable types of grammatical and pragmatic contexts condition an ultimately binary choice between representatives of two classes, namely of pfv. vs ipfv. stems. This binary choice is obligatory inasmuch as speakers cannot avoid choosing a pfv. or an ipfv. stem even with non-finite forms.

The Slavic aspect opposition can therefore be characterized as a system of the grammatical classification of verb stems (cf. Plungian, 2011; Arkadiev & Shluinsky, 2015). These two properties – stem derivation and grammatical classification – are not only compatible, but they support each other (Wiemer 2006, 2022). On this background, aspect pairs can be

³Suppletive pairs like Pol. *brać*^{IPFV} – *wziąć*^{PFV} ‘take’ just confirm this regularity, as suppletion by definition captures exclusions from, and thus builds on, patterns.

considered the backbone of the PFV:IPFV system in Slavic. However, they do not constitute (or define) a system by which verb stems are divided into two classes with complementary properties; instead, they are intertwined with these properties. The classificatory system, in turn, does not require all, or a majority of, verb stems to be organized in aspect pairs. We now move on to the premises that condition the rise of aspect pairs.

2.2 On boundaries and telicity

In Slavic, prefixes almost always function as bounders. That is, when they are added to a simplex stem, this new stem marks the respective situation as bounded (or limited). However, as explained in Sect. 2.1, the boundary may either be a simply temporal one, or it is conditioned by an inherent endpoint; if this point is reached, a qualitative change occurs after which the respective situation does no longer apply. Only in the latter case do we speak of telic predicates (see ex. (1)).

Unfortunately, the notion of ‘telicity’ (or of ‘telic predicates’) has suffered from a variety of treatments that differ (often only tacitly) in at least one of three ways, namely: (a) whether ‘telic’ only refers to the attainment of an inherent goal (and not to a process), (b) whether it entails a resultant state (e.g., *She closed the door* entails *The door is closed*) or not (e.g., *She hit the door* does not entail any change of state), (c) whether a qualitative change results from overcoming an absolute boundary (e.g., *The pumpkin turned into a carriage*) or is only connected to a relative boundary (as with parametric predicates, e.g. *The pumpkin grew bigger*).⁴ Since, after all, these issues are irrelevant for the determination of aspect pairs and triplets (see Sects. 2.3–4), we here will neglect (b) and (c).⁵ However, (a) does require some remarks. Predicates that imply boundaries (absolute or relative ones) may denote not only events, but they may also describe processes, i.e. processes that lead to a change and are thereby telic; compare: *She was writing a letter* → process vs *She wrote a letter* → event. The difference is that telic events *assert* that the respective boundary is/was reached, whereas telic processes only *imply* that the inherent boundary was/will be reached (provided things develop(ed) as implied by that predicate). However, the boundary inheres in either of them.

Correspondingly, a pfv. telic predicate asserts that the inherent boundary is/was attained, while – other things remaining equal – its ipfv. counterpart only implies this boundary, but its attainment can be denied. This relation holds for many telic aspect pairs, regardless of the derivational pattern (see (1)–(2)). However, if a prefix is added to an ipfv. simplex stem, it focuses on a boundary (endpoint) which may be already implied by the ipfv. simplex (together with its argument structure), as in (1) and (6)–(9), or not. This agreed, we basically may distinguish three functions of prefixes:

(A) If the ipfv. simplex implies a boundary, the prefix (yielding a pfv. stem) focuses on it.

Otherwise,

(B) the prefix either introduces an inherent boundary by modifying the lexical concept of the ipfv. simplex (e.g., Russ. *rabotat*’ (*nad stat’ej*) ‘work (on an article)’ ⇒ *ob-rabotat*’ (*stat’ju*) ‘work over, process (an article)’),

⁴Cf. Wiemer et al. (2023, pp. 78–80; *forthc.*, Sect. 3), with further references.

⁵That is, we may regard pairs and triplets like Pol. *oferować* ⇒ *zaoferować* ‘offer’ (only punctual and no resultant state) and Pol. *ciosać* ⇒ *ociosać* ⇒ *ociosywać* ‘chisel’ (parametric) as telic, as do, in fact, most scholars. Cf. also Nordrum (2017, pp. 243 et passim), who speaks of different “strengths”, or degrees, of telicity (see Sect. 4.2.2.).

(C) or the prefix marks off a temporal limitation of the atelic activity denoted by the simplex (e.g., Russ. *rabotat'* $\Rightarrow$ *po-rabotat'* 'work (for a while)').

Notably, whatever of these three functions the prefix fulfils, its addition to an ipfv. simplex stem practically always yields a pfv. stem; in other words: prefixes perfectivize regardless of telicity.⁶

Two other interconnected caveats are important here. First, telicity very often is not a matter of verb stem (with or without prefix), but it results from an interaction between the meaning of this stem and properties of its arguments or even further parts of the clause (whose argument status may be debated). In particular, telicity is often characterized by incrementality, i.e. a scalar increase, or decrease, of properties of q-boundedness that are conditioned simultaneously by the predicate and one (or more) of its arguments.⁷ However, even ipfv. simplex stems with incremental semantics and an inherent boundary differ: some of them reveal these properties in virtually any clausal constellation, i.e. by virtue of their lexical meaning (e.g., Russ. *stroit'* 'build', Pol. *konać* 'die'), while others are much more dependent on features of other parts of the clause (e.g., Russ. *pisat'* 'write', *est'* 'eat' and other consumption verbs); correspondingly, their aspectual properties are more variable.⁸ This brings us to the next point.

Second, as simplex verb stems and prefixes partake in the composition of predicates and clause semantics, they may also variably influence telicity. In part, this also depends on the discourse setting. Thus, on the one hand, ipfv. simplex stems can oscillate between readings w.r.t. whether a specific endpoint becomes important or not. For instance, an utterance like Russ. *Ona čitala knigu* 'She read / was reading a/the book' may be understood in a telic sense ('she read / was reading a book in order to comprehend its entire content'), or it may be read in an atelic manner, e.g., in an answer to a question like *What was she doing (at a time t)?* just to inform about the type of her temporary occupation,⁹ in contrast to alternative statements (for instance, *She was drinking tea*). On the other hand, even when an ipfv. simplex stem has different prefixed derivatives and these pfv. counterparts of the ipfv. simplex normally distinguish between a telic and an atelic interpretation (see fn. 9), the pfv. stem with the prefix that is associated with an atelic meaning can acquire telic features. Here discourse conditions can play a role, but also world knowledge. For instance, Russ. *s''-est'* 'eat up' (telic) is opposed to *po-est'* 'eat (some amount of)' (atelic). Both are derived from ipfv. *est'* 'eat', but *poest'* may be conceived of as telic as well, since it is often used for situations which imply the consumption of a whole meal, similarly to the pfv. telic stem *po-obedat'* 'eat lunch', which refers to a daily routine implying a rather conventionalized composition and portion (cf. Zaliznjak et al., 2015, p. 67).

⁶Consequently, assertions like "Russian prefixes can be viewed as grammaticalized telicity" (Kuznetsova & Sokolova, 2016, p. 217) are misleading, in fact, incorrect.

⁷Cf. Croft (2012: 72: "homomorphism from objects to events"), following Krifka (1989). For the probably most comprehensive account w.r.t. aspect and actionality in Russian cf. Tatevosov (2015).

⁸Therefore, Veyrenc's (1980b) claim that ipfv. simplex stems (as in (1)) denote processes without consideration of its endpoint ("sans considération de son terme") is appropriate inasmuch as the endpoint may be out of focus. Likewise, the 'Telicity Hypothesis' (Kuznetsova & Sokolova, 2016; Nordrum, 2017), which is based on Veyrenc (1980b) and states that ipfv. stems yielded by secondary imperfectivization (see (2)) share telicity features with the respective pfv. stems more consistently than the respective ipfv. simplex stems do, accounts for a general tendency. However, both Veyrenc's point and the Telicity Hypothesis would be inappropriate if they were to mean that (clauses with) ipfv. simplex stems cannot be telic (i.e. evoke an implied endpoint). If this were the case, it would jeopardize the notion of aspect triplets (which implies telicity) and even the Overlap Theory (see Sect. 2.4).

⁹In this case (as in some others), the telic-atelic oscillation can be "dissolved" by the choice of the prefix in the pfv. counterparts: *pro-čitat'* (telic) vs *po-čitat'* (atelic).

To sum up: telicity need not be any stable feature of a lexical unit, nor even of a clausal construction, and its strength may vary. This yields a wide range of imaginable constellations (and degrees of their conventionalization). In particular, telic-atelic oscillations of ipfv. simplex stems testify to this variability. Many ipfv. simplex stems are used in constellations in which they imply boundaries (and incremental processes leading to them). In this case the perfectivizing function of prefixes consists in asserting that this boundary is reached, while the simplex only implies such a boundary without asserting its attainment; the latter can remain out of focus and be denied.¹⁰

2.3 Morphological patterns and complementary distribution of near synonyms

Let us come back now to the prefix functions (A) and (B) distinguished above. In (B), the prefix modifies the lexical meaning of the ipfv. simplex (and concomitantly adds telicity). Linguists accept this as sufficient to assume new lexical items. However, in numerous instances the prefixed pfv. stem does not betray any conceivable difference in lexical meaning in comparison to the ipfv. simplex stem which it is derived from, and this is what (A) points to. Again, there is a wide range of intermediary stages for which it is debatable whether lexical meaning is modified or not (and how this may be described). More generally, morphologically related verb stems of pfv. and ipfv. aspect which correspond to one of the two patterns in (1)–(2) and which share their lexical meaning – more precisely: which can be used as equivalents in at least one of their lexical meanings – are considered aspect pairs. One may then argue whether we are dealing with different lexical units or not; alternatively, these two stems can be considered synonyms which only differ in their grammatical behaviour.¹¹

In the last resort, aspect pairs can be conceived of as the tightest and grammatically most rigid kind of partnership which allows two morphologically related verb stems to replace each other under sufficiently predictable conditions.¹² The best-known conditions of this kind are targeted by tests of ‘trivial aspectual pairedness’ (henceforth as shortcut: ‘trivial tests’) employed after Maslov (2004 [1948]). All of them are based on the assumption that the ipfv. stem replaces, and lexically represents, its pfv. counterpart if the latter cannot be used (or is avoided). The most widely known cases of such contexts are the narrative use of the present tense, reference to an unlimited number of repetitions, and the negated imperative (referring to a single situation); cf. Veyrenc (1980a), Zaliznjak and Šmelev (1997, pp. 41–44), Zaliznjak et al. (2015, pp. 55–58), Łaziński (2020a, p. 27f.), Wiemer et al. (2020a, Sect. 3.1). More precisely, these tests imply that the ipfv. stem provides a lexical copy – i.e. behaves as the closest synonym – of the pfv. stem, including “ontological” identity with the latter. This means that the ipfv. stem can stand for the same q-bounded event which is denoted by its pfv. counterpart. Admittedly, trivial tests were designed for (Standard) Russian, and their reliability decreases with Slavic languages farther to the west and south (Wiemer, 2017, p. 224, p. 227f.). However, the differences between Russian and Polish are small. In Czech, these tests work as well, although pfv. stems are not banned from (specific types of) narrative present and they can be freely used for the denotation of unlimited repetitions, even if these are regular (Dickey, 2000, pp. 52–82, Wiemer, 2021).

Such a concept of aspect pairs is usually unproblematic if the two stems are connected via an additional or altered suffix (see ex. (2)). By contrast, for at least the past 100 years

¹⁰Cf. Łaziński and Wiemer (1995), Arkadiev (2015, pp. 20–24), Wiemer and Seržant (2017, pp. 248–250), with further references.

¹¹Cf. Wiemer (2022) for the general reasoning and Wiemer et al. (2020a, Sect. 3.3) for a case study.

¹²Cf. Mende et al. (2011) for the most elaborate foundation of aspect partnerships as a gradient phenomenon with core and periphery. In this conception, aspect pairs constitute the inner core.

there has been much debate as for whether pairs that correspond to the pattern in (1) can be considered aspect pairs as well. The stumbling block has been the issue whether prefixes can leave the lexical meaning of a simplex stem unaltered, and this issue is directly related to the appearance of aspect triplets.

2.4 Natural perfectives and triplets

Aspect triplets result from a constellation in which two ipfv. stems lexically correspond to the same cognate pfv. stem: one ipfv. stem is derived from the pfv. stem by a suffix¹³ (= IPFV2), the other is an unprefixed ipfv. stem (= IPFV1, or simplex) and itself the morphological basis of the pfv. stem. Compare, for instance, (3)–(5).

	IPFV1		PFV		IPFV2	
(3a) Russian	<i>gre-t'</i>	⇒	<i>na-gre-t'</i>	⇒	<i>na-gre-va-t'</i>	‘warm up’
(3b)	<i>gotov-i-t'</i>	⇒	<i>pri-gotov-i-t'</i>	⇒	<i>pri-gotavl-iva-t'</i>	‘prepare (meal)’
(4a) Polish	<i>dzieli-ć</i>	⇒	<i>roz-dziel-i-ć</i>	⇒	<i>roz-dziel-a-ć</i>	‘divide; separate’
(4b)	<i>ład-owa-ć</i>	⇒	<i>w-ład-owa-ć</i>	⇒	<i>w-ład-ow-ywa-ć</i>	‘load (into)’
(5a) Czech	<i>bud-i-t se</i>	⇒	<i>pro-bud-i-t se</i>	⇒	<i>probouz-e-t se</i>	‘wake up’
(5b)	<i>lušt-i-t</i>	⇒	<i>vy-lušt-i-t</i>	⇒	<i>vy-lušt'-ova-t</i>	‘shell (peas, beans)’

Triplets result from an overlay of the two most productive patterns by which aspect pairs are created in Slavic (see (1)–(2)). Strictly speaking, there are different kinds of triplet relations in Slavic languages.¹⁴ Here the term *triplet* is used as a shortcut for what Zaliznjak et al. (2015, p. 235f.) baptized *bi-imperfective aspect triplets* (Russ. *biimperfektivnye vidovye trojki*). In this kind of triplet, the pfv. stem is a sort of morphological, semantic and lexico-graphic pivot between two ipfv. stems. It can serve this function because two interrelated conditions are fulfilled:

- (i) the simplex stem is suitable for denoting a telic situation;
 - (ii) the prefix does not change (or modify) the lexical concept represented by the simplex.
- It just asserts that the respective endpoint is reached (see Sect. 2.3).

Concomitantly to (ii) the prefix usually narrows the meaning range of the simplex stem. In many cases this leads to the appearance of different pfv. stems from the same simplex

¹³This change may consist either in an addition (as with {va} in (3a)), or in a replacement (as with {i} > {a} in (4a)), in a replacement resulting from the coalescence of two more elementary segments (as with {iva} < {i+va}, see (3b)), or in the addition accompanied by a truncation of the preceding morpheme (as with {ova} > {ov-iva}, see (4b)). For the present concern these distinctions are irrelevant, as are morphonological changes at the boundary between deriving stem and suffix (e.g., -d- > -z- in 5a) or root-internal vowel changes (as in (3b) and (5a)).

¹⁴Another widespread kind of triplet is based on atelic IPFV1 stems that denote unbounded activities consisting of rapid cyclic acts (e.g., ‘wave’, ‘shiver’, ‘blink’, ‘shout’). Here the ipfv. simplex is the pivot, as it derives two different pfv. stems, one with the prefix *po-* adding a temporal limit (delimitatives), the other with a nasal suffix (Russ. *-nu-*, Pol. *-ną-*, Cz. *-nou-*) denoting a single act out of the cyclic repetition (semelfactives), e.g. Pol. *merd-a-ć* ⇒ *po-merdać* / *merd-ną-ć* ‘wag’, Russ. *stuč-a-t'* ⇒ *po-stučat'* / *stuk-nu-t'* ‘knock’. We are not concerned with this type of triplet, nor with other, more marginal types (for which cf. also Kuznetsova & Sokolova, 2016, pp. 220–222).

and, further, to triplets based on the same simplex. Compare the following examples from Russian:

$rvat^{IPFV1} \cong sorvat^{PFV} / sryvat^{IPFV2}$ ‘tear off / from’

- (6a) *Rebjata vysypali vo dvor, okružili telegu. Rvali z voza meški, toropilis’ taskat’.*
 ‘The guys poured out into the yard, surrounded the cart. They **tore** bags from the cart, hurried to carry them.’
 (RNC; G.G. Belyx, 1929, *Lapti*)
- (6b) *Bol’šoj kljiv pomogaet sryvat’ plody s tonkix vetok v to vremja, kak sama ptica sidit na tolstom suku.*
 ‘A large beak helps to **pick** fruit from thin branches while the bird itself sits on a thick bough.’
 (RNC; Murzilka, 1999)

$rvat^{IPFV1} \cong otorvat^{PFV} / otryvat^{IPFV2}$ ‘tear from / off’

- (7a) – *Stoj! On budet orat’, emu tože nado zatknut’ rot! – ostanovil ego Satana i prinjalsja rvat’ kusok ot skaterti.*
 ‘– Stop! He will yell, we need to shut his mouth too! –Satan stopped him and began to **tear** a piece from the tablecloth.’
 (RNC; Gigalašvili M., 2007, *Čertovo koleso*)
- (7b) *Daže mne, postojal’cu, bylo bol’no, čto načnut otryvat’ doski i vyvoračivat’brevna doma.*
 ‘Even I, the guest, was hurt that they would start **tearing off** the boards and turning the logs inside the house.’
 (RNC; Solženicyn. A., 1960, *Matrenin dvor*)

$rvat^{IPFV1} \cong vyrvat^{PFV} / vyryvat^{IPFV2}$ ‘tear out’

- (8) *Esli už sovsem perestavalo nravit’sja, vyryval stranicu iz tetradi, v poslednij god tol’ko ètim i zanimal’sja, perečityval i rval nemiloserdno, ot devjanosta šesti listov polovina ostalas’.*
 ‘When he completely ceased to like it, he **tore** a page **out of** his notebook, in the last year he did just that, reread it and **tore** (out of it) mercilessly, half of the ninety-six sheets remained.’
 (RNC; Volga, 2008)

$rvat^{IPFV1} \cong porvat^{PFV} / poryvat^{IPFV2}$ ‘cut ties, break (with sb)’

- (9a) *Poètomu edinstvennyj vyxod – nemedlenno rvat’ s mentami.*
 ‘Therefore, the only way out is to immediately **break** with the cops.’
 (RNC; Savel’ev A., 2000, *Arkan dlja bukmekera*)
- (9b) – *Net, polnost’ju poryvat’ s advokatskoj rabotoj ne sobirajus’.*
 ‘– No, I’m not going to completely **break** with the work of a lawyer.’
 (RNC; Itogi, 2003)

In these cases, the IPFV2 keeps the narrower meaning of the PFV stem (since it has the same prefix), but it may defocus the implied boundary (e.g., by denoting a telic process), as may IPFV1 stems as well. This conditions a potential competition between the two ipfv. stems as for the functions that are generally assigned to ipfv. stems. IPFV2 inherits telicity from the already prefixed pfv. stem, but, as argued in Sect. 2.2, simplex IPFV1 stems often show variable telic-atelic behaviour, and some of them are invariably telic. In examples like (6)–(9) some of them can, others even must be interpreted as telic.

In order for the prefix to leave the lexical meaning of the simplex unchanged, the meaning profile of the prefix needs to overlap with semantic components of the simplex. Pfv. stems obtained in this way are called Natural Perfectives (NatPfv). The relevant prefixes are not (and need not be) semantically empty; quite to the contrary, NatPfv.s arise because meaning components of two units (simplex stem + prefix) are congruent with each other (cf. Janda, 2007 and Janda et al., 2013 for the term and a partial overview of the discussion on so-called empty prefixes). Importantly, prefixed pfv. stems are “natural” not by virtue of the semantics of their prefixes alone, but because the latter interact with the semantics of simplex stems. Moreover, since the semantics of prefixes is usually fuzzy, one cannot really predict which prefix will occur in aspect pairs of the pattern IPFV1—PFV, but one can motivate the results *ex post*. Of course, prefixes can lose much of their original meaning, but a necessary condition for this to happen appears to be that a prefix becomes particularly frequent on type level, i.e. is applied to an increasing number of verb stems.¹⁵ This has happened, for instance, to Russ./Pol. *po-* and Pol. *z-, u-, za-*. Likewise, Russ. *za-* seems to have enhanced its productivity among new borrowings (Olsson, 2022). Consider the following examples:

	IPFV1		NatPfv	
(10)	Cz. <i>dělit</i>	⇒	<i>roz-dělit</i>	‘divide’
	Pol. <i>dzielić</i>	⇒	<i>roz-dzielić</i>	
	Russ. <i>delit’</i>	⇒	<i>raz-delit’</i>	
(11)	Cz. <i>číst</i>	⇒	<i>pře-číst</i>	‘read’
	Pol. <i>czytać</i>	⇒	<i>prze-czytać</i>	
	Russ. <i>čitat’</i>	⇒	<i>pro-čitat’</i>	
(12)	Cz. <i>blížít (se)</i>	⇒	<i>při-blížít (se)</i>	‘approach [tr./intr.]’
	Pol. <i>bliżyc (się)</i>	⇒	<i>z-bliżyc (się)</i>	
	Russ. <i>blizit’ (sja)</i>	⇒	<i>pri-blizit’ (sja)</i>	
(13)	Pol. <i>budzić (się)</i>	⇒	<i>wz-budzić (się)</i>	‘wake up [tr./intr.]’
	<i>bogacić (się)</i>	⇒	<i>wz-bogacić (się)</i>	‘enrich [tr.]; become rich’
	Russ. <i>bodrit’ (sja)</i>	⇒	<i>vz-bodrit’ (sja)</i>	‘invigorate [tr.]; cheer up [intr.]’
(14)	Russ. <i>gotovit’</i>	⇒	<i>pri-gotovit’</i>	‘cook (e.g., food)’
		⇒	<i>pod-gotovit’</i>	‘prepare (e.g., a lesson)’

The prefix *raz-/roz-* saliently indicates a (physical or figurative) centrifugal movement or the division of some larger object into smaller ones. It occurs in all Slavic languages, and (10) shows cognate simplex stems whose lexical meanings imply the same notion of centrifugal movement or splitting into pieces. Likewise, the perlocative meaning ‘through’ of *pro-* and *prze-/pře-* (< *pre-*) forms the basis of semantic overlap with the telic meaning of ‘read’ in the cognates shown in (11). In turn, the meaning of the cognate simplex stems in (12) indicates a movement towards a reference point, i.e. it marks the decrease of the distance between a trajector and its landmark (goal). This concept is “harmonic” both with the allative-adessive prefix *pri-/przy-/při-* (‘towards / at, close to’) and with the comitative prefix *s-/z-* (‘with, together’).¹⁶ In NatPfv.s we encounter both prefixes; however, which one becomes more

¹⁵In contemporary Russian, out of 21 verbal prefixes 16 are used for deriving NatPfv.s, but their type frequency differs enormously (Janda et al., 2013). In Polish the same applies to 15 out of 19 prefixes (Łaziński, 2011, 2020b).

¹⁶This meaning must not be confused with the homonymous prefix *s-/z-* in the ablative meaning ‘from (away, down)’. The absolute majority of verbal prefixes are cognates of mostly extant prepositions, from which they derive their original functions as spatial modifiers (*roz-/raz-* is an exception).

customary is language-specific. The same, conversely, holds true for the establishment of a particular prefix with different simplex stems with which it may overlap in a central meaning component. This is shown in (13), where *vz-* shares its meaning of upward movement with a lexical component of the simplex stems: upward movement motivates a metaphorical transfer to becoming (more) agile or of increasing wealth. Moreover, one and the same simplex stem may combine with different prefixes to yield lexically motivated semantic overlaps. A case in point is (14), in which the prefix *pri-* can be argued to emphasize the idea that a meal is brought close to its consumer(s) by being made ready (Russ. *gotov-*), and a similar point can be made for *pod-* ‘under’, which is related to the idea of making available.¹⁷ In such cases, the simplex can either be considered polysemous or diffuse, and the prefixes disambiguate, or profile, the meaning by focusing on one of the meaning variants (cf. also Łaziński, 2020a, p. 77).

The observation that prefixes may overlap with a non-trivial meaning component of a simplex stem, while the simplex and the prefixed stem only differ for aspect, is corroborated by the corpus-based analysis by Janda and Lyashevskaya (2011). It shows that Russian pairs of the type in (1) and (10)–(14) – i.e. with NatPfvS – reveal the same grammatical profiles as those of the more frequent pattern in (2), i.e. based on secondary imperfectivization.

The foregoing considerations have now brought us to an explanation of the origin of triplets. Triplets arise when prefixes profile the telic potential of ipfv. simplex stems by asserting the attainment of the implied goal but do not alter the lexical meaning. Instead, they often profile alternations of lexical meaning of simplex stems, and this narrower meaning range is inherited by secondary imperfectives (IPFV2) derived from these pfv. stems (with an identical prefix).¹⁸ Therefore, triplets arise if aspect pairs with NatPfvS “keep intact”, although secondary imperfectives have also appeared.

According to Janda et al. (2013, p. xiv), more than one-third of stems that perfectivize with a prefix (i.e. aspect pairs of an ipfv. simplex and a NatPfv) also have attestations of secondary imperfectives, and thus triplets, in the RNC. This corresponds to 752 triplets in contemporary Russian (see Sect. 3.1). The figures are very similar for Polish. According to Łaziński (2020a, pp. 42–44), from among 4630 aspect pairs registered in the Great Polish-English Dictionary (Linde-Usiekiewicz, 2004) 1670 (= 36%) pairs are prefixal pairs of which the pfv. stems can be considered NatPfvS. From these, in turn, 565 show secondary imperfectives in contemporary dictionaries. This equals to 34% triplets from among all IPFV1-PFV pairs and to 12% in comparison to all aspect pairs acknowledged by authoritative lexicography. This is certainly no *quantité négligeable* in the contemporary languages, all the more so as these figures do not account for the ongoing creation of IPFV2 and the “resilience to decay” of IPFV1-PFV pairs. The latter two factors have remained largely unknown players in the dynamics of triplets, and several pitfalls are connected to them (see Sect. 3.1, Sect. 4.1).

¹⁷ Compare with the meaning of (physical or figurative) movement in verbs with this prefix, e.g. Russ. *pod-sunut’* (*pod nos*) ‘slip sth. (under one’s nose)’, *pod-ojti* ‘come up’. In other cases, *pod-* is linked to the idea of laying the foundation for something in terms of scaffolding (compare Russ. *pod-stavit’* ‘place under’). We thank one of the reviewers for this remark; however, we are unaware of a suitable NatPfv with *pod-* in this meaning.

¹⁸ Sokolova (2021) has found corpus-based support for the assumption that IPFV2 stems are more apt to share metaphorical extensions with their pfv. counterparts than with respective IPFV1 (= simplex) stems.

3 The *DiAsPol* database of aspect triplets

The *DiAsPol* project¹⁹ has prepared a database of aspect triplets in Polish, Czech and Russian for the period between 1750 and 2020. It can be employed as a source for in-depth studies in diachronic lexicography and semantics, but above that it is designed as a tool to formulate hypotheses about changes in the inventory of aspect triplets in these three languages; it also partially serves for testing such hypotheses (see Sect. 4). Table 1 provides the number of items included in the triplet database, after all final checks were done (June 2021). It should be emphasized that the figures comprise a period of 270 years, but they do not reflect much of the fluctuation in the inventory and properties of potential triplets that occurred during that period (see further Sect. 4). Verbs with and without reflexive marker (Cz. *se*, Pol. *się*, Russ. *-sja*) are given separate entries when they represent different meanings. This separation was possible for entries, i.e. on type level, since these were established on the basis of different sources and frequency did not play a role (Sect. 3.1). However, when it came to token frequencies, the reflexive marker caused serious problems (Sect. 3.2.2).

The number of triplets equals the number of pfv. stems, since these stems function as pivots of the triplets (see Sect. 2.4). There are fewer simplex (IPFV1) stems in each language because many of them enter into more than one triplet (via different prefixes). A first glance already allows us to infer that the proportion of such simplex stems in Russian is higher than in the two other languages.²⁰ In turn, the larger number of IPFV2 stems in comparison to PFV stems from which they derive corresponds to the amount of suffix variants, which include vowel changes in the root and, in Russian, stress changes (e.g., Cz. *opásávat* (MV) – *opasovat* (SV) ‘gird’, Pol. *dokańczać* (MV) – *dokończać* (SV) – *dokończywać* (SV) ‘finish’, Russ. *vydolbljāt* (SV) – *vydaľblivat* (MV) ‘gouge, hollow out’).²¹ However, variation of suffixes practically never correlates with differences in lexical meaning. Consequently, the overall number of suffix variants and, respectively, of simplex stems partaking in more than one triplet corresponds to the arithmetical difference with the number of PFV stems: 31 (Czech), 27 (Polish), 214 (Russian). This, again, shows a strikingly larger number of suffix variants in Russian.

The larger number of triplets in the Polish database results from two circumstances. First, the Polish part is based on a broader array of sources (Sect. 3.1). This also mainly explains the larger number of simplex stems in comparison to the Russian and the Czech part. The lower number of triplets on the Czech part, in turn, is mainly due to the much smaller size of the CzNC for periods prior to 1918 (see Table 2), which diminishes the diversity of attested verb stems. Second, the Polish part contains 292 IPFV2 stems (with lexically equivalent IPFV1 stems in the PNC and/or at least one of the dictionaries) which have only been attested on

Table 1 Size of aspect triplet database

	Triplets (without variants)	IPFV1	PFV	IPFV2 (incl. variants)
Czech	709	634	709	740
Polish	1754 [1462]*	1386	1754	1781 [1489]*
Russian	1280	837	1280	1494

*After subtraction of IPFV2 stems found only via Google (see below).

¹⁹See <http://www.diaspol.uw.edu.pl/eng/>.

²⁰The coefficients of the number of triplets divided by the number of IPFV1 stems are 1.53 (Russian), 1.12 (Czech), and 1.27 (resp. 1.05) for Polish.

²¹In the database such variants are additionally marked as *main variant* (MV) vs *subvariant* (SV).

the internet (via Google). The Czech and the Russian database do not include such units. We now dwell on these issues in more detail.

3.1 Entries and data collection

For a systematic and comprehensive collection of potential triplets, we initially composed lists of simplex stems, which were derived from a variety of sources. As for Polish, a provisional set of aspect triplets was composed in 2018 by Ruprecht von Waldenfels (U Jena) based on lists of aspect pairs in *Słowsieć* (Polish WordNet), the dictionaries Linde-Usiekniewicz (2002, 2004), Bańko (2000), Saloni et al. (2015), and a list of Polish aspect pairs put together by Oskar Swan (U Berkeley). Triplets were established on the basis of cross-combinations of pfv. and ipfv. stems in aspect pairs. The resulting list was supplemented by ipfv. simplex stems found in dictionaries of contemporary Polish – Dunaj (1996), Dubisz (2018) – to which we then assigned pfv. partners and secondary ipfv. stems. Dictionaries of historical stages – Linde (1854 [1807–1814]), Karłowicz et al. (1900–1927), Zdanowicz et al. (1861) – were consulted for a check on IPFV2 stems, but no further IPFV1 stems were added. As for Czech, a list of ipfv. simplex stems was derived from Esvan (2007), and for Russian from the Emptiness Database (http://emptyprefixes.uit.no/triplets_eng.htm), which lists 1583 potential triplets in modern Russian (see below). In addition, we used a list of Common Slavic simplex stems, composed by Il'ja Egorov (on the basis of acknowledged dictionaries, see References).

Thus, simplex lists supplied a starting point for systematic checks on the existence of aspect triplets since 1750. These checks consisted in a systematic investigation of comprehensive dictionaries to be considered authoritative and comprehensive lexicographic sources of their time (see exhaustive lists for each language under www.diaspol.uw.edu.pl/instrukcja/). These sources were searched for derivatives of the simplex stems. The resulting entries were then looked for in corpora (listed under References), also to establish their frequencies.

Both corpus and dictionary data served to establish approximate ranges of attestation (see Sect. 4.1). They were also employed to check sufficient closeness of lexical meaning. In accordance with common practice among Slavic aspectologists, we applied tests on trivial pairedness (see Sect. 2.3). That is, we checked on replacement in the narrative present, with unlimited iteration and (if sensible) the negated imperative. Furthermore, the creation of the database was guided by the premise that a triplet exists only if the relevant IPFV2 stem is attested in at least one source for a given period, and that the respective IPFV1 stem continues to exist as well. At this stage, token frequency is not an issue. The IPFV2 can be considered to be lexically identical to the PFV from which it derives morphologically (via suffixation), but it should also be synonymous with at least one of the meanings of the respective IPFV1 stem.

3.1.1 On synonymy and testing

Some caveats concerning tests on aspect pairs and synonymy are in order. First, the application of tests on aspectual pairedness ('trivial tests') to diachronic data is not unproblematic, since even informed native speakers project their contemporary linguistic competence (or intuition) on data of bygone times. We however know of no better method (also in view of the fact that very often corpora did not supply enough tokens for relevant stems, particularly prior to 1945) and thus regarded this way of checking as a suitable starting point for further research (which must be in-depth). Second, as emphasized in Sect. 2.3, trivial tests rest on the assumption that the ipfv. stem can replace the pfv. stem exactly because it becomes synonymous with the latter. In this case, synonymy also requires that the ipfv. stem can refer to

the same *event* as does the morphologically related pfv. stem.²² As a reminder, this “copying” function of the ipfv. stem only relates to *telic*, i.e. q-bounded events.

Now, to what extent does even this copying function really prove lexical identity? Strictly speaking, trivial tests – as all syntactic tests – only check for *equivalence in contexts* that are identical under all respects, except the grammatical or pragmatic feature targeted by the given test. In this respect, synonymy seems to apply only in a loose sense.

At this point, it might be helpful to realize that the relation between synonymy and equivalence is mirrored in debates as for whether meaning and usage can, and should, be kept apart. The borderlines between meaning and usage become blurred to the same extent that synonymy is recognized as a gradable concept: many linguists have claimed that absolute synonyms, i.e. meaning identity in all respects, hardly exist; in fact, speaking of “close”, or “near”, synonyms already implies scalarity. Likewise, linguists differ as for whether identity, or closeness, of meaning only refers to denotational aspects or also includes other aspects like indexing of social distinctions or politeness, on the one hand, or identical valency requirements, on the other (Divjak, 2010, pp. 3–5, Kroeger, 2019, p. 108). As concerns, in turn, the form of linguistic signs, we encounter the problem of granularity: are we comparing alternations between word forms, between constructions (on different levels of abstraction or complexity), or between units below the word form level?²³

As we have shown in Sect. 2, granularity of form and subtleties of meaning alternations beyond a coarse denotational level are both relevant when it comes to comparing cognate verb stems in potential aspect triplets. The units we are dealing with are verb stems, and the lexical meaning of IPFV1 stems is fuzzier than that of their pfv. derivatives: the prefixes of the latter narrow, or profile, the meaning range of the former. This explains why many IPFV1 stems lay the ground for more than one NatPfv (and, by consequence, for more than one triplet), but the lexical relation of diffuse IPFV1 stems to their prefixed derivatives may also turn out more fragile. In fact, this relation of meaning identity, or closeness, turns out as but a special case of ‘an emergent construal’, and the dynamics of synonymy as ‘a product of different types of cognitive equivalents’ (Storjohann, 2016, p. 252). Such synonyms are continually established, and they may fade away and be re-established, by usage within a speaker community. In turn, corpora can be treated as rough proxies of conventionalization (Schmid, 2015; see fn. 36), but the degree of conventionalization is extremely hard to operationalize and, thus, to estimate, all the more as it is fluctuant.

Since this discussion would go far beyond the concerns of this article, we here accept a gradable notion of synonymy. We are aware that the data assembled in our database does not allow us to disclose many of the “ingredients” of synonymy. This, however, seems to be a principled drawback of all comparable databases. We will nonetheless dwell upon some of these ingredients in Sect. 4.

3.1.2 Caveats concerning (dis-/re-)appearance and frequency

Since IPFV2 stems are derived from PFV stems with the same prefix, we assumed that the PFV stem existed prior to its IPFV2 derivative. Generally, this assumption seems correct. In principle, however, one can imagine a situation in which a derivational pattern has become so productive and frequent that a derivative appears prior to its morphologically simpler basis.

²²Of course, translations into English (or any other language) are nothing but a rough point of orientation for the meaning in the original language.

²³Cf. Ježek (2005, pp. 172–175) and, in particular, Uhrig (2015), who provides a comprehensive discussion of “No Synonymy” claims.

While this could not be checked for the majority of items included in the database, we at least do not know of any cases in which the IPFV2 stem was attested earlier than the respective PFV stem.

Furthermore, it is hardly possible to estimate the frequency of a derivative in speech, especially in view of scarce or lacking corpus data for more remote periods: stems with an extremely low occurrence rate can often hardly be distinguished from items with a higher token frequency. This problem is particularly nagging if productivity becomes an issue: on the one hand, hapax legomena and similar phenomena are important indicators of productivity; on the other hand, many items just occur “on the fly” and then disappear again (i.e. they do not spread further among speakers). Such items usually are not registered in dictionaries, and they are often absent from corpora (or other text editions), especially if these are monitored against some received norm; such items often do nonetheless occur, for instance, in internet blogs and chats (as for the contemporary stage). Thus, Russian IPFV2 *napisyvat* ‘write’ is considered non-normative (the IPFV1 *pisat* ‘is used instead), it was ousted from authoritative dictionaries of the 20th–21st century and is not even mentioned in the dictionary by Dal’ (1956 [1880]).²⁴ In the RNC it occurs a few times up to the early 20th century, the last record is from 1920:

- (15) *Ja v bespreryvnom tvorčestve. No vovse ne vedaju, čto mne delat’ s napisyva-juščimisja stixami.*
 ‘I’m in continuous creativity. But I don’t know at all what to do with the verses **that are being written.**’
 (RNC; Bal’mont K.D. 1920, *Pis’mo M.A. Vološinu*)

At the same time, despite its ban from the standard norm, we find *napisyvat* in blogs. See (16), in which it may be debated whether *na-* adds a cumulative meaning. However, other examples, like (17), are void of such a nuance:

- (16) *Počemu devuški často načínajut napisyvat’ byvšim parnjam v soc seti posle togo kak slučajno ix vstretjat na ulice?*
 ‘Why do girls often begin to **write** to their ex-boyfriends on social media after they accidentally meet them on the street?’
 (<https://otvet.mail.ru/question/215265044>; access 09/07/2019)
- (17) *Ljudi uže ustali odno i tože [sic!] napisyvat’, otvečaja na takie tipičnye voprosy?*
 ‘Are people already tired of **writing** the same things, answering such typical questions?’
 (from Kuznetsova & Sokolova, 2016, p. 223)

Similarly, Cz. *napisovat* has been registered in several dictionaries (also of the 20th century), but the CzNC (syn7) brings to light only one record:

- (18) *Úkoly předslabikářového období při psaní (...) – napisovat a číst hlásky a slabiky, číst kombinace bodů normální velikosti na cvičné tabulce.*
 ‘Writing tasks in the pre-syllabus period (...) to **write** and read sounds and syllables, read combinations of normal size points on the training table.’
 (CzNC; Růžicková, V., 2006, *Integrace zrakově postiženého žáka do základní školy*)

²⁴There also was a variant *napisovat*, which was mentioned last in the Academy dictionary from 1789–1794 (see <http://it-claim.ru/Projects/ESAR/SAR/PDFSAR/Framesetpdf.htm>) and for which the RNC gives no attestation at all.

Pol. *napisywać*, in turn, has been registered by dictionaries reflecting late 18th and 19th century Polish. In internet sources one can find it, although probably with the modified meaning ‘write upon, overwrite’, and there is one such example in the full version of the PNC:²⁵

- (19) *Po co **napisywać** na nagrobkach nazwiska zmarłych, skoro nie mają oni nic wspólnego z tymi ciałami, które leżą w ziemi?*
 ‘Why **write** the names of the dead on the tombstones if they have nothing to do with those bodies lying in the ground?’
 (PNC, full version; www.forumowisko.pl, 08/04/2007)

These are cases in which an IPFV2 stem, once arisen, has disappeared from normative use, and there may be other reasons why such stems formed on the basis of a productive pattern vanish from sources that are designed to reflect the usage of their time. However, such items may be “reactivated” showing up here and there in spontaneous use, exactly because they correspond to a productive pattern and satisfy an occasional need for ipfv. “copies” of pfv. verbs with the same prefix keeping the focus on the attainment of some boundary (see Sect. 2.2).

What about IPFV1 stems? Their disappearance does not so much “go against the grain” of a productive pattern, since these stems are the starting point of derivation²⁶ and many of them belong to the inherited stock of Slavic vocabulary (even if they happen to be derived from non-verbal roots). Rather, IPFV1 stems drop out from aspectual pairs (or triplets) because they dissociate from the meanings of their pfv. derivatives (and the corresponding IPFV2 stems), e.g., by specializing in narrow collocations, or they are just no longer used at all. For instance, Pol. IPFV1 *mrzeć* ‘die’ has become obsolete during the 20th century, it is associated with the collocation *mrzeć jak muchy* ‘die like flies’, although it can still be encountered in literary contexts, as in (20):

- (20) *Od razu kazali otworzyć bagażnik. Nawet do paszportów nie zajrzeli, tylko towar ich interesował. Bo tam wtedy to była prawdziwa nędza, człowieku, i dzieci **marły** z głodu w szpitalach albo z zimna.*
 ‘They immediately ordered the trunk to be opened. They didn’t even look into the passports, only the goods interested them. Because back then it was real poverty, man, and the children starved to death [lit. *died from hunger*] in hospitals or from cold.’
 (PNC; A. Stasiuk: Taksim. 2009)

3.1.3 Pitfalls concerning Internet sources

Now, why not use internet sources (covering the last decades) beyond “official” corpora? Informal speech in internet sources may provide a valuable avenue into investigating productivity. Thus, for instance, Kuznetsova and Sokolova (2016, p. 223) report that Google searches based on a list of 1981 Russian NatPfvS brought to light 1536 additional IPFV2 stems, i.e. 77% of this list; from these 1536 IPFV2 stems, 257 (i.e. 17%) occurred less than 10 times. However, Google and other search engines operating on internet sources pose cer-

²⁵The other four records of *napisywać* in the PNC full version are either metalinguistic or objects of parody.

²⁶Some researchers have argued that IPFV1 stems in aspect triplets are derived by deprefixation (cf., for instance, Zalaznjak et al., 2015). However, this can only be taken as a judgment based on the assumed semantic primacy of telic pfv. stems (with ipfv. stems as their “lexical copies”); it cannot be taken as a statement about the chronology of appearance. In fact, deprefixation of verb stems appears to be an exceptional phenomenon; for some such cases cf. Némec (1958, pp. 81–85), Wiemer (2017, p. 236f.).

tain problems. First, one cannot perform inferential statistics since the overall size of the internet is unknown (and constantly changes). Even if one finds interesting instances unattested elsewhere which may be considered representative of spontaneous speech, one cannot compare these data with samples from closed (though large) corpora for which the overall token size is known. Moreover, one cannot apply accepted measures of productivity based, for instance, on the occurrence rate of hapaxes (Baayen, 2009, p. 905f.). Second, many examples turn out cross-references to one another. Others are metalinguistic (examples from paradigms in grammars etc.), or they are products of linguistic play (in order to parody features of the language or other), which deliberately breaks conventions (see fn. 25). Such play (just like experimental poetry) may cast light on the potential of particular structures of a language, but it does not reflect “ordinary” usage in everyday speech. Possibly, an additional problem, especially for languages with a more global range (like Russian), is an unknown number of L2 speakers using communication channels on the internet.

Therefore, recruiting data from internet sources bears the risk that one cannot distinguish the potential of rules and patterns of linguistic activity for certain speaker communities from its realization and acceptance within those communities. Admittedly, distinguishing potentiality and realization of patterns is often problematic even with large corpora, which are more or less representative at best for written language. Dictionaries, in turn, are even less reliable sources of actual usage, and they usually do not allow for conclusions concerning frequency. However, corpora and dictionaries at least supply closed and controllable data sets with complementary advantages and disadvantages: comprehensive dictionaries normally contain a fuller number of lexical items (i.e. types), which can be browsed systematically, and their entries often contain cross-references to related items. In our case, it was important to have references to stems of the opposite aspect, and this involved both IPFV1 and IPFV2 stems. On the contrary, corpora may be less exhaustive as for the types (= lexical entries), but they allow for frequency counts, even though semantic issues, in particular with polysemous stems, still need to be controlled for (see Sect. 4.1). Thus, on the one hand, corpora allow us to check whether dictionary entries correspond to real usage. On the other hand, some stems, particularly new borrowings, do not appear in the dictionaries, so that corpora can be used to search for attestations of secondary imperfectives (IPFV2) as members of triplets.

Of course, these complementary advantages of corpora and dictionaries can be made use of the more profitably, the more their compilers manage to abide by principles that aim for a comprehensive and representative account of the envisaged stages of the language. This is why we disregarded data from the internet but relied on authoritative dictionaries to excerpt stems for entries in the database. The Polish part does contain units attested only on the internet (see above), but these are excluded from frequency counts (at least for tokens). As for Russian, the Emptiness Database contains 1583 potential triplets (see above), but our check revealed that among these, 831 (= 53%) are not attested in the RNC (by May 2019),²⁷ so they were not included into our database. This leaves us with 752 triplets as a conservative count for Russian derived from the Emptiness Database.

²⁷ The figures adduced in Kuznetsova and Sokolova (2016, p. 223), which we mentioned at the beginning of this subsection, are based on searches carried out in 2010. Anyway, they demonstrate an even more impressive potential of creating (resp. maintaining) triplets via the productive derivation of IPFV2 stems.

3.2 The structure of the database

An abridged version of the database for each language has been prepared for public access on the internet site of the project (<http://www.diaspol.uw.edu.pl/>).²⁸ In this version, the database divides into the following sections:

- **items**, i.e. IPFV1, PFV and IPFV2 stems, and their **translations** into English: the translations only serve as an orientation and only relate to the meanings which comprise the respective triplet as a whole. They gloss over possible meaning changes that occurred during the “lifetime” of a triplet and over meaning variation (polysemy) that does not pertain to all triplet members.
- **morphological properties**: prefixes and suffixes, including possible variants (also of thematic vowels) of the latter. For Russian, there is an additional column accounting for morphological changes affecting the root (incl. possible fusion with the infinitive suffix) which accompanies the formation of the IPFV2 stems.
- **token frequencies** of forms of the IPFV1 and IPFV2 stems for a series of subperiods, which are: 1750–1800, 1801–1850, 1851–1917, 1918–1945, 1946–1989, 1990–2020. The frequencies sum up all grammatical forms. They are not normalized, and one has to be aware that the amount of corpus data accounted for differs a lot, which was conditioned by the very different sizes and structure of the corpora used. Table 2 presents the overall numbers of tokens for each period in each language (to be used for normalization).
- **attestation of IPFV2 stems in the dictionaries**: For each dictionary used to look for triplets it is marked whether the given IPFV2 stem was attested. In addition, separate columns supply information about the first and the last attestation of the IPFV1 and the IPFV2 stem as well as about the source (dictionary or corpus) of these attestations.

The full version of the database contains additional information. In particular:

- detailed information on the frequencies of particular grammatical forms of IPFV2 stems for the period after 1945. The figures in the abridged version only sum up these frequencies (see above).
- for each subperiod, information as for whether an IPFV2 stem was attested and, if it was, whether the attestation appears in a corpus, a dictionary or both.
- information concerning the origin of the triplet:
 - whether the triplet possibly existed prior to 1750 (based on information on the IPFV1 and the IPFV2 stem).
 - a rough division into diachronic layers, i.e. whether the triplet is based on a (i) Proto/Common Slavic simplex, (ii) a borrowing that entered the language before 1750 (old borrowings), (iii) a borrowing that entered the language after 1750 (new borrowings).

Table 2 Sizes of subcorpora^a

	1750–1800	1801–1850	1851–1917	1918–1945	1946–1989	1990–2020
Czech	72,368	846,364	1,382,965	23,080,980	2,392,406	5,074,886,387
Polish	2,194,430	641,705	10,974,562	2,783,355	5,697,617	273,592,031
Russian	4,701,205	13,888,071	67,880,688	48,693,368	61,102,995	104,882,027

^aBased on access in March–May 2020.

²⁸We are obliged to Michał Woźniak (Cracow) for having set up this publicly searchable database.

In addition, it is noted whether the stem is derived from an old or new borrowing or from a Common Slavic noun or adjective, or whether it was borrowed from another Slavic language.

This information allows for a rough periodization of the rise of triplets, in particular it can also be used to set orientation points for the question of how quickly borrowed verb stems started being integrated into the aspect system by prefixes and when secondary imperfectives appeared.

3.2.1 Comment on periodization

A remark is due on the division into subperiods, as it emerges in Table 2 and some further tables below. For reasons of comparability, the guiding principle was to set an equal periodization for all three languages. The principle that intervals should be of more or less equal length was overrun by historical caesuras (1917, 1945, 1989). Admittedly, these caesuras were probably not equally important for all three languages, but here the guiding principle came into force.

3.2.2 Problems caused by reflexive markers

In connection with token frequencies a serious problem arises because of the reflexive marker. Our database contains many units that are distinguished in form by the presence vs absence of a reflexive marker, and this corresponds to a difference in lexical meaning. For instance, in the Polish part of the database we have both *barwić* ‘color’ and *barwić się* ‘take on color’ (each in two triplets), but we only have transitive *cechować* ‘characterize’; the lexical unit *cechować się* ‘be characterizable’ (with reflexive marker) does exist, but this anticausative derivative of *cechować* did not make it into the database.²⁹ Simultaneously, the reflexive marker can have very different functions, among others a grammatical function which, in Polish, may apply to almost any verb. Consequently, one would have to check for every corpus token whether the reflexive marker “belongs” to a transitive verb (*barwić*, *cechować*, etc.) or to its intransitive (“reflexive-marked”) derivative (*barwić się*, *cechować się*, etc.).

In Polish (*się*) and Czech (*se*) this marker is an enclitic, while in Russian it is a postfix, i.e. a bound morpheme which takes the last position in a word form (*-sja*, with an allomorph *-s’*).³⁰ In any case, the reflexive marker raises problems connected to the morphology—lexicon interface, and this has severe consequences when it comes to inventoring lexical units (with and without the reflexive marker), but even much more so for any calculations of token-frequencies of these units. In the following, these problems are only sketched. A fuller account (with illustrations) and a description of how we tackled these problems w.r.t. token frequencies are provided in an extra file (see the link to Supplementary material before the Acknowledgements below).

Briefly, in Polish and Czech, the reflexive enclitic is employed not only in the derivation of lexical units (which entails changes in the number and type of arguments), it also abundantly functions as a marker of voice operations that do not change argument structure but only reorganize the morphosyntactic coding of arguments (passive, subject impersonal). The latter

²⁹Obviously, because it only has a stative meaning and thus no pfv. partner (from which a IPFV2 might be derived).

³⁰In Kemmer’s (1993) terms, all these markers count as light reflexive markers.

operations do not create new lexical units. As a shortcut, the latter function of the reflexive enclitic can be dubbed ‘grammatical’, the former function ‘lexical’. Obviously, for frequency counts these two functions have to be distinguished, since ‘grammatical *się/se*’ represents a form of the respective “non-reflexive” verb (e.g., Pol. *tworzyć* ‘create’), while ‘lexical *się/se*’ goes with the “reflexive” verb (e.g., Pol. *tworzyć się* ‘arise, appear’) representing another lexical unit. However, neither in the PNC, nor in the CzNC (nor in any other corpus) does the tagging system account for this important distinction.

As for Russian, the problem is basically the same, albeit to a lesser extent. As a postfix, Russ. *-sja/-s*’ is bound to word forms, in the RNC one can therefore search for them separately from word forms or lemmata without this affix. Nonetheless, there remains a problem in distinguishing transitive verbs from their reflexive-marked counterparts, since *sja*-marked forms are also employed in passive constructions (see ex. (15)). With ipfv. stems, these are often “homonymous” with anticausative, autocausative or other derivatives of transitive verbs.

Therefore, in all three languages, assessments of token frequencies present us with a huge problem. Our database contains many “pairs” of a transitive stem with its reflexive-marked counterpart, but the different functions of the reflexive marker are not annotated in the corpora. While the database entries (= types = potential aspect triplets) were compiled from a systematic survey of dictionaries and similar sources (see Sect. 3.1), on the “surface” of text strings these two units cannot be distinguished and suitable tags are lacking. It is therefore impossible to obtain reliable token frequencies of such pairs. This would require manual annotation, which is unfeasible for any larger sample. To our knowledge, so far nobody has managed to solve this problem, nor have we been able to do so. We have, however, looked for a technique to assess the gravity of this problem w.r.t. our database. On this basis, we can argue that the problem is less grave than initially assumed (see the link to Supplementary material before the Acknowledgements below).

4 First insights from the database

As a reminder, the database assembles an assumed maximum number of *potential* aspect triplets. Its entries were established on a systematic investigation of lexicographic sources (see Sect. 3.1). We had to rely on the judgment and information provided by the compilers of those sources, but it was impossible to check systematically whether the related stems behave, or behaved, as true lexical substitutes of each other (in at least one context of use). This problem is aggravated since the database comprises a time span of more than 250 years, divided into six subperiods.

With this general caveat in mind, we now dwell on issues that show which purposes the database is good for, but also where its limits are. We start with an assessment of attestation rates (Sect. 4.1), before we come to parameters that describe the internal heterogeneity of triplets (Sect. 4.2). These concern issues of semantics (Sect. 4.2.1), to which we add discussions on frequency (Sect. 4.2.2), age and provenance (Sect. 4.2.3), and morphology (Sect. 4.2.4).

4.1 Division into periods and attestation rates

The following tables and diagrams give an impression of how the potential triplets distribute over the six subperiods and the data sources. The figures were calculated in March 2021, when the collecting process of entries for the database was almost finished. This is why the sums (see last rows) slightly differ from the figures in Table 1. These small differences do

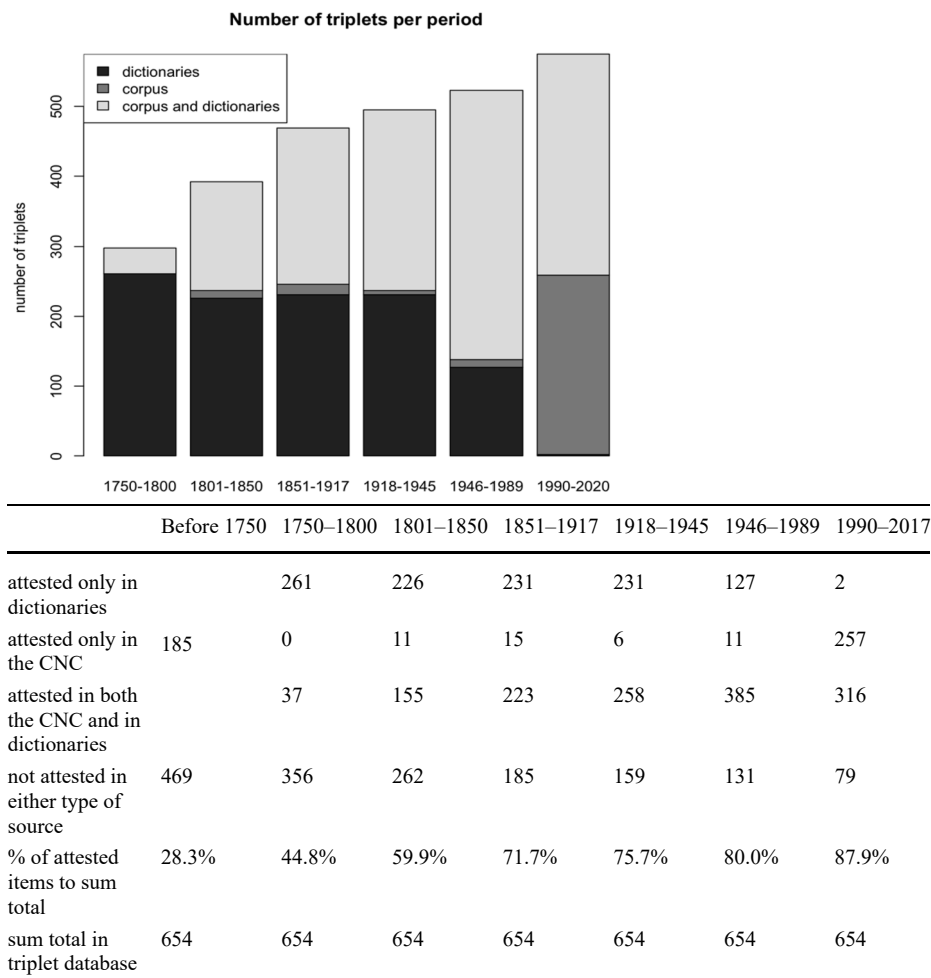
not have an impact on the tendencies and biases pointed out below. Moreover, the following tables exclude suffix variants, triplets attested only in Google (for Polish) and triplets with *se* (in Czech).

The figures show an obvious increase in the share of corpus-based data over the subperiods; this share skyrockets in the last subperiod, in which, for Russian, the RNC even becomes the almost exclusive source. While the latter observation probably cannot be explained by differences of size and design among the used corpora (see Table 2), the generally increasing share of entries additionally or exclusively attested by corpora is unsurprising. However, the increasing bias towards verb stems that are only attested in corpora raises the question to what extent dictionaries, which are often the only or dominant source for earlier periods, reflect, for “their” periods, the productivity of patterns relevant for morphology and the lexicon, such as the creation of secondary imperfectives. Moreover, dictionaries referring to earlier periods are often not very accurate in stating lexical relations, in particular synonymy. This issue is nagging especially with respect to ipfv. simplex stems, which provide the basis of aspect triplets and whose lexical relation to NatPfvS (and thence to secondary imperfectives) is difficult to induce even for particular cases and impossible in a wholesale manner. We had to rely on the dictionary compilers and the limited contexts they supplied, if any (see Sect. 3.1.1).

Let us now deal with the second-to-last row in Tables 3–5. It compares the percentages of attested triplets per period against the overall number of triplets with at least one attestation between 1750 and 2018. While the number of triplets in Czech and Polish steadily increases, we notice a peak for Russian in the third period (1851–1917), after which the percentage decreases, even quite drastically so in the last subperiod. Again, this cannot be done away just by different sizes of the subcorpora; the RNC shows a more even representation of the language for 1750–2020, while particularly the CzNC has a huge bias towards the modern period and poorly represents the time before 1946 (see Table 2). One therefore wonders whether the developmental lines in Russian, on the one hand, and in Czech and Polish, on the other, really reflect a substantial difference between these languages, and which of these lines might be more indicative of what happened with triplets over the last 270 years. After all, generally improved possibilities of exploring data for the time after 1945 much enhance the chances of “digging up” more facts indicative of triplets, but we would expect this to be the same for all involved languages. Anyway, the different developmental lines for the numbers of triplets call for further inquiry.³¹ After all, more reliable calculations of drop-out rates, against “newcomers”, are required (see below).

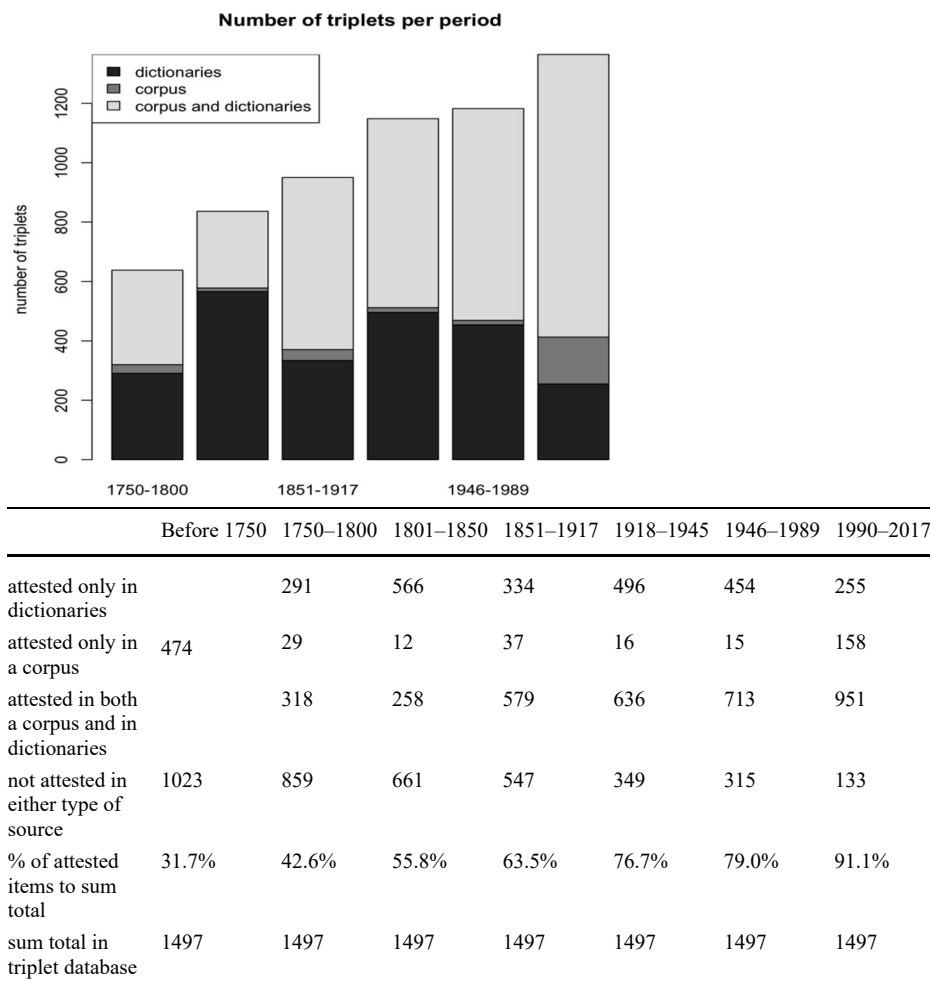
Russian also shows a lower percentage of triplets that, in relation to the overall number of triplets recorded between 1750 and 2018, existed before 1750: 17.7% in comparison to 28.3% (Czech) and 31.7% (Polish). Importantly, these figures do not tell us anything about the size of triplet inventories before 1750, in particular whether the Russian inventory was smaller than in Polish or Czech; the figures only show how different the inventories were in these languages before and after 1750. Triplets existing before 1750 are based either on simplex stems from the Common Slavic stock, or they derive from early borrowings. From this angle, the figures look as if Russian experienced a more pronounced influx of new triplets – or a more remarkable renewal of old by new triplets – between 1750 and 1800 than did Polish and Czech. After all, the remarkably different figure for Russian can be interpreted in two ways. Either earlier triplets fell apart (e.g., because the close lexical relation between IPFV1

³¹ An inquiry should check out whether in Russian the number of triplets decreased after 1917 because standardization “cleaned” the language from IPFV2 stems, as they might have been considered superfluous. (We thank one of the reviewers for this suggestion.)

Table 3 Triplets per period – Czech

and IPFV2 stem was lost, or at least one of these stems went out of use) by 1750, and this was the case to a considerably larger extent in Russian (i.e. less triplets continued to exist, or reappeared, after 1750) than in Czech and Polish. Or in Russian, after 1750, the increase rate of secondary imperfectives derived from NatPfv, with a simultaneous retainment of the respective ipfv. simplex stems, was much more remarkable than in Czech and Polish. In principle, both processes could interact and amplify one another. In addition, one can never exclude that ipfv. simplex stems became re-integrated as lexical copies of their prefixed pfv. counterparts after the latter had derived secondary imperfectives; that is, IPFV1 stems could also be “attached *post factum*” to PFV-IPFV2 pairs. This issue can be investigated only in thorough in-depth studies.

Jointly, a final point should be emphasized. While Tables 3–5 tell us how many potential triplets could be found in the subperiods, we cannot reliably infer from them how long triplets persisted, i.e. how many triplets ceased to exist (in the sources) nor how many of them have

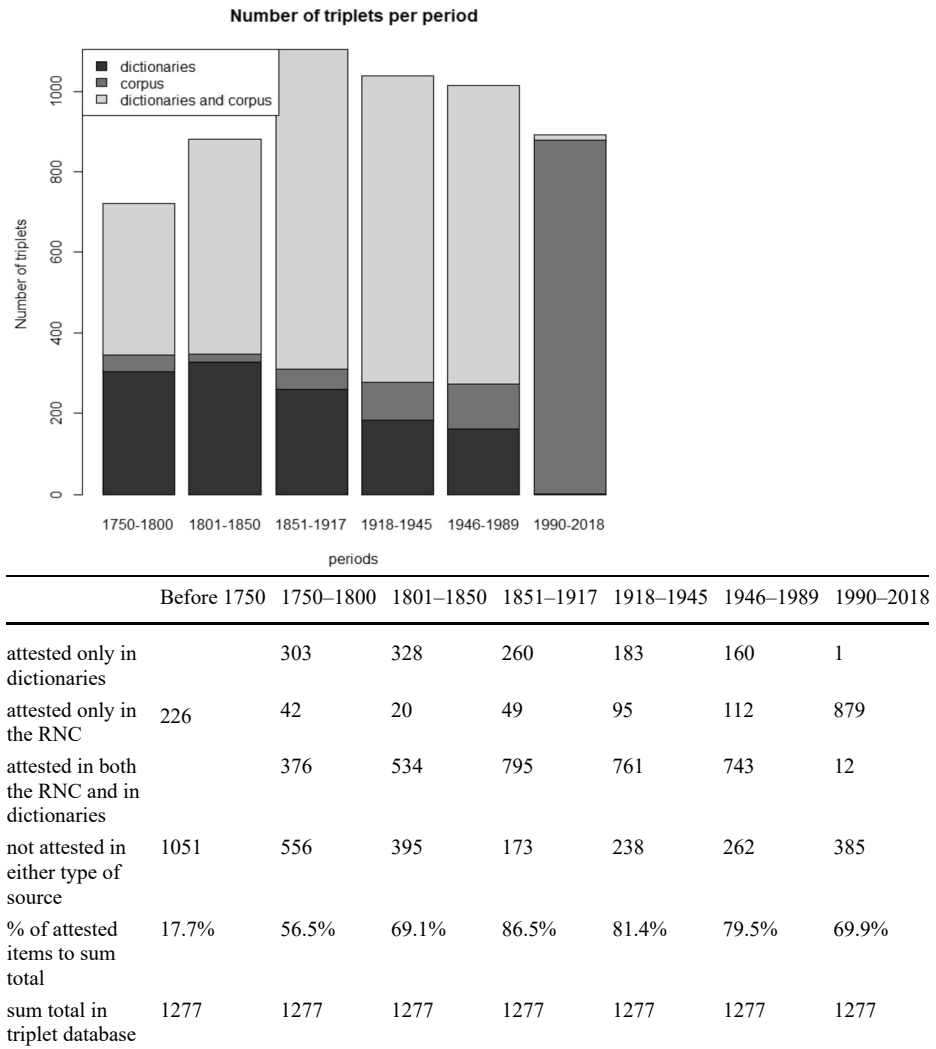
Table 4 Triplets per period – Polish^a

^aTriplets based on IPFV2 stems found only on Google were excluded (see Sect. 3).

interrupted histories of attestation.³² At present, persistence rates cannot be calculated in a wholesale manner, they can only be established case by case. We can, however, specify attestation rates, i.e. tell how many triplets have been attested in how many periods. These rates are shown in Table 6; note that the entire number of triplets per language (see last column) includes some few annotation errors (basically, typos).

Remarkably, triplets with the two highest attestation rates (periods 5–6) jointly make up comparable shares: 58% (Czech), 52% (Polish), 56% (Russian); a similar point applies to the summed up figures of the lowest attestation rates (periods 1–2): 24% (Czech), 21% (Polish),

³²For instance, Pol. *gryźć – ugryźć – ugryzać* ‘(take a) bite’ is attested in the first (1750–1800) and the second (1801–1850) period. Then, in the third period (1851–1917), IPFV2 is not attested in any of the sources, then in the fourth (1918–1945) it appears again. In the fifth period (1946–1990), it again disappears from the sources but reappears in the corpus during the last period (1990–2018).

Table 5 Triplets per period – Russian

18% (Russian). In each language, items with the two highest attestation rates yield slightly more than half of all triplets in the database, whereas those with low attestation rates make up hardly a quarter of them. This can be considered indicative of a rather high time stability since 1750, not of each particular triplet, but of the share of triplets in the aspect system of each language.

After all, the considerations based on Tables 3–6 tell us that much further research is required to capture and understand the fluctuation, i.e. the proportion of “incoming” and “outgoing” triplets, and whether these are based on simplex stems from the Common Slavic stock or rather on borrowings, particularly newer ones. A clarification of this issue would also help to get more reliable insights into the time that elapses from borrowing a verb stem to integrating it into aspect pairs and, further, into aspect triplets, and to understand how persistent the latter ones are.

Table 6 Attestation rates of triplets

Attested over periods	0*	1	2	3	4	5	6	Σ (= 100%)
Czech	0	128 (19.6%)	30 (4.6%)	45 (6.9%)	72 (11%)	133 (20.3%)	246 (37.6%)	654
Polish	22	199 (13.5%)	117 (7.9%)	234 (15.9%)	154 (10.4%)	223 (15.1%)	548 (37.1%)	1475**
Russian	4	90 (7.1%)	141 (11.1%)	155 (12.2%)	173 (13.6%)	160 (12.6%)	554 (43.6%)	1273***

* Annotation errors (included in 100%).

** 1497 – 22 (annotation errors excluded).

*** 1277 – 4 (annotation errors excluded).

4.2 Subclassification of triplets

Triplets do not constitute a homogeneous class but divide into “better” and “worse” representatives, or into core and periphery, on the basis of a variety of criteria. We already touched upon “survival rates” (see Sect. 4.1). In addition, IPFV1 and IPFV2 may behave like synonyms but develop preferences for different subsets of functions associated with imperfective aspect (see Sect. 4.2.1.2). In other cases, triplets decay because either the lexical meanings of the imperfective stems dissimilate, or one of them becomes obsolete and falls out of use.

We now discuss heterogeneous criteria by which triplets can be subclassified.

4.2.1 Semantics and aspect functions

We start with properties that are related to lexical meaning, including argument structure and valency.

4.2.1.1 Possible changes in the range of meaning identity We may ask whether IPFV1 and IPFV2 are synonyms in just one or more than one lexical meaning. That is, do IPFV1 and IPFV2 even share meaning alternations? If yes, how stable is this meaning relation over time?

For example, Cz. *vinit* (IPFV1) and *obviňovat* (IPFV2) ‘accuse, blame’ are practically interchangeable in all kinds of context; the same applies to the Polish cognates *winić* – *obwinić* (same meaning). This is not the case with Cz. *rušit* (IPFV1) and *zrušovat* (IPFV2), which today participate in a triplet with the meaning ‘cancel’. On the one hand, *rušit* has a wider meaning range than *zrušovat*; in contemporary Czech it enters into three triplets, each with a different meaning and prefix: *z-rušovat* ‘cancel’, *vy-rušovat* ‘disturb’, and *po-rušovat* ‘damage’ (plus the respective PFV stems). On the other hand, *rušit* does not replace *zrušovat* in all contexts: *zrušovat* is more likely to be used in contexts concerning law and administration, in the more specific meaning ‘repeal’. 19th century usage still testifies to a slightly broader lexical relation between both ipfv. stems, at least according to dictionaries. A corpus-based check basically corroborated this (Wiemer et al., 2021, pp. 74–77). Similar case studies can be designed because the database records many cases of triplets that are doubtful or unstable over time, so that they can be “picked out” for closer scrutiny.³³

³³ Compare Nordrum’s (2017) case study of triplets based on Russ. *putat*. It does not, however, focus on meaning change.

A further issue for which the database supplies a testing ground is the consideration that, in general, older stems have more chances to develop polysemy or to preserve lexical diffuseness. In either case prefixes usually disambiguate, or narrow, the simplex meaning (see Sect. 2.2, Sect. 2.4). Prime examples are stems belonging to the Common Slavic stock, like Cz. *rušit* (see above), Russ. *rvat* ‘tear’ (see Sect. 2.4), Pol. *chylić* (*się*) ‘bow [tr./intr.]’, and generally simplex stems entering into more than one triplet. For instance, among the simplex stems with more than one NatPfv in modern Russian mentioned by Janda et al. (2013, pp. 141–148) many can be found in our triplet database. Alternatively, old ipfv. simplex stems may vanish or end up in a small collocational niche (like Pol. *mrzec* ‘die’; see Sect. 3.1.2). This seems to illustrate that in older triplets IPFV1 and IPFV2 have more chances to grow apart from each other (see Sects. 4.2–4.3). By contrast, cases like the aforementioned Cz. *vinit* – *obviňovat* and Pol. *winić* – *obwiniać* demonstrate high time stability of synonymy but also lacking polysemy of old stems (from the Common Slavic stock). A systematic exploitation of the triplet database allows for more precise, corpus-based checks whether there are any correlations between the meaning range shared between IPFV1 and different IPFV2 stems and whether this influences their persistence.

4.2.1.2 Meaning identity and coding of arguments We may further ask whether IPFV1 and IPFV2 show the same type of argument alternation and of argument coding in the syntax. In other words: do the ipfv. stems that belong to the same potential triplet show different biases in how they treat their arguments?

As for coding in the syntax, it has been pointed out that IPFV1 stems are often capable of “omitting” object NPs, especially of low referentiality, while IPFV2 stems are not (cf. Xrakovskij, 2005, pp. 55–58; Tatevosov, 2010; Gorbova, 2015, p. 26; Kuznetsova & Sokolova, 2016, among others). This is obviously conditioned by the prefix (common for PFV and IPFV2 stems) and has been regarded as an argument against IPFV1-PFV aspect pairs, or in favour of regarding IPFV1 stems as “worse” ipfv. equivalents of PFV in triplets. We are not going to dwell upon this issue here again (see Sect. 2.4), but only emphasize that IPFV1 stems differ among themselves in this respect. For instance, while creation verbs like Russ. *pisat* ‘write’ and consumption verbs (Russ. *est* ‘eat’, *čitat* ‘read’) allow for object omission quite readily, other IPFV1 stems like, *delit* ‘divide, separate’, *belit* ‘bleach’, *dušit* ‘suffocate (tr.)’, *množit* ‘multiply, increase’, *žarit* ‘fry’ appear to be less capable of object omission. Consider replies to the question “What is X doing over there?”: Russ. *Ona pišet / est / čitaet* ‘She is writing / eating / reading’ vs *Ona ?delit / ?množit / ?žarit* ‘She is dividing / multiplying / frying’, or Pol. *?Czyszczq / ?Dławiq / ?Łagodzq* ‘They are cleaning / choking / smoothing’. Of course, systematic usage-based investigations are needed to get a handle on these differences and their reasons (cf. Anstatt, 2003, p. 169f for some considerations).

Let us now turn to argument alternations. Certain ditransitives, e.g. SPRAY-PAINT verbs, are known as prime examples of the locative alternation, in which a GOAL and a THEME argument alternate in their treatment as privileged (accusative) or peripheral object; compare Engl. *They loaded the truck with hay* (GOAL privileged) vs *They loaded the hay onto the truck* (THEME privileged). This topic has also been investigated for Russian, although almost exclusively for the contemporary language; cf., for instance, Sokolova et al. (2012) on *gruzit* ‘load’ and its prefixed pfv. derivatives *nagruzit*, *zagrutzit*, and *pogruzit*, which behave as NatPfv of *gruzit*. All these verbs show the locative alternation, although to a very different extent and with different (rather clear) biases in the modern language.

One wonders whether the relation between *gruzit* and the IPFV2 stems (presumably via the pfv. stems) has changed over time. A preliminary comparison of smaller samples from the RNC which contrast the time before and after 1945 (i.e. 1750–1945 vs 1946–2018) seems

to indicate that this alternation is rather persistent with the simplex stem. A comparison of random samples à 100 tokens shows that the Theme Object coding with *gruzit'* rose from about 48% to 67%, while for *nagružat'* (random samples of 100 tokens each) it fell from 20% to 12%. Since for *zagružat'* and *pogružat'* suitable data (at least for the earlier periods) are much scarcer, and random samples can hardly be composed, we have to be more cautious. However, *zagružat'* shows an increase of approx. 12% to 36% in favour of Theme Object coding, and the few examples of *pogružat'* almost exclusively show the same coding. These figures more or less confirm the findings from Sokolova et al. (2012) mentioned above. After all, *gruzit'* appears to have retained its multiple relationship with three prefixed derivatives, which was transferred to the secondary imperfectives derived from the latter.

Another case study dealing with Cz. *plnit* (IPFV1) and *naplňovat* (IPFV2) 'fill' revealed that, although both IPFV1 and IPFV2 have two- and three-place patterns (see (21)–(22) for *plnit*), in contemporary Czech the IPFV2 stem shows a clear bias towards the two-place pattern (see (21)), whereas before 1917 the situation was different: both stems were used with two and three arguments on an equal footing (Wiemer et al., 2021, p. 73f.).

- (21) *Autokempy na Břeclavsku plní první turisté.* two-place
'The first tourists **fill** motor camps in the Břeclav region.'
- (22) *Sladké pokrmy plníme různým ovocem nebo marmeládou (...).* three-place
'We **fill** sweet dishes with various fruits or jam (...).'
- (23) *sjednotí se v jedinou mohutnou řeku hlasů, která naplňuje celý prostor divadla.* two-place
'it will unite into a single mighty river of voices that **fills** the entire space of the theater.'
(all examples from the CzNC)

4.2.1.3 Distributional biases among functions of the imperfective aspect A further step to be taken is to look whether the different argument codings of IPFV1 stems and of their IPFV2 counterparts correlate with the distribution of aspect functions assigned to ipfv. stems (progressive, general-factual, habitual, etc., but also the eventive meaning as a „copy“ of the pfv. verb in narrative uses of the present tense). This issue has been investigated, for instance, in Wiemer et al. (2020a), where the cognate IPFV1-IPFV2 pairs Cz. *dělit* – *rozdělovat* and Pol. *dzielić* – *rozdzielać* 'divide, separate' were compared on the basis of larger random samples for the period 1750–2017. The most important factor favouring the choice of the IPFV1 stem was the presence of a PP, regardless of its argument or adjunct status. Another high rank in the factor hierarchy was occupied by the division between stative (IPFV1) and habitual (or progressive) function (IPFV2) of ipfv. aspect; compare (24)–(25):

Czech

- (24a) *Svůj život dělí na život před dítětem a po něm.* → stative
'He **divides** his life into a period before and after the baby.'
(CzNC; *Blesk pro ženy*, 2012)
- (24b) *Dle typů hypotéz rozdělujeme základní testy na testy rozdělení, testy četností, testy středních hodnot, rozptylů apod.* → habitual
'Depending on the type of hypothesis, we **divide** basic tests into tests of distribution, frequency tests, tests of medium values, tests of scattering, etc.'
(CzNC; Skarnitzl R. 2014, *Fonetická identifikace mluvičeho*)

Polish

(25a) (...) *sprawiedliwie dzielącym ich łóżko na dwie połowy.* → stative
 ‘(...) fairly **dividing** their bed into two halves.’

(PNC; Samson H. 2000, *Pułapka na motyla*)

(25b) *Różnica stopy życia, ciężarów życia rozdziela nawet szczere przyjaźnie.* → habitual
 ‘The difference in the standard of living and the burden of life **separates** [i.e. tears apart] even sincere friendships.’

(PNC; Kamińska A., 2007, *Dzienniki 1927–1969*)

Might there be a closer link between the syntactic and the aspectual properties? Probably, there is none, but it is exactly such purely empirical (and partially unexpected) coincidences between presumably independent factors which allow us to classify aspect triplets by different criteria. Notably, as concerns persistence, Cz. *dělit – rozdělovat* and Pol. *dzielić – rozdzielać* ‘divide, separate’ prove to be very time-stable: in the aforementioned case study neither time nor the distribution over grammatical forms had any conceivable impact on the choice of IPFV1 or IPFV2. All these properties together make these stems practically ideal representatives of aspect triplets.

4.2.2 Frequency

We may distinguish two basic questions. First, do the ipfv. members of a triplet show comparable token frequencies, or do they differ, despite their close lexical association? Second, how much do frequency rates of *entire* triplets vary (i.e. are all three members of a triplet jointly considerably more frequent than the average of all triplets)? In either case – provided reliable findings are available – one should ask *why* frequencies differ³⁴ and, further, how they influence the time stability of triplets. In general, frequent items can be assumed to have better chances of change, since in every “replication” (= instance of use) some “mutation” (= innovative use) may occur. It may be objected that frequency of use is also known to support conservative behaviour, often leading to splits into grammatical classes (compare weak vs strong past tense forms in Germanic languages) or to idiosyncrasies that also condition suppletion (Bybee 1995, 2007; Veselinova, 2006). However, these observations relate to form (Baayen, 2009, p. 904), not to function or lexical meaning (at least not directly), and it is the latter which, apart from morphological derivation, is relevant for stems to be united in an aspect triplet.

Here a particular caveat applies to IPFV1 stems. As stated (Sect. 2.2, Sect. 2.4, Sect. 4.2.1.1), they often have a broader meaning range than their PFV and IPFV2 derivatives and can enter into two or more triplets. Already this fact may considerably raise their token frequencies in comparison to the other members of a triplet, especially if the IPFV1 is part of more than one triplet. What is more, every token with such an IPFV1 stem should be assigned to the appropriate triplet, and this becomes the more infeasible the larger the samples (and the higher the general frequencies) are (as also noted by Nordrum, 2017, p. 251). After all, frequency counts of IPFV1 are less reliable than with IPFV2 stems, and checks of lexical meaning are more demanding. Simultaneously, among old and persistent triplets we find IPFV1 stems with particularly high frequency, e.g. Russ. *est* ‘eat’, *čitat* ‘read’ (Anstatt, 2003, p. 157). One wonders whether their stability as triplet members (and thus of lexical meaning) results from the fact that they name very basic types of activity. Obviously,

³⁴Cf. Kuznetsova and Sokolova (2016, pp. 226–228) for a comparison of IPFV1 and IPFV2 in triplets of modern Russian. The different frequency distributions between the two ipfv. stems of the investigated triplets were explained as an effect of different strength of telicity (see Sect. 2.2).

the impact of frequency on a lexical “wear and tear” and on meaning shifts requires more systematic investigation.

Issues connected to the second type of question (frequencies of entire triplets) can hardly be solved because this would require weighing multiple things at once that are complicated enough on their own and need to be answered first. Most of these things belong to the first type of question, in particular the relation between frequency and closeness of lexical meaning (near synonymy) and, in turn, the connections of the latter with argument structure and its coding (see Sects. 4.2.1.1–4.2.1.2).

To render such surmises more palpable, one can exploit findings from cluster analysis. Unfortunately, these can only be provided separately for IPFV1 and IPFV2 stems (cf. Wiemer et al., 2021 for Czech). There is a broad spectrum starting from cases in which both the IPFV1 and the IPFV2 stem show high frequencies (in comparison to the bulk of triplets in the database), but each of them rarely occurs in contexts in which they can replace each other. A case in point is Cz. *konat* and *vykonávat* ‘do, perform’: *konat* has become rare, contrary to its anticausative equivalent *konat se* ‘occur’; *konat* belongs to the Common Slavic stock, *vykonávat* appeared before 1500. In turn, the Polish cognate *konać* originally had two meanings: ‘do, perform’ (with pfv. *wykonać*) and ‘die’ (with pfv. *skonać*). But while *wykonać* acquired the IPFV2 *wykonywać* early and both have over centuries preserved the meaning ‘do’ with comparatively high frequency (as have Cz. *vykonat* – *vykonávat*), they did so only as a pair (there has been no triplet with *konać* at least since 1750). By contrast, the pair *konać* – *skonać* ‘die’ (with a NatPfv) had an IPFV2 *skonywać* attested only in dictionaries for the time between 1814 and 1861, but corpus attestations are lacking.

On the low-frequency end of the spectrum we find triplets with IPFV1 and IPFV2 stems which appear to be exchangeable for each other rather freely. A good case in point is Cz. *abstrahovat* – *vyabstrahovávat* ‘abstract (away from)’. The first attestation of the IPFV2 is from 2001 (in the CzNC), while the IPFV1 appeared first in 1835. Evidently, *abstrahovat* – *vyabstrahovávat* and *konat* – *vykonávat* are antipodes in terms of age as well.

However, we also encounter old triplets (with IPFV1 from the Common Slavic stock and the IPFV2 attested since 1500) that are largely exchangeable for one another (and have been so at least since the 19th century); compare the already mentioned cognates Cz. *vinit* – *obviňovat*, Pol. *winić* – *obwiniać* ‘accuse, blame’. These IPFV1 and IPFV2 stems also count among high-frequency items (in comparison to the remainder of IPFV1 and IPFV2 stems, respectively) and, in contrast to Cz. *konat* – *vykonávat*, these triplets are time-stable because they have remained close synonyms. The same appears to hold true for their reflexive-reciprocal counterparts Cz. *vinit se* – *obviňovat se*, Pol. *winić się* – *obwiniać się*.

When it comes to younger triplets, e.g. those based on loans from the 18th or 19th century, it is difficult to find good examples of high-frequency items. However, among them we easily find cases in which IPFV1 and IPFV2 can replace each other in the majority of grammatically relevant contexts; compare, e.g. Cz. *balit* – *zabalovat* ‘pack, wrap’, *barvit* – *zabarvovat* ‘colour’ (which have a somewhat higher frequency rate than the average of younger triplets). A cursory perusal of the Russian database confirms the same for Russian IPFV1–IPFV2 pairings. On a first account, one feels tempted to generalize that IPFV1 and IPFV2 stems in “young” triplets (especially if the IPFV2 is “brand-new”) are closer to each other lexically, irrespective of their frequency, than in triplets of long standing in the language. However, this, again, requires a thorough examination of the database with time-consuming checks on lexical meaning and grammatical contexts that favour ipfv. aspect.

Finally, there are triplets for which IPFV1 and IPFV2 differ enormously in frequency. This group as well is internally heterogeneous: while in some cases the two stems appear to be exchangeable for each other rather readily, in other cases they prove bad replacements for one

another. The former case can be illustrated with Cz. *psát* – *napisovat* ‘write’: the IPFV2 stem has been attested only occasionally, but it can replace the IPFV1 stem. The same holds true for the relation between Pol. *pisać* and *napisywać*, at least in the 19th century (see Sect. 3.1.2). The latter case can be illustrated with Cz. *krmit* – *zkrmovat* ‘feed’: the IPFV1 stem is much more frequent than the IPFV2 stem; but although according to Vallex (<http://ufal.mff.cuni.cz/vallex/3.0/>) and several dictionaries both stems can replace each other, a corpus check yields a different picture. This is not very surprising, since today *zkrmovat* rather means ‘give sb sth to eat’ (mediated causation) than simply ‘feed’ (immediate causation) and, jointly with this, today both stems differently code their arguments (see Sect. 4.2.1.2).

4.2.3 Age and provenance

The preceding discussion has already raised the issue of different age as a reasonable parameter in a subclassification of triplets. Connected to age is provenance, i.e. whether the simplex derives from a verbal or a non-verbal root and, furthermore, from the Common Slavic stock or from (early or late) borrowings. This issue will not be pursued here. Age is established via the first attestations of IPFV1 and IPFV2 for identical meanings (as far as older sources allow to judge; see Sect. 3.1). In connection with this one may ask about (i) the time that elapsed between the first attestation of the IPFV1 and of the IPFV2 stem, and about (ii) persistence: how long did these stems coexist (in a triplet), and do they still exist today?

Here, again, we can only put the question, but examples like Pol. *konać* (Sect. 4.2.2) demonstrate that sometimes polysemous IPFV1 stems are correlated with IPFV2 stems at quite distant periods for different meanings (‘perform’ vs ‘die’). In each of these meanings, triplets can have a very short life, e.g. because the IPFV2 quickly disappears again (as with *skonywać* ‘die’), or the triplet disintegrated early (before 1750), e.g. because the IPFV1 lost its lexical relation to the remaining PFV-IPFV2 pair (as Pol. *konać* ‘die’ in relation to *wykonać* – *wykonywać* ‘perform’). With the Czech cognates *konat* – *vykonávat* ‘perform’ this dissociation obviously was finished much later. In other triplets, conversely, it was the IPFV2 stem which disappeared or was marginalized; compare, again, Russ. *napisyvat’* and its Czech and Polish cognates (see Sect. 3.1.2).

4.2.4 Morphology

Finally, triplets can be subclassified by their prefixes, but also by their suffix variants. As for the latter, we noticed that Russian stands out in having preserved a much larger number of stems with suffix variants than Polish or Czech (see Sect. 3). The background for investigating prefix distribution among triplets is provided by findings which show that verbal prefixes in NatPfvS have a skewed distribution that is revealed if their distribution in the lexicon (type frequency) is compared with their token frequency (in corpora). For instance, on token level, Russian NatPfvS (and with them the prefixes) are on average 10 times more frequent than pfv. stems in which the prefix modifies the meaning of the simplex stem. This indicates that NatPfvS are more like a closed class than other pfv. stems. However, even within this class the prefixes are distributed very unevenly (cf. Łaziński, 2011 for Polish, Janda et al., 2013, pp. 14–17 for Russian).

Skewed distributions should also manifest themselves in triplets, since NatPfvS serve as their pivots. In contemporary Russian, out of 21 verbal prefixes only 16 are used in NatPfvS (Janda et al., 2013), in modern Polish it is 15 out of 19 prefixes (Łaziński, 2011), whereas in modern Czech it is only 8 out of 19 prefixes, according to Kolařová (2013), although our diachronic database contains examples for 16 prefixes (Wiemer et al., 2020b, p. 53). For

Polish the database records 15 prefixes, for Russian it is 17 prefixes. These observations reveal that among each other the prefixes differ considerably in their type frequency. The database can be employed to understand whether the distributional characteristics of prefixes in triplets have changed over time, both on token and on type level. In particular, it provides the empirical starting point for inquiring whether in Czech the number of prefixes used in NatPfvS (and in triplets) really has decreased (as a comparison of the database entries with Kolařová, 2013 would suggest) and, if confirmed, why this might be so.

4.2.5 Summary on parameters

The criteria that seem suitable for the subclassification of aspect triplets can be summarized as follows:

- [1] Attestation and use – the following considerations are particularly relevant:
 - [1a] A high **persistence rate** of IPFV1 and IPFV2 usually correlates with “old age”. Ideally such ipfv. stems are attested through all periods since 1750 (or even longer). For younger triplets this criterion is of reduced value. Moreover, **attestation rates** might be employed as an approximation to persistence rates; data scarcity often causes gaps of attestation, so that persistence is difficult to judge upon (see Sect. 4.1).
 - [1b] For some periods, both IPFV1 and IPFV2 show comparable **token frequencies**, and they are comparatively more frequent than other potential triplets (see Sect. 4.2.2). Although, on face value, token frequency can hardly be considered an indicator of the “quality” of a triplet, it does so indirectly, inasmuch as it testifies to its entrenchment and conventionalization (see Sect. 5).
- [2] Semantics (see Sect. 4.2.1) – “ideal” triplets should fulfil the following criteria; the first is superordinate to the other two:
 - [2a] IPFV1 and IPFV2 have been synonyms (since 1750, or in some period) in at least one meaning.
 - [2b] IPFV1 and IPFV2 have shown an identical or similar meaning range (polysemy) for all periods of parallel attestation.
 - [2c] In addition, IPFV1 and IPFV2 show identical alternations of arguments and of their coding in the syntax.

Presumably, hardly any triplet satisfies all these requirements. Moreover, the criteria themselves should be weighed. Actually, criterion [2a] as such is definitional for aspect triplets (see Sect. 2.4) and should, in this respect, be treated as superior. However, only few (if any) triplets fulfil this requirement by 100%; of course, this partially depends on how synonymy is understood (see Sect. 3.1.1). Note that the same consideration applies to aspect pairs: synonymy has been questioned for aspect pairs based on NatPfvS; in general, there is a wide range of context types (and their frequencies on text level) that contribute to what can be called the strength of an aspect pair (Kuznetsova, 2015, Sect. 5; Nordrum, 2017, pp. 252–254; see fn. 8). Consider also the controversy between Zaliznjak and Mikaëljan (2012) and Kuznecova and Janda (2013), which cannot be duly appraised here.

Finally, there is a point to make for aspect *triplets* which aspect *pairs* do not raise: which weight, among other properties, are we to ascribe to the extent to which IPFV1 and IPFV2 stems (behaving like near synonyms in practically every usage) tend towards complementary distribution over functions associated with ipfv. stems (see Sect. 4.2.1.3)? Or is it irrelevant how IPFV1 and IPFV2 distribute over specific aspect functions? Rather “chaotic” distribution (i.e. high entropy) in this regard may be taken as free variation among otherwise synonymous, or functionally equivalent, units. Clearly, this issue requires discussion

on a meta-level, it cannot and need not be decided by an exploitation of a database of aspect triplets.

5 Conclusions and outlook

We have presented the design and content of a database of aspect triplets in Russian, Polish and Czech that allows us to account for changes since 1750. This database discloses a heterogeneous character of triplets and their “mixed quality”. This may partially be explained by uneven or insufficient coverage of data by the sources that were used in compiling the database. Simultaneously, however, we are convinced that this heterogeneity reflects the reality of the aspect system of these languages in its diachronic dynamics. The database may be seen as a first step towards approaching this reality. Progress can be seen already in the fact that intricacies about triplets and their role in the aspect system of Slavic languages can be spelt out and pitfalls be identified, in particular when it comes to diachronic change. These intricacies partially repeat those known from debates about aspect pairs.

In connection with this, we have sketched issues for which this database provides valuable (partially even unique) material. We also have shown along which parameters aspect triplets can (and have to) be captured as a gradable concept. Variation occurs, first of all, with respect to several semantic and syntactic properties as well as to aspect functions for which IPFV1 and IPFV2 stems may reveal different distributions. In this sense, our triplet database contains comprehensive lists of near synonyms, which can be employed as a pool of concrete items for usage-based analyses. Moreover, the investigation of these near synonyms may find applications for language learners.³⁵

Since triplets (more strictly: bi-imperfective triplets) presuppose Natural Perfectives, the database can also be used as an expanded list of NatPfvS for each language since 1750. On a diachronic account, no such lists have existed before, and for Czech they have not been composed even for the contemporary language. Thus, in particular for Czech the database for the first time gives an opportunity to investigate aspect pairs based on NatPfvS comprehensively.

Lastly, the theoretical underpinnings inherent to the notion of ‘aspect triplet’ were spelt out, including the significance of aspect triplets in the Slavic PFV:IPFV opposition. We can support conclusions arrived at by other researchers (e.g., Anstatt, 2003; Janda et al., 2013; Zaliznjak et al., 2015), namely that aspect triplets are an inevitable concomitant of this type of aspect system, whose grammatical status is conditioned by a strong link between lexicon and morphology, since we are dealing with stem derivation. With only slight simplification, one may say that triplets result from the cross-combination of a derivational pattern which has become particularly productive (suffixation of prefixed stems leading again to ipfv. stems, known as ‘secondary imperfectivization’) with another pattern based on prefixation. Prefixes either modify the meaning of (ipfv.) simplex stems (yielding Janda’s 2007 ‘Specialized Perfectives’) or they just highlight an inherent boundary (*telos*) that may be induced already by the simplex (yielding ‘Natural Perfectives’); concomitantly, lexical diffuseness, or polysemy, of the simplex is dissolved by narrowing its meaning. With either Natural or Specialized Perfectives, the prefix perfectivizes and asserts the attainment of an implied boundary, but with NatPfvS no operation on the lexical concept of the simplex, other than narrowing, takes place. This is possible because the meaning of the prefix overlaps with a meaning component of the simplex. If an additional secondary imperfective (IPFV2) is derived from the pfv. stem,

³⁵Cf. Divjak (2010), who demonstrates how the amount and quality of linguistic input can shape networks of near synonyms and constructional patterns associated to them.

the latter serves as a pivot in a potential unit of lexical meaning with two morphologically related ipfv. stems that are both able to behave like lexical copies of this pfv. stem.

Therefore, how should we assess the significance of both patterns of affixation in the aspect system? The perfectivizing pattern via prefixation is limited by the number of inherited and borrowed simplex stems. In turn, derivation by suffixation has largely been restricted to prefixed stems, whose inventory is larger on account of the 15+ prefixes employed in verbal stem derivation of Slavic languages. This leaves much more “space” for the productive application of the suffixation pattern, i.e. secondary imperfectivization. The big question is how secondary imperfectivization interferes with the preservation of simplex stems, and how this interaction changes the dynamics of the formation of aspect triplets. Triplets can come and go, and they may reappear. To model this process, and thus to understand its dynamics, one needs to counterbalance drop-out rates of triplets against their rates of appearance (“incoming” vs “outgoing”). This requires control over the closeness of lexical association (i.e. synonymy) between IPFV1 and IPFV2 stems and over some, as it were, subordinated parameters, like the distribution of aspect functions. For diachronic research this creates serious problems in principle. Above that, more often than not sufficient (corpus) data on earlier periods is difficult to obtain, and gaps of attestation do not necessarily mean that a particular stem did not exist anymore, but that it remained “below the radar” (and it may have reappeared, or might reappear, later).

While this indeterminacy of diachronic evidence is problematic for assessing persistence (i.e. the “life time”) of triplets, it is also connected to another principled, as though timeless issue which concerns productivity, or speakers’ creativity in applying patterns to new items. Given that secondary imperfectives can theoretically be created *ad hoc*, how do we treat hapax-like phenomena, and how, then, does productivity relate to entrenchment? A symptom of entrenchment is persistence, for which, in turn, frequency in discourse can be a satisfying indicator.³⁶ However, persistence presupposes some (variably chosen) minimal time span over which the respective units have a chance to survive in usage. Therefore, the older the triplets (or better: the earlier the moment for which one can regard a triplet relation as settled), the more suitable they are for an assessment of the stability of the triplet inventory. On the other hand, recent triplets and triplets created “on the fly” are better indicators of the potential of morphological patterns. By the same token, triplets that come and go (according to diachronic attestations) may be good indicators of that potential as well. In addition, apart from IPFV2 stems (considered to be results of productive processes), IPFV1 stems may reappear as lexical equivalents of PFV-IPFV2 aspect pairs, and IPFV1-PFV pairs may prove very resilient to decay. Only all these factors taken together condition the spread, or shrinkage, of aspect triplets in the lexicon.

In short: there seems to be a huge difference between entrenchment and productivity, or: between the number of triplets that “have been staying” for a long time and units that only “occur on the fly”. At present, the proportion between such parts of a triplet inventory cannot be reliably calculated, and thus the dynamics of change remains unknown to a large extent. We can only say that triplets are an organic part of the aspect system. Even in most

³⁶Schmid (2015, 2020) regards entrenchment as a result of routinization in the individual (speaker/hearer), whereas conventionalization is a matter of diffusion among a speaker-hearer population via utterances. From this angle, “corpus frequencies are a proxy for operationalizing conventionalization rather than entrenchment” (2015, p. 14). However, what are the “units” of entrenchment resp. conventionalization? With regard to aspect triplets, they are derivational patterns and the lexical units as outcomes of the application of these patterns. Schmid understands persistence in terms of patterns rather than in relation to lexical items (e.g., verb stems), including their paradigmatic competition (e.g., between IPFV1 and IPFV2 stem). It therefore remains to be clarified how Schmid’s model might apply to the particular case of language change addressed in this article.

conservative counts (753 triplets for modern Russian, 565 for modern Polish, which corresponds to approx. 10–15% of all “acknowledged” aspect pairs in the modern languages; see Sect. 2.4) triplets are no marginal phenomenon, and there are no convincing indicators of them to become less, let alone to vanish (see the discussion of Tables 3–5).

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Corpora

- CzNC: Czech National Corpus. <https://korpus.cz/doku.php>.
- DiAsPol: Polish-German / German-Polish parallel corpus. <http://diaspol.uw.edu.pl/polniem/#!/> (Polish part).
- KorBa: Korpus Barokowy – Electronic corpus of Polish texts from the 17th and 18th centuries (up to 1772). https://korba.edu.pl/query_corpus/.
- PNC: Polish National Corpus (NKJP). <http://nkjp.pl/> (balanced version, ≈ 300 mln tokens).
- Pol_preWar: Korpus XIX wieku. <http://www.diaspol.uw.edu.pl/XIX/#!/>.
- RNC: Russian National Corpus. <https://ruscorpora.ru/new/>.

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