

## BJÖRN WIEMER

Johannes Gutenberg University Mainz

ORCID: 0000-0001-6466-2060

## ANNA SOCKA

Gdańsk University

ORCID: 0000-0002-0938-1861

## JOANNA WRZESIEŃ-KWIATKOWSKA

Johannes Gutenberg University Mainz

ORCID: 0000-0001-8371-1665

# **Relations between modal and aspectual meanings in Polish. Answers from a corpus study**

## **1. Introduction**

In this article, we address the choice of aspect in infinitives under the scope of possibility modals. We claim that, contrary to the aspect-modality-link theory (cf. Abraham, 2008, among others), there is no straightforward correlation between modal interpretation and the grammatical aspect of the infinitive complement. Instead, the aspect of the infinitive, under a given modal interpretation, is influenced by a variety of other factors, among which actionality (often called 'lexical aspect') and pluractionality appear to be the most significant ones. In order to examine the relevance of these factors in real usage, the second part of this article is centred around a corpus study.

The argument with the aspect-modality link is developed in §2.2. In order to substantiate our argument, we start with clarifications concerning core notions such as

telicity and boundedness (§2.1) and then, in the course of the argument, re-evaluate the relations between (grammatical) aspect, actionality and modality subdivisions (2.2.1) as well as on some other fundamentals about the architecture of aspect in Polish (§2.2.2). Subsequently, we will present the results of a corpus-based study, which shows how much aspect choice in the scope of possibility modals (i) correlates with modality distinctions that are more fine-grained than just [ $\pm$ deontic] or [ $\pm$ epistemic] and (ii) how much, in this context, it distributes over actionality distinctions; moreover, we ask (iii) whether a less finely grained pluractional distinction of [ $\pm$ limited count] of situations makes any difference (§3). The last section is dedicated to a summary and to our conclusions (§4).

## 2. Notional distinctions

We first present our approach to telicity and its relation to boundedness, arguing that boundedness is the crucial feature allowing one to define perfectivity (and, thus, the perfective aspect), while telicity (however understood) can only be used as a feature in the subdivision of verb stems as perfective (pfv.) or imperfective (ipfv.) (§2.1). This clarified, we will deal with the relation between (grammatical) aspect and actionality and ask about their link with modality distinctions, in particular in the scope of possibility modals (§2.2).

Our account of temporal relations is based on notions from Klein (1994). Time of Utterance (TU) refers to the current moment of speech, Time of Situation (TSit) corresponds to event time, and Topic Time (TT) is “the time for which the particular utterance makes an assertion” (1994, p. 37). TT establishes the reference interval from which TSit is judged;<sup>1</sup> the relation to TU is variable and can be downgraded (e.g., in habitual statements) or altogether be cut (as in narrative discourse). A perfective predicate indicates that TSit is included in TT, whereas imperfective predicates conceptualize TT as being inserted in TSit (Tatevosov, 2015, pp. 65–69, 101, among others). Thus, perfectivity means that the situation<sup>2</sup> denoted by the predicate (= TSit) is presented as bounded (or limited), while imperfective predicates defocus boundaries or are simply indifferent to them.

### 2.1. Boundedness and telicity

In the bulk of publications on aspect and actionality, in particular those based on English and West Germanic languages, [+telic] only relates to goal-directed events, i.e. events with a “natural endpoint.” That is, telicity is, as a rule, restricted to predicates which assert the realization of this endpoint. Alternatively, [+telic] is sometimes used to refer to just any kind of event, even to punctual ones that do not entail changes of state, such

<sup>1</sup> In this respect, TT can be considered equivalent to notions like ‘observer’, ‘conceptualizer’, or ‘epistemic agent’, which are used primarily in cognitive semantics. Note that the reference interval can shift between the current speaker and other subjects (e.g., a narrator).

<sup>2</sup> A.k.a. ‘eventuality’, which are equivalent to ‘states of affairs’ (SoAs).

as, e.g., Pol. *spotkać* ‘meet’, *zauważyć* ‘notice’ or *potknąć się* ‘stumble’ and verbs denoting speech acts (see §2.2.2). These different understandings of ‘telic’ have led to confusion.<sup>3</sup> Regardless, arbitrarily chosen examples like those in (1)–(4) show that limitation, or boundedness, does not depend on telicity; in fact, under a certain treatment, telicity does not even entail boundedness. On the one hand, a situation may be conceived of as bounded, although it is not directed toward any goal (see 2). On the other hand, an implied goal may remain unattained (see 3). Thus, under the premise that [+telic] implies a goal evoked by a predicate (often in interaction with other elements of its clause), there are not only telic events, but also telic processes (i.e. goal-directed activity).<sup>4</sup> Compare the following examples: (1) denotes a goal-directed activity which has been accomplished, while in (2) there are no implied goals, but the activities are presented as limited in time, which can be made parts of narrative sequences. In turn, (3) describes the same kind of activity as in (1), with an implied goal (induced by the specific object *list* ‘letter’), but the goal has not been accomplished (at the relevant TT) or this is left open; the activities in (4), again, do not imply any goal, and they are not presented as limited in time.

- (1) – *Są dowody. Kasia przeczytała Trylogię Sienkiewicza w 45 minut – udowadnia.* [+goal] [+PFV]  
 ‘– There’s evidence. Kasia **read** Sienkiewicz’s Trilogy in 45 minutes – he is trying to prove.’  
 (PNC, “Gazeta Wyborcza”, 07.09.2002)
- (2) *W nocy pojechałem na plac Dąbrowskiego. Poleżałem, poczytałem. Topola szumiała, na ulicy pusto.* [–goal] [+PFV]  
 ‘Last night I went to Dąbrowski Square. I **lay** for some time, **read** (for a while). The poplar tree was rustling, the streets were empty.’  
 (PNC, M. Białoszewski, *Chamowo*, 2010)
- (3) *Na pufie w kształcie kostki siedział mężczyzna i czytał list. Był nieco podobny do Lewickiego, ale nie dlatego zwróciła na niego uwagę.* [–goal] [–PFV]  
 ‘A man was sitting on a cube-shaped pouf **reading** a letter. He looked a bit like Lewicki, but that wasn’t why she paid attention to him.’  
 (PNC, Z. Górniak, *Siostra i byk*, 2009; slightly adapted)

<sup>3</sup> For more detailed clarification cf. already Dahl (1981), also Łaziński/Wiemer (1995), Arkadiev (2015, pp. 20–24), and Wiemer/Serżant (2017), with further references.

<sup>4</sup> Goal-directed activities have sometimes been treated under the heading of the Imperfective Paradox (cf. Filip, 2012, p. 724; Tatevosov, 2015, p. 118f.).

- (4) *Bezdomni **siedzieli** w ciepłe przy telewizji, **czytali** gazety, **grali** w warcaby.* [-goal] [-PFV]

‘The homeless **sat** in the warmth by the TV, **read** newspapers, **played** checkers.’

(PNC, “Dziennik Zachodni”, 07.01.2002; slightly adapted)

Thus, an a/telic distinction is no defining property of aspect, although a/telicity (based on verb meaning or on clause level) may support the development of an aspect system.<sup>5</sup> If a/telicity were a defining property a PFV:IPFV opposition, this would be tantamount to a complementary distribution based on strict entailments: only telic verbs (better: verb stems) could be pfv., while atelic verb stems would only be assigned to ipfv. aspect. This would lead to a truly paradoxical situation, since it would contradict aspect as a grammatical category being able to “transfer” members of opposed classes (here: telic and atelic verbs) into the respective other class, i.e. to assign the opposed value (pfv. vs ipfv.) of the grammatical category (i.e. aspect) largely irrespective of actionality features. Note that this applies regardless if telicity is understood as a feature only applicable to events (with attained goals) or as including goal-directed activities as well. After all, a/telicity turns out as a feature that influences actionality (on a basic level) and can, thus, be employed as a criterion in the subdivision of situation types described by verb stems and/or clausal semantics. Provided telicity is meant to include goal-directed activities, it can be used in the subdivision of both pfv. and ipfv. verb stems (see §2.2.2).

By contrast, the defining property of the perfective aspect is that it puts limits on situations, either by asserting that some inherent boundary has been reached (→ telic), or by adding an external, purely temporal boundary (→ atelic).

## 2.2. Link to aspect, or to actionality?

We now turn to the role of modality and the choice of aspect in specific contexts for which modality is marked explicitly (e.g. by modal auxiliaries). The main question is whether, and to what extent, different types of modal readings are influenced by aspect or rather by the actionality of the clause; moreover, aspect choice may depend on other factors that can outperform the role of modal distinctions. We first review and revise some claims concerning associations between aspect and modality domains (§2.2.1), before we discuss more finely grained actionality distinctions that apply across the grammatical aspect opposition, and point out other factors that influence the choice of aspect in Slavic languages, in particular in Polish (§2.2.2).

<sup>5</sup> Thus, from a diachronic viewpoint, a stimulus in the rise of the Slavic aspect opposition obviously originates in a distinction between telic events and telic processes (cf. Bermel, 1997; Eckhoff/Haug, 2015). Moreover, there is a very tight association between telic events (and correlated changes of state) and pfv. aspect (cf. Wiemer, 2017a; Wiemer/Seržant, 2017, pp. 265–267, with further references), but association must not be confused with definitorial properties of a grammatical category.



no claim has been made for readings of the present tense of perfective stems.<sup>7</sup> Third, we observe a conflation of grammatical aspect (pfv.: ipfv.) with telicity and other features on lexical and clause level relevant for actionality (for which cf. Tatevosov, 2015). In particular, pfv. aspect is identified with ‘resultativity’ and ‘terminativity’ (Abraham, 2011, p. 249f.). Thus, on the one hand, grammatical aspect is unduly entangled with “lexical aspect” (i.e. actionality). On the other hand, when grammatical oppositions are accounted for, the behaviour of English progressive aspect, see (5a)–(5b) is compared to Slavic ipfv. stems (in the infinitive). This skews the analysis since, first, the meaning range of ipfv. aspect is much broader than the range of progressive aspect, and, second, the choice of ipfv. stems in Slavic languages is often determined by a multitude of heterogeneous factors of which many are only indirectly related to temporality or modality (see below).

It is therefore unsurprising that, to a large extent, A&L’s claims are not confirmed when it comes to the Slavic opposition of pfv. vs ipfv. stems. A basic observation disproving the claimed distribution is aspect choice of infinitives in the scope of possibility modals like Pol. *można* ‘can’ (uninflected).<sup>8</sup> Under minimal pair conditions, as in (6a)–(6b), the preferences for modal readings are not very stable (which becomes manifest in a high degree of inter-speaker variation),<sup>9</sup> and the choice is anyway (as is common) between deontic and circumstantial readings, which A&L subsume under ‘root modality’. In fact, the choice between pfv. (6a) and ipfv. (6b) infinitive in the scope of *można* rather follows a contrast of single vs repeated (or generalized) action. Either sentence can be understood as a request for permission, thus in a deontic sense, although (6a), with pfv. infinitive, might also be understood as a question about the physical properties of the window, which corresponds to a circumstantial reading.

(6a) *Można teraz otworzyć okno?* PFV > single action

(6b) *Można teraz otwierać okno?* IPFV > deontic  
 ‘Can the window be opened now?’  
 (may be obliterated by other factors, e.g. repetition)

Corpus queries confirm these tendencies (see below). Nevertheless, the overarching problem is that, often, different factors influence aspect choice simultaneously; compare (7a)–(7d). (7c) supplies a case where the conversational background (in Kratzer’s sense) is not clear, so that the modal reading is actually diffuse (i.e. indiscriminate):

(7a) PFV: no negation, circumstantial  
*U ciebie w domu był prawie hektar ogrodu i można tam było otworzyć<sup>[pfv.inf]</sup> male zoo z delfinarium.*

<sup>7</sup> This issue will not be discussed here, but cf. Wiemer, Socka, Wrzesień-Kwiatkowska (submitted).

<sup>8</sup> Abraham et al. (2011, p. 168f.) could not find any correlation between epistemic and root modality with Polish past tense modal auxiliaries scoping over ipfv. vs pfv. infinitives. As for modal auxiliaries in the present tense, the authors found a weak affinity of deontic readings with pfv. infinitives (2011, p. 164f., 169f.).

<sup>9</sup> Thus, in a usage-based study on classifications of Polish modals conducted by Divjak et al. (2015) inter-rater agreement in the annotation of *można* turned out 59% (for *musieć* ‘must’ it was even lower: 49%).

‘Your house had almost a hectare of garden, and you **could open a small zoo with a dolphinarium there.**’ (PNC; Z. Miłoszewski, *Domofon*, 2005)

(7b) PFV: negated, circumstantial

*Co za miejsce! Zawiasy skrzypiały, łóżko skrzypiało – i jego, i jej – okna **nie można było otworzyć**<sup>[ipfv.inf]</sup>, a dywanik na podłodze, jeśli w ogóle był kiedyś odkurzany, to pewnie zaraz po wynalezieniu odkurzacza.*

‘What a place! The hinges creaked, the bed creaked – both his and hers – the window **could not be opened**, and the carpet on the floor, if it was ever vacuumed, it was probably right after the invention of the vacuum cleaner.’ (PNC; M. Kaszyński, *Rytuał*, 2008)

(7c) IPFV: no negation, deontic or circumstantial (with additional feature [+presupposed])

*Platforma Obywatelska kończy prace nad ustawą, która ma ułatwić dostęp do zawodu ra[d]cy prawnego i adwokata. Wystarczy egzamin i już będzie **można otwierać**<sup>[ipfv.inf]</sup> kancelarię.*

‘Civil Platform (*Platforma Obywatelska*) is finalizing a law that should facilitate access to the profession of legal adviser and lawyer. All you need is to take an exam and you will **be able to open** a law firm.’ (PNC; *Dlaczego?*, 11.05.2010)

- The background is indiscriminate, since the possibility of opening a lawyer’s office may be taken to depend either on the legal regulation mentioned in the text (→ deontic), or legal regulation, in turn, creates favourable conditions (→ circumstantial).

(7d) IPFV: negated, deontic

*Mamy więcej urządzeń, niż tego wymagają polskie normy – zaprzecza Gołębiewski. Ale jednak złamał przepisy, bo **nie można otwierać**<sup>[ipfv.inf]</sup> hotelu bez wszystkich wymaganych decyzji.*

‘We have more devices than required by Polish standards – denies Gołębiewski. But he broke the rules, because **you can’t open** a hotel without all the required decisions.’ (PNC, “Trybuna Śląska”, 08.11.2003)

Of course, we are dealing with tendencies, not with strict rules. Thus, quantifying approaches based, e.g., on corpus data are warranted; concomitantly, we need to be aware of diffuse contexts which do not allow unanimous decisions, see (7c). From a usage-based perspective, the complex interplay between modal backgrounds, pluractionality (see §2.2.2), and other factors that may influence the choice of aspect in the scope of modal auxiliaries has been studied, among others, by Divjak (2009; 2011), albeit only for telic aspect pairs (in Russian, Polish, and Croatian). Divjak found that, after all, the type of temporal reference (specific vs generic) is more decisive than the modality type:

“it is significantly more likely to find a modal adverb [*można* etc.; BW/AS] followed by a perfective infinitive when dynamic [= dispositional +circumstantial; BW/AS] modality is expressed [...] it is

significantly more likely to find a modal adverb followed by an imperfective infinitive when a generalization is expressed. [...] Although type of modality remains a significant contributor to aspectual choice, the fact whether the option, permission, order etc. has been given in a generic or specific way outperforms the type of modality in predicting the choice of aspect for the infinitive.” (Divjak, 2011, p. 81)

Divjak did not observe any significant role played by polarity or by the level of agent control over the infinitive action (tests: imperative, adverbs like *deliberately*, *attentively*).

Another of A&L’s claims says that pfv. aspect under modals with clausal negation yields epistemic modality, contrary to unnegated pfv. aspect, which yields root (i.e. deontic) modality. Following up on this, one wonders whether there may be a simple mechanism of scope inversion according to which deontic and epistemic readings “swap” if the modal is negated. This is not the case, first and foremost because the alleged simple relation of [ $\pm$ NEG] and epistemic vs deontic readings with pfv. aspect is not reflected in real usage. To start with, compare an example cited from Weiss (1987, p. 135):

(8a) *Sekretarka musi<sup>[prs]</sup> / musiała<sup>[pst]</sup> (zaraz) wrócić<sup>[pfv.inf]</sup>, bo zostawiła kosmetyczkę na biurku.*

‘The secretary **must** / **was supposed to return** (in a moment), for she has/had left her cosmetic bag on the desk.’

Regardless of the tense of the auxiliary, (8a) conveys a prediction, i.e. an epistemic statement concerning a single event posterior to a reference interval (which, respectively, coincides with or precedes the moment of speech).<sup>10</sup> This prediction arises from an inference based on observable evidence (the cosmetic bag is/was lying on the desk). The same would apply with “bare” present tense of pfv. stems, which, under such conditions, normally qualifies as future:

(8b) *Sekretarka zaraz wróci<sup>PFV.PRS</sup>, bo jej kosmetyczka leży na biurku.*

‘The secretary **will return** in a moment, because her cosmetic bag is lying on the desk.’

Thus, pfv. aspect is not only compatible with epistemic meanings, but easily triggers them, provided it refers to a single bounded event.

Now, what would be the negated equivalent of an utterance as in (8a)? Compare (8c):

(8c) *Sekretarka nie musi / nie musiała wracać<sup>[ipfv.inf]</sup> (\*wrócić<sup>[pfv.inf]</sup>), bo pozwolono jej pracować w domu.*

‘The secretary need not / was not required to **return**, because she was allowed to work from home.’

Under clausal negation the aspect changes to an ipfv. infinitive, and we get a deontic reading (*notabene*, w.r.t. the same single event). If we accepted A&L’s claim that ipfv. aspect is associated with deontic modality and further assumed that negation leads

<sup>10</sup> That is, TT < TSit, regardless of whether TT precedes TU (TT < TU) or is included in it (TT  $\subset$  TU).



to scope inversion, we would expect pfv. aspect here. However, (8c) illustrates another point about Slavic languages, namely, that negated deontic necessity very strongly triggers ipfv. stems. On the other hand, not every predicate denoting a state or a process (i.e. of an ‘imperfective’ semantics) evokes a deontic interpretation, see (9)–(11).

By contrast, epistemic interpretations of pfv. stems are usually not affected by negation.<sup>11</sup> In particular, regardless of negation, “imperfective” meanings with epistemic *musieć* ‘must’ occur if the complement of this modal is not a lexical verb, but a copula with a nominal predicate or a locative phrase, which denote a state. However, lexical verbs, with ipfv. stem, are not excluded; compare (9a)–(9b) and (10).

non-negated

- (9a) *Sekretarka musi akurat być na obiedzie.* state, embedded nominal predicate:  
 ‘The secretary must be at lunch right now.’ √epistemic  
 vs *Sekretarka musi akurat jeść obiad.* process, embedded verbal predicate:  
 ‘The secretary must be eating lunch right now.’ √epistemic, ?deontic

negated

- (9b) *Sekretarka nie musi akurat być na obiedzie (może pić kawę).* √epistemic  
 ‘The secretary doesn’t have to be at lunch (she may be drinking coffee).’ √epistemic  
 vs *Sekretarka nie musi akurat jeść obiadu (pewnie pije kawę).* √epistemic  
 ‘The secretary doesn’t have to eat lunch (she’s certainly drinking coffee).’ √epistemic, ?deontic
- (10) *Janek nie musi być palaczem (może raka płuc dostał z innej przyczyny).* √epistemic  
 ‘Janek might not be a smoker (maybe he got lung cancer for some other reason).’ √epistemic  
 vs *Janek nie musi palić.* √deontic, ?circumstantial, epistemic  
 ‘Janek doesn’t have to smoke.’

but also:

- Janek musi palić.* ?deontic, √circumstantial, ?epistemic  
 ‘Janek has to smoke / ?is probably smoking.’  
 vs *Janek musi być palaczem.* ?deontic, ?circumstantial, √epistemic  
 ‘Janek must be a smoker.’

The observations outlined thus far lead us to the following intermittent summary: Most of the evidence presented above is at variance with A&L’s predictions and their

<sup>11</sup> For more discussion on epistemic (and inferential) readings with modals in Polish cf. Wiemer, Socka (2022, pp. 473–478).

implications; in particular, there is no simple way of scope inversion for modal readings under negation, compare (9b) with (10).

Finally, if we compare the English sentences in (5a)–(5b) with a similar minimal pair in Polish, see (11a)–(11b), we see that there is no correspondence between English simple vs progressive form, on the one hand, and Polish pfv. vs ipfv. stem (in the scope of MUST), on the other.

(11a) *Musi teraz wyjść*<sup>[pfv.inf]</sup>.

(11b) *Musi teraz wychodzić*<sup>[ipfv.inf]</sup>.  
'S/He must leave / ~~be~~ leaving now.'<sup>12</sup>

Either sentence can be interpreted in a deontic (apart from a circumstantial) reading. The only context in which ipfv. stems are clearly predominant (and often the only choice) is negated deontic necessity (e.g. *Nie trzeba wychodzić / \*wyjść* 'There's no need to leave').<sup>13</sup>

Obviously, A&L's claims cause false predictions also because they mainly concern states rather than imperfective semantics in general. To the extent that processes are considered, a direct comparison between progressive and imperfective aspect suffers from the flaws outlined above.

#### 2.2.1.2. Changes of state and resultative entailments

In addition, another reason why A&L's claims are not confirmed in relation to aspect distinctions in Slavic probably lies in overlooking the entailment relation between state-changing events and subsequent (= resultative) states. Very briefly, state-changing events (as all events) are conceived of as included in TT, whereas resultative states (as all states) themselves include TT (or rather: a chain of TTs).<sup>14</sup> From a communicative point of view, this causal relation between change of state and ensuing state requires that one of them be foregrounded (asserted, coded), and the other backgrounded (inferred). In these terms, change of state and resultative state are complementary parts of a more complex situation. This relation becomes particularly obvious when we compare the meanings of past tense forms of pfv. stems that imply a change of state (= telic in the narrow sense; see §2.1) with predicates that denote corresponding resultative states. Compare (12a)–(12c).

(12a) *Spalili / Spalono dom (wczoraj w nocy)*.  
'They burned the house / The house was burned (last night).'

(12b) *Dom został spalony (wczoraj w nocy)*.  
'The house was burned down (last night).'

<sup>12</sup> Another way for *musieć* 'must' (or *móc* 'can') to express an epistemic reading referring to an ongoing process consists in "extraposing" it as a syntactically self-standing predicate with an attached complement clause (in ipfv. present tense), or as a parenthetical comment: *Musi/Może być tak, (że) teraz wychodzi* 'It must/can be (that) s/he is leaving now'.

<sup>13</sup> Cf. Padučeva (2008) for analogous environments in Russian.

<sup>14</sup> On this relation cf. Wiemer, Giger (2005, pp. 1–3, et passim), with further references.

- (12c) *Dom jest spalony (\*wczoraj w nocy).*  
 ‘The house is burnt down (\*last night).’

The assertive focus of (12a)–(12b) lies on the event which changed the state of the house, whereas, strictly speaking, the subsequent state of the house is only implied. By contrast, (12c) asserts exactly this subsequent state (and presupposes the telic event that brought about this state). However, since a change of state by necessity leads to a new state, predicates that assert the attainment of a state-changing event easily entail an ensuing new state, i.e. reference time (TT) shifts to that state. This entailment is particularly strong in deictic tense use, that is, if that state is to hold at the moment of speech (thus, TT is included in TU), as in (12c), and it is usually prevented in narrative contexts. From a communicative point of view, the difference of assertive focus (or: its switch from the state-changing event to the subsequent state) often seems irrelevant and, thus, it is blurred. Thus, if utterances like (12a)–(12b) are used in isolation (without any anchorage in a narrative sequence), they are usually understood as referring to a state that is true at the time of the utterance (TU). However, neglecting this difference regarding claims about (im)perfectivity (or, more properly: about state-changing events and resultative states) and the impact on modal readings, leads to false predictions: claims which should be applied to pfv. telic predicates (denoting a change of state) are unduly transferred to resultative states (which represent a “subdomain” of imperfectivity).

Recently, Nowakowska (2020, pp. 144–154) justly made a very similar point when pointing out the rather widespread confusion of perfectivity with resultativity. Among other things, Karolak’s ‘resultative configuration’ (*konfiguracja rezultatywna*) does not actually focus on a resultative state, since it is defined as consisting of a momentary event and an immediately following state, but the event is considered “dominating” (obviously in the sense of primacy of logical decomposition); cf. Karolak (2007, p. 38), Nowakowska (2020, p. 122f., 152). However, Nowakowska herself (as others) does not discuss the entailment relation between variable fore- and background, although her definition proposed for French anterior tenses (2020, p. 42) and generalized later (2020, p. 138f.), implies that TT (Reichenbach’s R) follows after the state-changing event.

### 2.2.2. Factor conflicts against aspect pairings and their motivations

In general, as a grammatical category, aspect can, and often does, override actionality distinctions. As some of the examples discussed in §2.2.1.1 have already illustrated, actionality may interfere not only with modal distinctions, but also with features related to event-external plurality, or pluractionality. This notional domain relates to the “count” of situations (denoted by predicates), in particular to situations that are conceived of as occurring (or having occurred) an unlimited number of times;<sup>15</sup> open-ended repetition entails that there is no single TT serving as temporal anchor. Oftentimes pluractionality proves more relevant for aspect choice than modal distinctions (see the quote from

<sup>15</sup> Cf. Xrakovskij (1997), Shluinsky (2005, pp. 83–89; 2006), Wood (2007, p. 15f.), Mattioli (2019).

Divjak 2011 in §2.2.1.1). In any case, the binary distinction of pfv.: ipfv. aspect – an obligatory choice every time a verb is used – covers a network of quite heterogeneous functions that may compete with each other (cf. Wiemer et al., 2020).

These considerations hold true both for stems united into aspect pairs (i.e. pairs of morphologically related verb stems with an identical lexical meaning, but with different distribution over grammatical and pragmatic contexts – which conditions their opposed membership to pfv. or ipfv. aspect) and for “unpaired” stems (i.e. *perfectiva* and *imperfectiva tantum*). This does not mean that actionality types become irrelevant, it only means that we need to distinguish between stems whose aspect membership is motivated by their actionality type, and stems where aspect membership, as it were, is in conflict with the actionality type. For aspect pairs, one of the members motivates the actionality class to which the pair belongs, while the other is derived semantically. Thus, stems denoting an eventuality with an inherent absolute boundary (=telic) motivate pfv. aspect, whereas stems lacking such a boundary (=atelic) motivate ipfv. aspect.

Accordingly, if applied to the overall set of verb stems in the respective language, pfv. and ipfv. stems (as subsets of that overall set), may each be divided into core and peripheral members on account of the correspondence between aspect and actionality group. Thus, following Lehmann (1999), we can distinguish between core and periphery for stems of either aspect: core members, whose actionality motivates the respective aspect, are  $\alpha$ -verbs, while members on the periphery are  $\beta$ -verbs (Mende et al., 2011). For instance, good examples of  $\alpha$ -verbs of pfv. aspect are Pol. *otworzyć (drzwi)* ‘open (door)’ and *zbudować (zamek)* ‘build (castle)’, the corresponding ipfv. stems (*otwierać, budować*) are  $\beta$ -verbs of ipfv. aspect. Conversely, for ipfv. aspect good examples of  $\alpha$ -verbs are *pracować* ‘work’ and *chodzić* ‘walk’, with the corresponding pfv.  $\beta$ -verbs *popracować* and *pochodzić*.

On this basis, we may distinguish between  $\alpha$ -telic aspect pairs and  $\alpha$ -atelic aspect pairs;<sup>16</sup> thus, *otworzyć – otwierać* is an  $\alpha$ -telic pair, while *pracować – popracować* is an  $\alpha$ -atelic pair. Alternatively, we might say that there are aspect pairs for which the pfv. stem represents the  $\alpha$ -member, and aspect pairs with the ipfv. stem as the  $\alpha$ -member. However, this “equation” does not apply by 100%, since ipfv. aspect can also be motivated by verb stems denoting changes along some parameters which do not (or not necessarily) imply absolute boundaries; compare, for instance, Pol. *leczyć* ‘heal’, *doskonalić* ‘improve’ in (13)–(14), or *pogarszać* ‘worsen’, *rosnąć* ‘grow’ (cf. Lehmann, 1999; Mende et al., 2011). The relevant pairs have the ipfv. stem as their  $\alpha$ -member despite the fact that they imply changes, although without absolute endpoints. We will apply this distinction in our corpus-based study (see §3).

<sup>16</sup> Traditionally,  $\alpha$ -atelic pairs have not been considered aspect pairs at all in Russian aspectology, but basically only for the reason that the strict definition of aspect pairs (in that tradition) is based on grammatical contexts where the ipfv. stem supplies a lexical copy of the pfv. stem (e.g., in narrative present or unlimited repetition), but not vice versa; in other words: aspect pairs are assumed only in cases when the ipfv. member “copies” the event of the pfv.  $\alpha$ -member in the pair relation (cf. Wiemer, 2017b, p. 227f.).

Moreover, in typical  $\alpha$ -telic pairs the ipfv. member can be used to denote a process. There are, however, numerous ipfv. stems (also as members of aspect pairs) that are unable to denote a process; instead, they just denote the same punctual event as do their pfv. counterparts, from which they are motivated. Compare, for instance, *sposzrzec*<sup>PFV</sup> – *sposzrzegać*<sup>IPFV</sup> ‘notice, spot’, *potknąć się*<sup>PFV</sup> – *potykać się*<sup>IPFV</sup> ‘stumble’, *zauważyć*<sup>PFV</sup> – *zauważać*<sup>IPFV</sup> ‘1. notice, 2. note, mention’, *przyjść*<sup>PFV</sup> – *przychodzić*<sup>IPFV</sup> ‘arrive’. Typically, many verbs that denote speech acts (e.g. *przeprosić*<sup>PFV</sup> – *przepraszać*<sup>IPFV</sup> ‘ask for excuse’, *poprosić*<sup>PFV</sup> – *prosić*<sup>IPFV</sup> ‘ask, beg’, *oświadczyć*<sup>PFV</sup> – *oświadczać*<sup>IPFV</sup> ‘declare’) also belong here. As mentioned in §2.1, verbs of this actionality group have often been subsumed under ‘telic’. In a strict sense, this is inadequate provided ‘telic’ is to imply a change of state (not only an eventuality with an inherent limit). However, this distinction between state changing and merely punctual events is often neglected (or ignored) in research on temporal and aspectual semantics; moreover, an overly differentiated division of actionality types is likely to cause data sparseness. For these two reasons, in our pilot study we will unite all stems coding an eventuality with an inherent boundary, including punctual ones, as ‘telic’ (see §3).

In summary: the grammatical function of aspect in Slavic, among other functions, consists in imposing boundaries on atelic stems, so that situations which are not inherently bounded can be presented as bounded (e.g. in narrative sequences). Another grammatical function of Slavic aspect is to provide lexical “copies” to inherently bounded situations when pluractionality comes in or boundaries are defocused (see fn. 16). Yet another grammatical function of Slavic aspect consists in making telic stems available to processes (for singular situations); see the discussion on (1)–(4) in §2.1. All of these factors provide the precondition for a productive process of deriving ipfv. stems from pfv. ones, and vice versa.<sup>17</sup>

### 3. Corpus-based study: Interpretation of pfv. and ipfv. infinitives in the scope of *móc, można* ‘can’

Based on the observations outlined above, we set out to test which factors are associated with the choice of aspect and its reading in modal environments. If there are several factors, we want to know how they interact. In order to put the relation between aspect, actionality and modality in Polish to a usage-based test, we designed a corpus study focusing on the interpretation of pfv. and ipfv. infinitives in the scope of possibility (POSS) auxiliaries *móc* (inflected) and *można* (uninflected) ‘can’, with and without clausal negation.

#### 3.1. Study design

The basis of this corpus study were random samples from the Polish National Corpus (PNC), with data from texts published after 1946. All data was annotated independently

<sup>17</sup> For comprehensive overviews of the division of functions between pfv. and ipfv. stems in Polish cf. Łaziński (2020, Chapters 4–5) and Wiemer et al. (2020, §§2–3).

by two persons (A. Socka and B. Wiemer), cases of disagreement were discussed and rechecked, cases for which no clear decision could be taken were marked as such ('doubtful'). The annotations gained from this procedure yielded the input for statistical calculation; cases dubbed 'doubtful' were treated like "n(o)".

We performed random searches for *móc/można* (+infinitive) in past and present tense,<sup>18</sup> with and without clausal negation, in the balanced subcorpus of the PNC. Then we randomly selected 100 tokens with telic and atelic predicates from the search output, in the scope of these possibility modals. We also considered predicates that denoted events without a change of state as 'telic' (the reasoning behind this is outlined in §2.2.2). If not noted otherwise, 'telic' is henceforth used in this broader notion. However, our division of actionality classes (see §3.2) takes into account the distinctions made in §2.2.2, in particular of the feature [±change of state].

Our method yielded 800 random tokens distributed according to the following schema:

	<table style="border-collapse: collapse; margin: 0 auto;"> <tr> <td style="padding: 5px 15px;">telic</td> <td style="padding: 5px 15px;">atelic</td> </tr> <tr> <td style="padding: 5px 15px;">100</td> <td style="padding: 5px 15px;">100</td> </tr> <tr> <td style="padding: 5px 15px;">100</td> <td style="padding: 5px 15px;">100</td> </tr> </table>	telic	atelic	100	100	100	100	predicates	
telic	atelic								
100	100								
100	100								
+NEG									
-NEG			× 2 (past +present tense) ⇒ Σ <b>800 random tokens</b>						

Table 1a. Data selection of *móc/można* +INF (pfv./ipfv. stems)

All tokens were annotated for

- modal meanings: deontic, dispositional, circumstantial, epistemic
- aspect (pfv. – ipfv.)
- actionality class: ± state-changing
  - × event vs process
  - + state
 ⇒ **5 classes**
  - (+ nominal predicates treated as an extra category)
- pluractionality: singular, iteration (limited repetition), unlimited repetition, generalized

Because of our way of handling the data, both pfv. and ipfv. infinitives could occur in the sample. As expected, the bulk of telic predicates occurred with pfv. infinitives and among atelic predicates ipfv. infinitives predominated, but we also encountered 56 nominal predicates (e.g. *Przynajmniej o to mogą być spokojny* 'At least of it I **can be confident**'), including passive participles (e.g. *Żli dyrektorzy nie mogą być zwolnieni z pracy, bo zakładów nie stać na wypłacenie odprawy* 'bad managers **cannot be dismissed**, because the companies cannot afford paying gratuities'). Nominal predicates were excluded from further analysis; see, however, §3.4. We are sure that their inclusion

<sup>18</sup> With the uninflected *można*, past tense is indicated by the copula (*było*).

would have increased the number of examples with epistemic readings, §2.2.1.1 offers an explanation for this. After sampling was finished, actionality classes were assigned to each of the hits, independently from the aspect of the infinitive.

Due to our choice of random sampling, our approach results in an equal chance for pfv. and ipfv. stems to be part of the selection. The only feature which we “manipulated” was to push the number of atelic predicates closer to the number of telic ones (but see next paragraph), so that possible biases in the distribution over modal meanings would better reflect general frequency patterns in the choice of aspect among telic and atelic verbal predicates, respectively. Regardless of aspect, we controlled for possible biases in the distribution of actionality classes, for which a/telicity is not the only determining factor.

During the annotation process, adjustments were made in the assignment of telic or atelic behaviour of the predicate (*móc/można* +INF). For this reason, and because of the nominal predicates among the atelic items (which are not part of our main analysis), the figures in the following do not have a total of 200 telic and 200 atelic predicates. In particular, among the predicates without negation there were many more corpus tokens reassigned to the telic group than to the atelic group.

Moreover, it became clear that the pluractionality distinctions can be simplified by conflating ‘single (event)’ with ‘iteration’ (limited repetition) and, respectively, ‘unlimited repetition’ with ‘generalized’; the former represents reference to a distinct number of situations, while the latter refers to an open number of situations (see §3.5).

### 3.2. Aspect, negation, and actionality classes

We start with the relation between aspect and actionality classes. Tables 1b–1c show the distribution of tokens over actionality classes (=cross-classification of event, process, state × ±change of state) with negated vs unnegated *móc/można*; Table 1b includes stems from aspect pairs in which the ipfv. stem is the  $\alpha$ -member ( $\alpha$ -atelic pairs), Table 1c contains stems from aspect pairs in which the pfv. stem is the  $\alpha$ -member ( $\alpha$ -telic pairs). Remember that events need not change states and that processes may imply (or express a tendency toward) a change of state (see §2.1).

	process		state
	no change of state	change of state	
NEG+	61	13	102
NEG–	44	6	118
$\chi^2 = 0.34834$ , $df = 1$ , $p > 0.5$ (Fisher’s F: $p > 0.4$ ), Cramer’s V = 0.076			

Table 1b. Actionality classes and ±negation with ipfv. stem as  $\alpha$ -member

	event	
	no change of state	change of state
NEG+	77	111
NEG-	83	140
$\chi^2 = 2.973e-30$ , $df = 1$ , $p = 1$ , Cramer's $V = 0.004$		

Table 1c. Actionality classes and  $\pm$ negation with pfv. stem as  $\alpha$ -memberExamples to Table 1b (ipfv. =  $\alpha$ -member)

- process, change of state
- (13) *Jeśli mają lekarza pierwszego kontaktu w swoim miejscu zamieszkania, to **nie mogą się leczyć** tam, gdzie studiują.*  
 'If they have a general practitioner in their place of residence, they **cannot be treated** where they study.' (PNC, Sejm, 22.04.1999)  
 (pfv. *wyleczyć się*)
- (14) ***Doskonalić można** wszystko i nic nie stoi na przeszkodzie, by zająć się modyfikacją zasilacza komputerowego.*  
 'Everything can be improved and nothing stands in the way of modifying a computer power supply.' (lit. 'one **can improve**...') (PNC, B. Danowski, *Tuning, wyciszanie, overclocking komputera PC*, 2003)  
 (pfv. *udoskonalić*)
- process, no change of state
- (15) [...] ***nie można traktować**<sup>IPFV</sup> specjalnej strefy ekonomicznej jako długofalowego instrumentu rozwoju w sferze zagospodarowania przestrzennego kraju.*  
 '[...] the special economic zone cannot be regarded as a long-term development instrument in the sphere of national spatial planning.' (PNC, Sejm, 17.11.2000)  
 (pfv. *potraktować*)
- state
- (16) *Czy **można im było wierzyć**<sup>IPFV</sup>?*  
 'Could they be believed?' (more lit. 'Could one believe them?')  
 (pfv. *uwierzyć* – denotes inception of state)



Examples to Table 1c (pfv. =  $\alpha$ -member)

- event, change of state: IPFV
- (17) *Przyjechali, gdy już można było jabłka zrywać*<sup>IPFV</sup>.  
 ‘They came when it was already possible to pick apples.’  
 (PNC, W. Szostak, *Oberki do końca świata*, 2007)  
 (pfv. *zerwać*)
- event, change of state: PFV
- (18) *Na Fudzijamę można dostać się z dwóch stron* [...].  
 ‘There are two ways to get to Fujiyama [...].’ (more lit. ‘one can get to Fujiyama...’)  
 (PNC, J. Podgórska, *Rada na zdradę*, “Polityka” 17.06.2006)  
 (ipfv. *dostawać się*)
- event, no change of state
- (19) *Jedynie można było powtarzać*<sup>IPFV</sup> *te same słowa*  
 ‘only the same words could be repeated.’  
 (PNC, W. P. Szymański: *Niedźwiedź w katedrze*, 2001)  
 (pfv. *powtórzyć*)

Tables 1b-1c clearly show that presence vs absence of clausal negation has hardly any impact on the distribution, in particular with stems belonging to aspect pairs with the pfv. stem as  $\alpha$ -member (see Table 1c). Nonetheless, we observe a clear tendency toward change of state for stems of pairs with pfv.  $\alpha$ -member and, conversely, toward homogeneous processes for stems of pairs with ipfv.  $\alpha$ -member.

Lacking impact of the role of negation also holds true if we only apply a binary distinction between events and processes+states, i.e. ignore the feature [ $\pm$ change of state]. See Table 1d, the strong association of pfv. stems with events and of ipfv. stems with processes and states does not change under negation, including the direction, i.e. pfv. stems remain associated with events and ipfv. stems with processes or states (see Table 1e).

<i>móc/można</i> +pfv./ipfv.	event vs process or state
–NEG	$\chi^2 = 238.44$ , $df = 2$ , $p < 2.2e-16$ , Cramer’s V = 0.805
+NEG	$\chi^2 = 178.59$ , $df = 2$ , $p < 2.2e-16$ , Cramer’s V = 0.707

Table 1d. Situation types and aspect under the scope of POSS-modals

The ratio between events and processes denoted by ipfv. stems is quite considerable, namely 0.77 (+NEG) and 0.78 (–NEG), respectively; see highlighted cells in Table 1e. If we also consider states, the ratios decrease to 0.39 (+NEG) and 0.26 (–NEG).

+NEG	event	process	state
pfv.	155	0	0
ipfv.	56	73	70
–NEG	event	process	state
pfv.	181	0	0
ipfv.	38	49	99

Table 1e. Distribution of pfv. and ipfv. stems under POSS with/without NEG

Another noteworthy observation is that ipfv. stems in the scope of *móc/można* do not seldomly mark events. This, again, applies regardless of negation; compare (20)–(21).

- (20) *W zależności od położenia ścięgna [mięsień] może nawracać<sup>IPFV</sup> lub odwracać<sup>IPFV</sup> stopę.*

‘Depending on the position of the tendon, [the muscle] **can pronate** or **invert** the foot.’

(PNC, B. Sokołowski, *Zarys anatomii człowieka*, 2004)

- (21) *Drzwi maskowało się wtedy kredensem, niby że mieszkanie jest jednopokojowe. Nie mogła tylko palić<sup>IPFV</sup> światła, żeby nie przeświecało przez szpary [...].*

‘At that time the door was hidden by a cupboard, as if it was a one-room flat. However, **she could not put the light on** as it would shine through the cracks [...].’

(PNC, M. Nurowska, *Wybór Anny*, 2010)

In these cases, ipfv. stems function as “placeholders” of their pfv. equivalents (see fn. 16), for instance, in cases when other features outperform actionality, e.g. unlimited repetitio, as in (19) and (20), or modality, as in (21), which conveys a sense of prohibition (or undesiredness).

### 3.3. Aspect, actionality class, and modality

Let us now address the question how much the modal interpretation depends on aspect or on the actionality class. We start with aspect; the distribution over the samples is represented in the following tables.

	deontic	dispositional	circumstantial	epistemic
PFV	12	21	136	6
IPFV	12	15	132	18
$\chi^2 = 7.0486$ , $df = 3$ , $p = 0.07037$ , Cramer's V: 0.142				

Table 2a. Aspect and modal interpretation – without negation

There is no significant correlation between aspect choice and modal interpretation if the modal complex occurs without negation ( $p > 0.05$ ). This changes when the modal complex is negated, although effect size (= Cramer's V)<sup>19</sup> remains small.<sup>20</sup>

	deontic	dispositional	circumstantial	epistemic
PFV	40	12	98	0
IPFV	91	7	87	4
$\chi^2 = 18.369$ , $df = 2$ , $p = 0.0001026$ , Cramer's V: 0.234				

Table 2b. Aspect and modal interpretation – with negation

Negation generally favours deontic readings for ipfv. infinitives in the scope of POSS (22). However, the data contains an almost equal number of circumstantial readings (23), which, in turn, is only slightly higher for pfv. infinitives after negated POSS (24). However, compare this to (25) for a pfv. infinitive (under negated POSS) with a possible deontic reading (which is disfavoured, but not that rare).

- (22) *Projekt, choć bardzo krótki, legislacyjnie i stylistycznie nie jest dopracowany. Przepis **nie może** na przykład **brzmieć**: „Ustawa wchodzi w życie w trzy miesiące od dnia ogłoszenia”.*

'The project, although very short, is not legislatively and stylistically refined. For instance, an article **cannot read** [lit. *sound*]: "The law comes into effect three months from the day of announcement."' (PNC, Sejm, 10.03.2004)  
+NEG, IPFV, deontic

- (23) *Lata 1944–1956 w polskim sądownictwie to okres, o którym **nie można mówić bez poczucia wstydu**.*

'The years 1944–1956 in the Polish judiciary are a period that **cannot be discussed** without a sense of shame.' (PNC, Senat, 04.03.1993)  
+NEG, IPFV, circumstantial

<sup>19</sup> The effect size (Cramer's V) indicates the strength of association (values from 0 to 1), while the p-value only indicates the probability that the result obtained is accidental (i.e. that other random samples would yield a different distribution).

<sup>20</sup> The calculation excluded epistemic readings (for data scarcity).

- (24) *Po dokonaniu szczegółowej analizy **nie można podzielić** poglądu o niezgodności z prawem Unii Europejskiej całej ustawy [...].*  
 ‘After a detailed analysis, one **cannot share** the view that the entire Act is incompatible with European Union law [...].’ (PNC, Sejm, 05.06.2002)  
 +NEG, PFV, circumstantial
- (25) *Pan minister stwierdził, że rząd **nie może dokonać** nowelizacji ustawy o najmie lokali mieszkalnych i dodatkach mieszkaniowych, ponieważ gminy są już po uchwaleniu swoich budżetów, a więc te zmiany byłyby niekonstytucyjne.*  
 ‘The minister stated that the government **cannot amend** the law on residential lease and housing allowances, as the municipalities have already passed their budgets, so these changes would be unconstitutional.’ (PNC, Sejm, 05.02.1998)  
 +NEG, PFV, deontic (or circumstantial)

Altogether, in the scope of POSS, pfv. infinitives clearly prefer circumstantial readings, irrespective of negation. Moreover, with negated POSS, epistemic readings are rare, we encountered them only with ipfv. stems; compare (26):

- (26) *że ci ludzie stawiali tę samą kwestię w różny sposób, dowodzi niezbicie, że **nie mogli się na mnie powoływać**<sup>IPFV</sup>, bo gdyby tak było, to wszyscy mówiliby jednym głosem.*  
 ‘that these people raised the same issues in different ways, irrefutably proves that they **couldn’t refer** to what I said, because if that were the case, everyone would have spoken unanimously.’  
 (PNC, Kancelaria Sejmu RP, “Stenogram z 25. posiedzenia Komisji Śledczej ds. Orłenu”, 2004)

Remarkably, in this rare case of epistemic reading under negated POSS the ipfv. stem denotes a non-state changing event, as in ex. (20)–(21), not a state. The other three instances, however, do refer to states (e.g., *jej oczy **nie mogły naturalnie posiadać** chabrowoblękitnej barwy* ‘her eyes **could not be** naturally cornflower blue’, lit. ‘[...] **could not have** cornflower blue colour’). With unnegated POSS, epistemic readings occur with either aspect, but the distribution can be motivated by the underlying actionality. Thus, the pfv. complement of *móc* in (27) refers to a single event, while the ipfv. complement in (28) denotes a process (the sentence is part of Free Indirect Discourse in a narrative):

- (27) [...] *książę szczeciński Kazimierz II lub rycerz Piotr z Bnina także **mogli się otrzeć**<sup>PFV</sup> o Egipt [...].*  
 ‘the Duke of Szczecin Casimir II or the knight Peter of Bnin **could also have faced** Egypt [...].’  
 (PNC, T. Mirkowicz, *Pielgrzymka do Ziemi Świętej Egiptu*, 1999)

- (28) *Co tam jeszcze mogło się palić*<sup>IPFV</sup>?  
 ‘What else could be burning there?’  
 (PNC, M. Tomaszewska, *Urwany ślad*, 2001)

Therefore, let us check the distribution of the same data over actionality classes, which is shown in Tables 2c–d. In general, epistemic readings are in a clear minority. Even with unnegated POSS, there are only 24 of them; among these, 18 (75%) arise with states. However, as for states, overall the lion’s share (81, i.e. 78%) has circumstantial readings (Table 2c).

	deontic	dispositional	circumstantial	epistemic
atelic event	4	10	61	2
telic event	15	14	99	3
atelic process	5	7	28	1
telic process	0	0	7	0
state	3	6	81	18
Σ	27	37	276	24

Table 2c. Actionality and modal interpretation – without negation

	deontic	dispositional	circumstantial	epistemic
atelic event	33	4	35	1
telic event	41	8	79	0
atelic process	23	5	30	1
telic process	7	0	6	0
state	52	2	40	0
Σ	156	19	190	2

Table 2d. Actionality and modal interpretation – with negation

Due to the low number of hits contained in a couple of cells, neither  $\chi^2$ - nor Fisher’s Exact test could be applied, nevertheless the figures are indicative as such. The distribution under POSS-modals without negation (Table 2c) leads us to the following conclusions:

- In general, a circumstantial interpretation is predominant (76% of all tokens), mostly on account of events.
- Processes are rather not favoured, telic processes are particularly rare.
- Epistemic interpretation is rare and displays a clear bias towards states, however the sample also virtually includes almost no processes.

In turn, the conclusions as for POSS-modal constructions with negation (Table 2d) are as follows:

- Circumstantial readings are still the most frequent ones, but less prominently so, particularly in comparison to deontic readings. Negation causes an increase of cases with a deontic reading.
- Deontic and dispositional readings are more or less equally frequent, at least for atelic situations. There is still a clear bias toward circumstantial readings for telic events, but there is another, though weaker, bias toward deontic readings for states.
- Epistemic readings are exceptional.<sup>21</sup>

As the most important insight from this, we can say that negation enhances the chance of deontic interpretations especially for atelic situations, but deontic readings still do not, in general, outnumber circumstantial readings. If considered jointly with the findings from Tables 2a–2b, this observation strongly suggests that it is not aspect as such which yields a bias toward deontic interpretations (for ipfv. stems) in the scope of POSS modals, but negation and clear associations between aspect and actionality classes (pfv. with telic classes, ipfv. with atelic classes). Moreover, epistemic readings are altogether rare with verbal predicates.

### 3.4. POSS with nominal predicates

Although we excluded nominal predicates from our statistical analyses, some general observations can be made. The samples contain 28 tokens of nominal predicates without negation and 28 tokens of nominal predicates with negation. Among the tokens without negation, 11 tokens (39%) have a circumstantial reading (see 29), followed by 6 instances with deontic and 3 instances with epistemic reading. 8 tokens were considered ambiguous regarding their modal interpretation, however all of them allow for a circumstantial reading as well (see 32). In the sample with negation, the clear majority has a deontic reading (25 instances; see 30). There are also 2 instances with circumstantial reading, and there is one example with epistemic reading (see 31). So it can be concluded that, again, negation favours the deontic reading, while the circumstantial reading predominates when there is no negation. Instances of the dispositional interpretation do not occur in either of the two samples.

- (29) *O Wodniku mówi się, że ma humanistyczny stosunek do ludzi. Jest to cecha, która w przypadku szefa spod znaku Wodnika **może być** jednak nie zaletą, lecz **wadą**. Szef taki bowiem w najlepszych intencjach wprowadzi techniczne nowinki ułatwiające pracę, zwalniając przy tym część pracowników, ponieważ będą niepotrzebni.*

<sup>21</sup> See (26) for an atelic event and the following one illustrating an atelic process: *Błysk **nie mógł również** pochodzić z urzędzenia radarowego, które miała w tunelu zostawić drogówka paryska – żadnego radaru tam po prostu nie było.* ‘The flash **could neither come** from the radar allegedly left in the tunnel by the Paris traffic police. There was simply no radar at all.’ (PNC, “Gazeta Wyborcza”, 12.09.1997)

‘Aquarius is said to have a humanistic attitude towards people. This is a feature that, in the case of an Aquarius boss, **may not be** an advantage, but **a disadvantage**. Such a well-meaning boss will introduce technical innovations to make work easier, while firing some employees because they will be unnecessary.’

(PNC, E. Kłobus, Z. Wieczorek, *Z astrologią pod rękę*, 2007)

circumstantial

- (30) *Nie można zakładać, że na komercjalizacji i prywatyzacji zrobi się dobry interes, że wyraźnie zwiększą się wpływy do budżetu państwa. Nie może być celem samym w sobie. Należy precyzyjnie określić i uregulować kwestie prywatyzacji kluczowych dla państwa gałęzi gospodarki.*

‘It cannot be assumed that commercialization and privatization will bring good profits, that revenues to the state budget will increase significantly. **It cannot be an end** in itself. The issues of privatization of key sectors of the economy should be clearly defined and regulated.’

(PNC, Senat RP, 5.07.1996)

deontic

- (31) *Jadąc do Pawła powtarzał sobie, że po prostu pogada z nim trochę, ulży sobie, ale że w żadnym wypadku nie zdradzi się z obawami, iż jego własna wyobraźnia zaczyna mu płatać figle. No bo tak to w sumie postrzegał. Nie mogło przecież być inaczej. Musiał ulec autosugestii.*

‘On the way to Pavel, he kept repeating to himself that he would only talk to him a little, make his task easier, but in no case betray his fears that his own imagination was playing a cruel joke on him. Well, that’s how he saw it. **It couldn’t be otherwise**. He had to succumb to self-suggestion.’

(PNC, P. Krawczyk, *Plamka światła*, 1997)

epistemic

- (32) *Zupełnie inna może być sytuacja lekarzy wojskowych. Są oni żołnierzami zawodowymi, więc nowa ustawa nie pozostawia im wyboru. Tymczasem z Iraku dochodzą wieści, że naszym wojskowym służbom medycznym potrzebna jest pomoc.*

‘A completely different situation can apply to military doctors. They are professional soldiers, so the new law doesn’t leave them with a choice. Meanwhile, news is coming from Iraq that our military medical services need help.’

(PNC, “Dziennik Bałtycki”, 19.05.2004)

ambiguous

### 3.5. Aspect, telicity, negation, and pluractionality

Finally, let us examine a possible impact of pluractionality in connection with *móc/można*. Tables 3a–3b contain figures that are the result of a binary contrast that distinguishes between limited and unlimited “counts” of situations; for illustrations see the following examples. The group with limited count conflates reference to a single occurrence and

to a limited iteration of occurrences, the other group unites all cases where the count was not limited. These conflationations were necessary due to the sparseness of data in some categories.

The following examples illustrate different combinations of the relevant features:<sup>22</sup>

- (33a) „Dziś **mogę prosić** tylko o wybaczenie” – napisał Maleszka przyznając się do współpracy.  
 ‘“Today, I can only ask for forgiveness,” wrote Maleszka, admitting to collaboration.’  
 (PNC, M. Kwaśniewski, *Agenci biegli z tyłu*, 2002)  
 +limited count of situation, single, –neg
- (33b) *Rozpoznając poprzednią kasację Sąd Najwyższy **nie mógł się zająć** tym zagadnieniem wobec jednoznacznie korzystnego wówczas dla strony skarżącej stanowiska Sądu Apelacyjnego, że weksel został przedstawiony wystawcy, czego strona skarżąca oczywiście nie kwestionowała.*  
 ‘While hearing the previous annulment, the Supreme Court could not address this issue due to the unequivocally favourable stance of the Appellate Court at that time, which stated that the bill of exchange had been presented to the issuer, an assertion that the complaining party, of course, did not dispute.’ (PNC, Supreme Court, resolution of 21.03.2001)  
 +limited count of situation, single, +neg
- (34a) *Jeleniogórzanka Keila Beachem kilkakrotnie **mogła się** tylko **przyglądać**, jak Magdalena Leciejewska z Lotosu zdobywała kolejne punkty.*  
 ‘Keila Beachem from Jelenia Gora several times could only watch as Magdalena Leciejewska from Lotos scored more points.’  
 (PNC, “Słowo Polskie Gazeta Wrocławska”, 26.02.2007)  
 +limited count of situation, iter, –neg
- (34b) *Zaiste, niektórzy wskazani **nie mogli się podnieść** o własnych siłach i musieli korzystać z pomocy innych.*  
 ‘Indeed, some of those appointed were unable to rise on their own and had to rely on the assistance of others’. (PNC, G. Mathea, “IV Rzeczpospolita”, 2005)  
 +limited count of situation, iter, +neg
- (35a) – *Och, panie Filipie, jakież pan punktualny, na pana **można zawsze liczyć** – wołała Helena od drzwi. – Mało jest dziś takich rzetelnych ludzi jak pan.*  
 ‘“Oh, Mr. Filip, how punctual you are! You can always be counted on,” called Helena from the door. “There are few reliable people like you today.”’ (PNC, K. Kofta, *Fausta*, 2010)  
 –limited count of situations, –neg

<sup>22</sup> Example (34a) is not part of our sample, since this combination did not occur in it. The purpose of providing it here is to illustrate what such a combination looks like and that these combinations do occur in natural language use.



- (35b) *Zdarzało mi się później oglądać przeróżne parady najróżniejszych nacji, ale żadna z nich pod względem tego nieprawdopodobnego klimatu **nie mogła się równać** z irlandzką paradą z okazji Dnia Świętego Patryka.*  
 ‘Later, I happened to watch various parades of various nations, but none of them could compare to the Irish St. Patrick’s Day parade in terms of this incredible atmosphere.’  
 (PNC, K. Sławińska, *Nowy Jork. Przewodnik niepraktyczny*, 2008)  
 –limited count of situations, +neg
- (36a) *Na razie, mógł kupić mleko we wsi, najwidoczniej **mógł** już **chodzić** po okolicy. Mając gotowaną wodę i płatki owsiane, Agnus pewien był, że już wkrótce będzie zdrowy.*  
 ‘For now, he could buy milk in the village; evidently, he could already walk around the area. With boiled water and oatmeal, Agnus was certain that he would be healthy again soon.’  
 (PNC, A. Anonimus, *Nie nadaje się, przecież to jeszcze szczeniak*, 1999)  
 generalized, –neg
- (36b) *W dawnych, bardzo dawnych czasach żyła w miasteczku dziewczyna, która miała serce z kamienia – **nie mogła pokochać, nie mogła znieawidzić, nie mogła się smucić ani radować.***  
 ‘Long, long time ago, there lived in a town a girl who had a heart of stone – she couldn’t love, couldn’t hate, couldn’t grieve or rejoice.’  
 (PNC, H. Kowalewska, *Tego lata, w Zawrociu*, 1998)  
 generalized, +neg

Table 3a presents the figures for telic predicates (regardless of the change of state distinction) in combination with *móc/można* and with negation.

+NEG	+limit (single +iter)	–limit (incl. generalized)	
PFV	60	67	127
IPFV	1	36	37
Σ	61	103	164
–NEG			
PFV	75	88	163
IPFV	23	23	46
Σ	98	111	209

Table 3a. Reference to limited and unlimited counts of situations: telic predicates

Regarding negation, there is some correlation, with a highly significant p-value and a moderate effect size ( $p = 2.141 \times 10^{-6}$ , Cramer's  $V = 0.385$ ). By contrast, without negation there is no correlation at all ( $p = 0.76$ , Cramer's  $V = 0.03$ ). If negated and unnegated cases are considered jointly, there is still a significant correlation, but the effect size is very small ( $p = 0.033$ , Cramer's  $V = 0.12$ ). Evidently, negation makes a big difference.

With atelic predicates, all data is much more skewed, regardless of negation (see Table 3b). The sample contains hardly any pfv. stems, so that sensible statistic tests cannot be performed. However, the raw figures reveal that ipfv. stems show a stronger propensity toward situations with unlimited repetitions, particularly in negated contexts.

+NEG	+limit (single +iter)	-limit (incl. generalized)	
PFV	1	3	4
IPFV	45	112	157
Σ	46	115	161
-NEG			
PFV	4	3	7
IPFV	38	71	109
Σ	42	74	116

Table 3b. Reference to limited and unlimited counts of situations: atelic predicates

Actually, the aspect distribution for atelic predicates, regardless of negation, looks inverse in comparison to telic predicates under negation. Thus, if we compare telic and atelic predicates and, for each of them, merge their negated and unnegated tokens, we observe a highly significant bias of pfv. stems toward limited situations, although effect size is small ( $p = 0.002$ , Cramer's  $V = 0.18$ ). If, however, we do our calculations without the negated tokens, there is practically no effect at all ( $p = 0.23$ , Cramer's  $V = 0.07$ ).

After all, as for associations with a basic pluractionality split (single+limited count vs unlimited count), both the telic – atelic distinction and aspect (pfv.: ipfv.) appear to play a role. Nonetheless, the effect of the telic – atelic distinction can be considered stronger: in the scope of *móc/można*, atelic meanings are almost exclusively expressed by ipfv. stems, but quite some ipfv. stems also occurred in telic environments. See, for instance, (37):

- (37) *Surkont niczego nie odmawiał, czegokolwiek poprosił „Baltazarek” i tu już **można** było pokazywać palcem czoło. Wrogów sobie nie narobił, bo umiał postępować [...]*  
 ‘Surkont was a pushover for any of Balthazar’s requests, to the point of exposing himself to ridicule [lit.: and here **one could point** their finger at your forehead]. The forester made few enemies, for he knew how to act with discretion [...]
- (PNC, C. Miłosz, *Dolina Issy*, 1993[1955], Engl. by L. Iriborne, *The Issa Valley. A Novel*, 1981)

Apart from that, aspect is considerably influenced by a/telicity. However, an even more important impact can be ascribed to negation: for ipfv. stems, negation diminishes the chances for reference to a single situation or limited repetition more significantly; with pfv. stems no such effect could be observed (see Table 3a), and only negation leads to remarkable contrasts between stems distinguished by a/telicity and/or by aspect. We should, however, remember that all of these findings concern infinitives under the scope of POSS modals. It would thus be premature to draw more general conclusions including verbs that are inflected for present tense (without modals).

#### 4. Conclusions

In this article, we assumed that boundedness is the defining feature of pfv. aspect, which, as such, does not depend on telicity. Jointly, we discussed different, partially divergent notions of ‘telicity’ in research on aspect and actionality, and we argued that attempts at reducing pfv. aspect to ‘telicity’, ‘resultativity’ or similar notions have been deemed to fail, because they cannot account for the real functional and syntactic distribution of pfv. and ipfv. stems. As a grammatical category, the opposition between pfv. and ipfv. stems in Slavic is charged with a large number of heterogeneous functions, and some of them may systematically override telicity and other actionality-related distinctions.

Against this background, we decided to put assertions about correlations between aspect choice and modality interpretations to the test, in order also to account for distributions in real usage. For this purpose, we investigated such correlations on the basis of random samples from a large corpus, by examining a rather specific grammatical context, namely, aspect choice of the infinitive in the scope of the main possibility modals (*móc, można* ‘can’) in Polish. This specific context was chosen, because it has played a prominent role in discussions about the ‘aspect-modality interface’. Our corpus-based investigation started from a clear separation of telic and atelic stems (respectively, usage on clause level) and a clear distinction between aspect membership and actionality classes. We also separated a minority of nominal predicates (denoting states) from the bulk of verbal predicates, and only the latter ones were submitted to statistical standard calculations. The results can be subsumed as follows.

In general, negation has no conceivable impact on the actionality interpretation of verbal predicates; a small, but insignificant effect may be discerned only for atelic stems. Irrespective of negation, [+change of state] correlates with pfv. stems and [–change of state] with ipfv. stems. This parallels a strong association between pfv. stems and events, on the one hand, and between ipfv. stems and processes and states, on the other; this, in turn, confirms a strong affinity of events with [+change of state] and of processes (apart from states) with [–change of state]. These observations are rather unsurprising. However, we should emphasize that a considerable number of ipfv. infinitives (in the scope of POSS) mark events (as “copies” of their pfv. equivalents), thereby “overwriting” simple actionality distinctions of event vs process often associated to pfv. vs ipfv. aspect, respectively.

As for the main issue of what most influences the modal interpretation of verbal predicates (under the scope of POSS), the picture is much more diversified than suggested by a reduction of modality contrasts to deontic ('root') vs epistemic modality. Some tendencies are clearly palpable, but most of them do not support a simple "projection" of modality domains on a binary contrast of pfv. and ipfv. aspect.

First of all, epistemic readings are altogether very rare, especially in negated contexts where we only found ipfv. infinitives. Relevant tokens from the samples mostly, but not exclusively, refer to states. Without negation, modality interpretations in general do not pattern according to any correlations; this holds true regardless of whether aspect or actionality is assumed as a factor. Negation does favour deontic readings for ipfv. stems, but pfv. stems are not entirely excluded (at least as an optional interpretation) in the same environment. Pfv. stems in general favour circumstantial readings, regardless of negation, but circumstantial readings also make up a large share of ipfv. infinitives under POSS without negation. The same result obtains if we analyse the data with regard to actionality classes: without negation, circumstantial readings are generally most frequent among all classes (including states); under negation the frequency of deontic readings increases, but it exceeds the number of circumstantial readings only for states and atelic processes. These findings together suggest that [ $\pm$ telic] is indeed a more important feature than the opposition between pfv. and ipfv. aspect. Moreover, the main rivals among modal interpretations are deontic and circumstantial ones, and the dominant role of circumstantial readings is somewhat diminished (in favor of ipfv. aspect) only under negation.

As for nominal predicates, negation favours deontic readings as well, whereas without negation the distribution among modal readings is more even, but most tokens have a circumstantial reading, and we encounter a larger number of ambiguous cases.

Because of data scarcity, the role of pluractionality could be examined only on the basis of a split between predicates with a [+limited] and a [-limited] "count" of situations. Given this, [ $\pm$ telic] again turned out as more important than aspect (pfv.: ipfv.), and both oppositions seem to be outperformed by negation, since a significantly different distribution of pfv. vs ipfv. stems for the [ $\pm$ limited] pluractional contrast can be observed only if [ $\pm$ telic] is taken into account, and this effect is propelled in combination with negation.

In conclusion, we have to add two methodological caveats. First, even when p-values reached (highly) significant levels, effect size in general remained less than moderate. Jointly with this, the samples were not too large. Second, one has to admit that a certain number of examples defied an unambiguous annotation according to the criteria established (we marked them as 'doubtful'). The share of such examples in samples drawn from corpora (i.e. more or less natural discourse) might be even larger than suggested by our investigation. Their importance must not be downplayed, although (or rather: because) in many studies these have gone unnoticed or been treated as "noise". They should instead be considered as valuable contexts supplying loci of reanalysis and,

consequently, be treated as a “category” *sui generis*. This separate, and new, object of study could not be addressed in this article.

Finally, we should once more emphasize that our corpus study addressed a rather specific (though prominently discussed) environment for aspect choice in a Slavic language (in this case: Polish), in which modality is explicitly marked by auxiliaries with a maximally broad flexibility of communicative backgrounds (in Kratzer’s sense). Comparison with further study should clarify to what extent modality distinctions as made in this contribution also hold true for other environments where modality is marked less explicitly, or where it is covert.

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## SUMMARY

**Keywords:** Polish, aspect, modality, auxiliaries, corpus-based analysis

This article addresses the connection between aspect, actionality, and modality, and it investigates biases in modal interpretations of aspect choice for infinitives under the scope of possibility modals. Samples from the Polish National Corpus provide an empirically testable ground towards answering the question whether such biases are motivated by aspect or rather by actionality. Negation with *ipfv.* infinitives shows a considerable bias for deontic readings, while *pfv.* infinitives clearly favour circumstantial ('dynamic') readings irrespective of negation. The basic split amounts to a distinction between deontic and circumstantial (not deontic vs epistemic) readings. The study underlines the importance of not confusing aspect with a/telicity distinctions or other features relevant for actionality.

## STRESZCZENIE

**Relacje między znaczeniami modalnymi i znaczeniami aspektowymi w języku polskim. Odpowiedzi z badania korpusowego**

**Słowa kluczowe:** język polski, aspekt, modalność, czasowniki posiłkowe, analiza korpusowa

Tematem artykułu jest relacja między aspektem, akcjonalnością i modalnością. Stawia on pytanie o czynniki decydujące o preferowanej interpretacji modalnej konstrukcji złożonych z czasownikowego operatora możliwości i bezokolicznika. Na materiale Narodowego Korpusu Języka Polskiego przeprowadzono badania mające na celu ustalenie, czy czynnikiem ważniejszym jest aspekt, czy raczej akcjonalność wyrażenia bezokolicznikowego. Badania te wykazały, że negacja w połączeniu z bezokolicznikami aspektu niedokonanego wyraźnie sprzyja interpretacjom deontycznym, podczas gdy bezokoliczniki aspektu dokonanego wyraźnie preferują interpretacje okolicznościowe ('dynamiczne') niezależnie od negacji. Podstawowa dychotomia nie polega na opozycji interpretacji deontycznych i epistemicznych, lecz raczej dotyczy różnicy między znaczeniami deontycznymi a okolicznościowymi. Ważne jest przy tym staranne odróżnianie aspektu zarówno od znaczeń (a)telicznych, jak i od innych cech istotnych dla akcjonalności.