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On Scalarity in the Verbal Domain.
The Case of Polish Psych Verbs.
Part 2: The Aspectual Classes of Polish Psych Verbs, Perfectivity, and Scales

Abstract

Polish perfective psych verbs are generally analyzed as inceptive predicates denoting the beginning of an emotional state holding of an experiencer. However, a perfective psych verb can also denote an event of gradual scalar change. In this paper, I argue that on the inceptive reading a perfective psych predicate denotes a transition from a state in which p does not hold to a state in which p holds of an experiencer. In events of gradual change, there is an increase in the degree on the scale of intensity of a given psych state or on the (abstract) extent scale contributed by a verb's argument. As the internal temporal structure of the events denoted by perfective psych predicates can depend on elements of syntactic context outside the verb, the domain of aspectual composition in Polish is not the verb, *pace* Rothstein (2020), but VoiceP/vP.

Abstrakt

Dokonane czasowniki stanów emocjonalnych są zwykle analizowane jako czasowniki wyróżniające fazę początkową danego stanu. Te same predykaty mogą w pewnych kontekstach składniowych wyrażać znaczenia ewolutywne. W artykule przedstawiona jest hipoteza, że w kontekstach inicjalnych, czasownik wyraża moment zaistnienia stanu w nosicielu. W kontekstach ewolutywnych predykat wyraża stopniową zmianę na skali intensywności stanu lub stopniowe nabycie stanu przez wszystkie części podzielnego

argumentu czasownika. Zależność interpretacji wewnętrznej struktury temporalnej zdarzeń od kontekstu składniowego pokazuje, wbrew tezie zawartej w pracy Rothstein (2020), że interpretacja rodzaju zdarzenia nie jest określona na poziomie czasownika dokonanego, ale ustalana jest na poziomie struktury zdaniowej (VoiceP/vP).

Słowa kluczowe

inicjalność, *Aktionsart*, aspekt dokonany, Hipoteza Skali, zmiana skalarna, czasownik parametryczny, nosiciel stanu, język polski

3. The aspectual properties of Polish psych predicates[1]

As has been shown in Section 2 (cf. Willim 2020), regardless of whether the combination of a prefix and a base verb or bound root is interpreted in a (fully) compositional manner, as in the case of e.g. *kochać*^{I}/**po***kochać*^{P} 'love', or not, as in the case of, e.g. **po***cieszyć*^{P}/**po***cieszać*^{SI} 'comfort' where the prefix deriving the perfective stem combines with the base verb *cieszyć*^{I} 'please' and **za***dowolić*^{P}/**za***dowalać*^{SI}, where *za*- combines with a bound root, the argument structure and argument realization patterns of Polish psych verbs belonging to the morphosyntactic classes given in (16)–(21) in Section 2 and summarized here in (29) are not affected by the imperfective/perfective distinction.[2]

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[2] The prefixes are bolded in the examples given in this paper and they are separated from their bases with a full stop mark in the glosses. The superscript *I* is added to an underived imperfective verb, *SI* indicates secondary imperfective, which has a prefix in its stem, and *P* indicates perfective aspect, a notation used throughout this paper. Grammatical information is given in the glosses only where necessary and the glossing conventions in the material reproduced from cited works are adapted to the glossing conventions adopted here. Other abbreviations used in the text and the glosses in this part of the paper are: ACC – accusative, DA – degree achievement; DAT – dative; EXP –experiencer; GEN – genitive; NOM – nominative; OBL – oblique; PP – prepositional phrase; s – stimulus; SE – reflexive clitic/Voice marker. Altogether, 11 prefixes combining with bare (prefixless) imperfective verbs and/or bound roots have been found in the perfective psych verbs listed in Section 2. Some perfective verbs occurring in the construction types in (29c), (29d) and (29d) have prefixed secondary imperfective (*SI*) partners, but the semantic contrast between the aspectually paired verbs is the same regardless of whether the imperfective verb is bare or it is a secondary imperfective derived from a prefixed stem with the *SI* morpheme −*ywa* and its allomorphs. The prefixes in the stems of Polish psych verbs are taken here to be merged VP-internally in Polish (cf. Section 2). This assumption is based on the observation that *SI* morphology scopes over prefixed stems in *SI* psych verbs and further, the interpretation of a prefix and a verb(al root) need not be (fully) compositional, VP being the domain of lexical idiosyncrasy (cf., a.o., Ramchand 2004, 2007; Svenonius 2004). For further arguments against merging various Slavic prefixes expressing aspectual and quantificational notions of inception, delimita-

(29) a. Exp_{NOM} – S_{ACC} (Exp in nominative case, S in accusative case), e.g., *lubić*[I]/***polubić***[P] 'like'

   b. Exp_{NOM} – S_{OBL} (Exp in nominative case, S in inherent/lexical case or PP), e.g., *tęsknić* [I]/***zatęsknić***[P] 'miss, yearn'

   c. Exp_{NOM} – S_{OBL} (Exp in nominative case, obligatory reflexive clitic *się* encoding antipassive active Voice (S in instrumental case or PP), e.g., *cieszyć* *się*/***ucieszyć***[P] *się* 'be pleased'; ***obrazić***[P] *się*/***obrażać***[SI] *się* 'be offended'

   d. Exp_{ACC} – S_{NOM} (Exp in accusative case, S in nominative case), e.g., *ciekawić*[I]/***zaciekawić***[P] 'interest'; ***olśnić***[P]/***olśniewać***[SI] 'dazzle, stun'

   e. Exp_{DAT} – S_{NOM} (Exp in dative case, S in nominative case), e.g., *podobać*[I] *się*/***spodobać***[P] *się* 'appeal to'; ***dokuczyć***[P]/***dokuczać***[SI] 'bother'

   f. Exp_{NOM}, e.g., *smutnieć*[I]/***posmutnieć***[P] 'sadden'

This section focuses on the interactions between lexical (situational) aspect of Polish verbal psych predicates, sometimes also referred to as *Aktionsart*, and grammatical (viewpoint) aspect. Although both situational aspect and viewpoint aspect are the linguistic means of expressing the temporal structure of the eventualities described by verbs and/or verbal predicates and sentences, situational aspect is often analyzed as the abstract, ontological type of eventuality, distinguished with respect to the aspectually relevant concepts of change of state or transition to a specified state, the presence of a natural endpoint, limit or boundary, and temporal extent (Filip 2012). The traditional Vendlerian aspectual classes, i.e. accomplishments, achievements, activities and states are distinguished based on the internal temporal structure of the events denoted by verbs (or verb phrases) rather than on viewpoint aspect distinctions. Accomplishments (e.g. *build a house*) are non-homogeneous events that are temporally extended/durative and have a definite endpoint.[3] Achievements (e.g. *reach the summit, spot*) also have a definite endpoint, but they are instantaneous.[4] Activities, e.g. *swim*, are

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tion, distributivity and accumulation above VP, in or above the Asp projection, see Žaucer (2005, 2013); Tatevosov (2015, 2020) and Rothstein (2020), *inter alia*. The arguments based on Russian data, e.g. the subject-object asymmetry exhibited by the distributive prefix *pere-* and the cumulative *na-* in Russian, can be replicated in Polish.

[3] Informally speaking, an expression is non-homogeneous if it cannot refer to a proper part of what it applies to, e.g. both *an apple* and *eat an apple* are non-homogeneous. An expression is homogeneous if it can refer both to an entity and a proper part of such an entity, e.g., a proper part of *wine* can be referred to with *wine* and a proper part of an event referred to with *drink wine* can also be referred to with *drink wine*. In formal semantic accounts, a homogeneous predicate is cumulative/non-quantized and a non-homogeneous one is non-cumulative/quantized (Krifka 1989, 1992).

[4] Whether durativity is a grammatically relevant meaning component that distinguishes between accomplishments and achievements is a debated issue. For example, in Verkuyl (1972, 1993, 1999), achievements are simply accomplishments with a process part that is too short to be observed. However, as achievements have different entailment patterns and interact with

ongoing events that are homogeneous down to minimal stages (Rothstein 2004). States, e.g. *own a house*, are homogeneous down to time instants and they do not have an endpoint. Unlike activities, which also do not have an endpoint, states do not develop over time. They simply hold in time, being true at every time moment within the interval over which they hold.[5] The perfective and imperfective, which are grammaticalized categories of viewpoint aspect in Slavic, mainly allow the speaker to describe an eventuality as a temporally bounded whole or to refer to its parts or stages excluding the endpoints (Smith 1997).

Polish perfective psych predicates typically denote punctual events (cf. Section 2), but they can also denote events of gradual change along the (abstract) extent scale associated with Exp or along the intensity scale, as illustrated with examples in Section 1 Willim (2020), repeated here for convenience in (30)–(32).

(30) *Jan*   ***po****kochał*[P]   *Marię*   *(bardzo)*   *(w tydzień).*
      John   po.loved   Mary.ACC   a.lot   in week
      'John began to love Mary (a lot) (in a week).'

(31) *W*   *ciągu*   *dwóch*   *dekad*   *zachód*   *stopniowo*
      in   duration   two.GEN   decades.GEN   West.NOM   gradually
      zniechęcił[P]   *się*   *do*   *Pakistanu.*
      z.disheartened   SE   to   Pakistan
      'The West has gradually become disheartened towards Pakistan over the course of (the last) two decades/Western countries have gradually become disheartened towards Pakistan over the course of (the last) two decades.'

(32) *W*   *niecały*   *miesiąc*   *Jan*   *stopniowo*   ***po****kochał*[P]   *Marię*
      in   not.whole   month   John   gradually   po.loved   Mary.ACC
      jeszcze   *bardziej.*
      even   more
      'John gradually got to love Mary even more in less than a month.'

To account for the punctual vs. gradual change readings available with perfective psych verbs, as in (30) vs. (31)–(32), I adopt here a scale-based approach to the analysis of the lexical aspectual properties of verbal predicates (cf., a.o., Hay et al. 1999; Kennedy and Levin 2002, 2008; Beavers 2008, 2012, 2013; Rappaport Hovav 2008, 2014) as well as to the viewpoint perfective/imperfective distinction (cf., a.o., Filip and Rothstein 2006; Filip 2008; Rothstein

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the progressive as well as with temporal adverbials and with phasal verbs differently, they are treated as a separate aspectual class, among others, in Mourelatos (1978), Dowty (1979), Bach (1986), Smith (1997), Filip (1999, 2008), Rothstein (2004), and Beavers (2008, 2012, 2013).

[5] Not denoting change, states are distinguished from the other aspectual classes, which denote dynamic situations and are referred to as events. Following Bach (1986), states and events are cumulatively referred to as eventualities.

2020). In scalar approaches to event descriptions and their aspectual structure, a temporally extended process of change is associated with a multi-point scale that measures the extent of change while a non-gradual/punctual event of change is associated with a two-point scale.[6] The punctual/durative alternation that Polish perfective psych verbs exhibit, as illustrated in (30) vs. (31)–(32), will be argued here to follow from the differences in the mereological complexity of the scale along which the extent of change occurring in the denoted events is measured.

This section consists of three parts. Section 3.1 focuses on the aspectual structure of punctual events denoted by Polish perfective psych predicates. Based on Rozwadowska (2020), I show here that such predicates do not pattern with culminations like *die*, *arrive* or *win*, but with inchoatively/inceptively interpreted happenings like *spot* and *recognize*. Unlike the former, the latter do not have a presupposed preliminary process leading up to a culmination/result state. I suggest here that both experiencer happenings like *spot* and *recognize* and Polish perfective psych verbs denote transitions from a situation in which a given mental or emotional state *p* does not hold of Exp to a situation in which it holds of Exp. Thus, both types of predicates have events with exactly two parts in their denotation.

In Section 3.2, which is concerned with the relationship between situational and viewpoint aspect, I discuss Rothstein's (2020) scale-based approach to perfectivity in Russian (and other Slavic languages), where V, which lexicalizes a null perfective/maximalization operator, is argued to be the sole source of the aspectual properties of VP and IP/TP (cf. also Filip and Rothstein 2006; Filip 2008). I argue here that Polish perfective psych predicates denoting punctual events are not lexically atomic but denote events with two parts, which can be ordered as stages of one another and interpreted with the help of the maximalization operator. As the punctual/durative alternation exhibited by Polish perfective psych verbs depends on the mereological complexity of the scale associated with Exp, the argument encoding the participant transitioning to a given psych state in (30) and (31) respectively, I suggest here that the structure of the scale associated with the events denoted by the predicates in (30) and (31) is not determined at the V-level in Polish, *pace* Rothstein (2020). Rather, although perfective psych

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[6] A scale is a linearly ordered set of values (or degrees) of a dimension, which is a scalar attribute (size, length, width, temperature, cost, etc.) and it is lexicalized by the verb(al root) and/or its argument. The degrees are the values of the attribute. Scales are typically multi-valued and hence gradable, but in many accounts, a scale can also have just two values. Gradable scales have different structural properties and they can, but need not include the minimum and/or the maximum degree(s). A two-valued/binary scale has the minimum and the maximum degrees and it is non-gradable. For discussion, see Kennedy and McNally (2005), Rappaport Hovav (2008, 2014), Beavers (2012, 2013), *inter alia*.

verbs lack incrementality entailments, the structural properties of the scale of the event are determined by the structural properties of the scale associated with Exp.

Section 3.3 is concerned with the relation between the time of the events denoted by Polish perfective psych predicates and reference as well as utterance time and focuses on the (stative) perfect reading of past tense perfective psych verbs. Departing from Rothstein (2004) and Beavers (2008, 2013), I suggest here that the temporal trace of punctual events denoted by perfective psych predicates in Polish does not include two adjacent time instants, but a single time moment that maps onto to the maximal degree on the binary scale associated with the denoted event. The temporal trace of the events of gradual change, which are durative, as in (31) (and (32), also includes a time moment that corresponds to the maximum degree on the scale associated with the event, but the scale is not binary, but multi-valued. The moment in the run time of the event that is determined by the scalar maximum is a definite time moment and it is this moment that is picked out by the perfective operator and related to reference/assertion time and to utterance time (Ramchand 2004, 2007). Thus, on the stative perfect reading of a past tense perfective psych verb, the transition to the psych state lexicalized in a verb is in the past, but the state to which Exp transitions in the event can be in existence at utterance time. The gradual scalar change readings will be discussed in more detail in Section 4.

3.1. Polish psych predicates and the state/event distinction

Polish imperfective psych verbs are either unambiguously stative or they are ambiguous between a stative and an eventive interpretation.[7] By contrast, a perfective psych (partner) verb is unambiguously eventive (Biały 2005; cf. also Rozwadowska 2020), perfective Slavic predicates taking their denotation in the domain of events (Filip 1999, et. seq.). The contrast manifests itself, among others, in the ability of perfective psych predicates to co-occur with the verb $stać^P$ $się$ 'happen' (cf. (33)), argued to diagnose the presence of an event argument by Maienborn (2007) (cf. also Rozwadowska 2020).[8]

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[7] An investigation of the stative/eventive distinction in imperfective psych verbs is beyond the scope of this paper, but it could be analyzed in terms of the individual-level vs stage-level distinction (Dowty 1979; Kratzer 1995) and/or the Kimian-state vs. Davidsonian-state distinction (Maienborn 2007, Rothmayr 2009).

[8] In Biały (2005), psych predicates are diagnosed as eventive based on (1) compatibility with time span adverbials, (2) compatibility with imperative mood (used as a criterion diagnosing inchoative uses of psych predicates as events in Mourelatos 1978), (3) non-stative interpretation in the present tense, and (4) bound iterativity, i.e., compatibility with a numerical expression like *twice*, *several times*, etc. Unambiguously stative verbs in the class of verbs with Exp_{ACC} (cf. (29d)) include *martwić^I* 'worry', ***przygnębiać^{SI}*** 'depress', *interesować^I* 'interest',

Imperfective (psych) verbs cannot co-occur with *stać^p się* (cf. (34); See also Bondaruk (2020: 146, fn. 5) in reference to Exp$_{ACC}$ psych verbs.).

(33) *Maria   znienawidziła^p Jana.   Stało^p się to,   kiedy   ją*
     Mary.NOM   z.hated   John.ACC   happened   SE it   when   she.ACC
     zdradził^p.
     cheated
     'Mary started hating John. It happened when he cheated on her.'

(34) *Maria   nienawidziła^I Jana.   #Stało^p się to,   kiedy   ją*
     ary.NOM   hated   John.ACC   happened SE it   when   she.ACC
     zdradził^p.
     cheated
     'Mary hated John. #It happened when he cheated on her.'

Furthermore, unlike predicates headed by imperfective psych verbs, predicates with perfective psych verbs can be modified by a time span adverbial (cf. (35)), and by a punctual adverbial (cf. (36)).

(35) a. *Oferta   za**interesowała^p Janka   (w pięć minut/ *pięć minut).*
        offer.NOM   za.interested   John.ACC   in five minutes five minutes
        'The offer began to interest John (in five minutes/for five minutes).'
     b. *Oferta   interesowała^I Janka   (*w pięć minut/ ^{OK}pięć minut).*
        offer.NOM   interested   John.ACC   in five minutes five minutes
        'The offer interested John (*in five minutes/for five minutes).'

(36) *Maria   nagle   **po**kochała^p/   #kochała^I Marka.*
     Mary.NOM   suddenly   po.loved   loved   Mark.ACC
     'Mary suddenly started to love Mark.' (Rozwadowska 2020: 43)

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fascynować^{cI} 'fascinate', *smucić^{cI}* 'sadden', *cieszyć^{cI}* 'please'. Object experiencer (Exp$_{ACC}$) verbs ambiguous between the stative and eventive readings include *irytować^{cI}* 'irritate', *straszyć^{cI}* 'frighten', **obrzydzać^{SI}** 'disgust', **za**wstydzać^{SI} 'shame'. The stative and eventive readings of an Exp$_{ACC}$ verb that can license either reading are shown in (i) and (ii) respectively from Bondaruk (2020: 144).

(i) *Podwyżki   cen   irytowały^I Ewę.*
    rises.NOM   prices.GEN   irritated   Eve.ACC
    'Price rises irritated Eve.'
(ii) *Głos   Marka   **po**irytował^p Ewę.*
    voice.NOM   Mark.GEN   po.irritated   Eve.ACC
    'Mark's voice irritated Eve.'

Agentively interpreted Polish object experiencer psych verbs, which license an agent-oriented adverbial like *celowo* 'deliberately' and a purpose clause, have been analyzed not as psych verbs, but as incremental (agent-patient) verbs in Biały (2005) (Belletti and Rizzi 1988; Pesetsky 1995; Landau 2010, *inter alia*). As such, they typically denote temporally extended events with a process part controlled by an agent leading up to a result state and are associated with a multi-valued scale. The agentive uses of psych verbs will not be discussed further here.

Inchoative (eventive) uses of experiencer verbs of mental and psych state in English/Germanic languages typically license time span adverbials with the *after*, but not with the *during* reading (cf. (37)). Following Vendler (1957), they have often been analyzed as achievements (cf. Mourelatos 1978; Dowty 1979; van Voorst 1992, Piñón 1997; Smith 1997; Filip 1999; Rothstein 2004; Rothmayr 2009). Slavic perfective verbs of mental and psych state have been analyzed as achievements, among others, in Smith (1997), Filip (1999), Młynarczyk (2004), and Łazorczyk (2010). As shown in (38), only the perfective counterpart of *understand* is compatible with the time span adverbial in the Polish translational equivalent of (37).

(37) John was curious to find out where his grandfather had been born, and with the help of the record office he knew the answer in a few hours.

(Rothstein 2004: 16)

(38) *Jan chciał^I się **do**wiedzieć^P, gdzie urodził się jego dziadek i z pomocą biura ewidencji*
      znał^I/^{OK}poznał**^{P} odpowiedź   w kilka   godzin.*
      knew/po.knew   answer.ACC   in several   hours
      'John wanted to find out where his grandfather had been born and with the help of the record office he knew the answer in a few hours.'

However, predicates categorized as achievements by Vendler (1957) are not a homogeneous class (cf., a. o., Bach 1986; Piñón 1997; Filip 1999; Engelberg 2004).[9] For example, Bach (1986) distinguishes between culminations like *die, win* and *arrive* and happenings like *spot* and *notice* on the basis of the availability of a predicate to occur in the progressive (cf. also Dowty 1979; Rothstein 2004). Culminations, which can be used in the progressive, display the imperfective paradox, i.e. a progressive (imperfective) assertion does not entail that the event has occurred, as shown in (39). Happenings are generally incompatible with the progressive, but they may be felicitous in some special contexts, which Rothstein (2004: 56) refers to as "slow-motion" readings. For example, (40a) is felicitous if the speaker is "describing what is happening in a film which is being played before us (maybe being played at a slow pace), or […] describing the events of a party to an onlooker." Importantly, the progressive does not induce the imperfective paradox with happenings, i.e. a progressive assertion, available in (40a) on the special "slow-motion" explained above, entails that the event has occurred. Thus, negating the occurrence of the event yields a contradiction, as shown in (40b) from Rothstein (2004: 57).

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[9] Semelfactives like *pinch*, not discussed in Vendler (1957), are a separate class of punctual events, among others, in Bach (1986), Smith (1997), Engelberg (2004), and Beavers (2008, 2013), as they do not denote transitions to a (result) state. They are omitted from discussion here.

(39) Jane is reaching the summit, but she has not reached it yet.

(40) a. Mary is spotting her arch enemy at the party at the moment.
       b. #Mary is spotting her arch enemy at the party but she hasn't yet spotted her.

Although progressively interpreted imperfective Polish psych verbs do not require a special "slow-motion" scenario, similarly to English psych verbs in the progressive (van Voorst 1992: 69), they do not give rise to the imperfective paradox, exhibiting the entailment pattern characteristic of happenings (cf. (40b)), but not of culminations (cf. (39)). This is shown in (41) and (42) respectively.[10, 11]

(41) a. #*Maria*   *złościła^I*   *Janka,*   *ale*   *go*   *nie **rozzłościła**^{P}*.
          Mary.NOM   annoyed   John.ACC   but   he.ACC   not za.annoyed
          '#Mary was annoying John, but she did not get him annoyed.'
                                                                        (Rozwadowska 2020: 46)
      b. #*Widok*   *mieszkania*   *mile*   *mnie*   ***za**skakiwał^{SI}*,
          look   apartment.GEN   pleasantly   me   za.surprise
          ale   *mnie*   *nie*   ***za**skoczył^P*.
          but   I.ACC   not   za.surprised.
          'The apartment's look was pleasantly surprising me, but it did not surprise me.'
                                                                        (Rozwadowska 2020: 47)

(42) *Marek*   ***wy**grywał^{SI}*   *mecz,*   *ale*   *go*   *nie*   ***wy**grał^P*.
      Mark.NOM   wy.win   match.ACC   but   it.ACC   not   wy.won
      'Mark was winning the match, but he did not win it.'
                                                                        (Rozwadowska 2020: 46)

Culmination achievements and Polish perfective psych verbs also pattern differently with respect to the event continuation test, which Rozwadowska (2020) uses as a test diagnosing the presence of a final endpoint in a process event in the denotation of a predicate. Perfective culminations are inconsistent with the *nadal* 'still' adverbial, which modifies the presupposed preliminary event of change terminating at the transition to a result state. By contrast, the *nadal* 'still' adverbial can modify a psych predicate. However, what it can modify is only the state to which Exp transitions in an event denoted by a perfective psych predicate. The contrast is shown in (43) and (44) respectively.[12]

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[10] The progressive interpretation is available only with (some) imperfective verbs in Polish (cf. Rozwadowska 2020, cf. also fn. 7).

[11] For reasons of space, I refer the readers to Rozwadowska (2020) for further tests that do not diagnose punctually interpreted psych predicates in Polish as culmination achievements.

[12] Piñón (1997) analyzes English happenings like *recognize* as beginning of states (of recognizing), where if Anita suddenly recognizes Peter, there is a beginning of a state in which she recognizes him, the state stretches temporally to the right, and it is not immediately preceded

(43) #*Janek*   ***zdobył***^{P} *szczyt*   *i*   *nadal*   *go*   ***zdobywa***^{SI}.
    John.NOM   z.reached   summit   and   still   it.ACC   z.reaches
    '#John reached the summit and he is still reaching it.'

(44) *Jan*   ***po***kochał^{P} *Marię*   *i*   *nadal ją*   *kocha*^{I}.
    John.NOM   po.loved   Mary.ACC   and   still she.ACC   loves
    'John started to love Mary and still loves her.'

(Rozwadowska 2020: 50)

Assuming with Mourelatos (1978: 416) that achievements "capture either the inception or the climax of an act" (cf. also Piñón 1997), I suggest here that similarly to experiencer happenings like *recognize*, which denote events in which Exp transitions from the state of not being aware to the state of being aware of the stimulus (cf. fn. 13), punctually interpreted Polish perfective psych verbs denote an instantaneous transition from a situation in which Exp is not in a given psych state towards a stimulus or triggered by a stimulus to a situation in which Exp is in the given psych state. Accordingly, the events denoted by experiencer happenings and Polish perfective psych verbs interpreted punctually have exactly two parts in their lexical semantics: the set of states in which Exp is not in the psych state lexicalized in the base verb(al root) and the set of states in which Exp is in the given psych state. If perfective happenings and perfective psych verbs denote transition events, they have a salient endpoint in their meaning, but unlike in the case of culminations (cf. (42)–(43)), this endpoint is not the termination point of a (pre-supposed) process event leading up to a (result) state.[13]

Punctually interpreted Polish psych predicates are headed by perfective verbs, raising the question of the relationship between the *Aktionsart* of Polish perfective psych predicates and perfectivity, a viewpoint aspectual category. I address this question in the next section against the backdrop of Rothstein's (2020) approach to perfectivity in Russian (and other Slavic languages), in which the aspectual properties of VP (and IP/TP) in Slavic are determined solely at the V-level.

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by a state in which she recognizes him. A similar analysis of happenings as punctual events followed by a state to which the subject argument transitions is offered in Engelberg (2004). The event of change preceding the culmination is analyzed as presupposed in Engelberg (2004), a view that I adopt here.

    [13] The absence of a process subevent in the lexical meaning of experiencer happenings and Polish perfective psych predicates denoting punctual events militates against analyzing such predicates as involving the BECOME operator of Dowty (1979: 141), which has often been used in the analysis of both accomplishments and (culmination) achievements (cf., a.o., Pustejovsky 1991; Rothstein 2004; Rothmayr 2009). For discussion, see Marín and McNally (2011), Willim (2016), and Rozwadowska (2020).

3.2. Aspectual composition, Polish perfective psych predicates, and perfectivity

Unlike in English and other Germanic languages, where aspectual composition and in particular, (a)telicity is determined at the level of VP (and/or IP/TP), the aspectual structure of perfective predicates is often taken to be determined at the V-level in Russian and other Slavic languages (Verkuyl 1972, 1993, 1999; Krifka 1992; Filip 1999, et seq.; Piñón 2001; Filip and Rothstein 2006; Rothstein 2020, *inter alia*). The evidence that the internal temporal structure of the events denoted by verbal predicates is not determined at the V-level in English/Germanic languages is offered by strictly incremental verbs like *drink* and by incremental verbs like *write*, which specify in their meaning a homomorphic/incremental mapping relation from objects to events and which denote telic or atelic events depending on whether their incremental theme argument is quantized or not (e.g. *drink a glass of wine* vs. *drink wine*).[14] In Russian (and other Slavic languages), atelic predicates corresponding to English predicates like *drink wine* and *write letters* cannot be expressed with perfective verbs. In Rothstein (2020), this follows on the assumption that perfective verbs denoting change lexicalize a null maximalization operator over events (Max_E) defined in (45) (cf. also Filip and Rothstein 2006; Filip 2008).

(45) The perfective operator PERF = MAX_E, a monadic operator, such that $MAX_E (\Sigma) \subseteq \Sigma$, mapping a set of plural events Σ onto the set of maximal, completed events $MAX_E (\Sigma)$.

(Rothstein 2020: 165, (28))

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[14] Aspectual composition is a systematic interaction between the aspectual properties of (incremental) verbal predicates and the referential properties of incremental theme argument(s), which stand in different homomorphic/structure preserving/incremental relations to the event (cf., a.o., Verkuyl 1972, 1993, 1999; Krifka 1989, 1992, 1998; Jackendoff 1996; Filip1999). The main idea is that if a predicate specifies a homomorphic/incremental relation between the part structure of an incremental theme argument, which can be the object of a creation/consumption verb like *write* and *drink* respectively, the path of a directed motion verb, e.g., *cross*, or a property of an argument of a so-called degree achievement verb like *widen* or *cool*, and the part structure of the denoted event, the referential properties of the incremental theme are transferred onto the referential properties of the event. Thus, a quantized incremental theme gives rise to a quantized VP (and/or IP/TP), e.g., *drink a glass of wine*, which is compatible with a time span, but not with a durative adverbial, e.g., *drink a glass of wine in five minutes/*for five minutes*. A cumulative/non-quantized incremental theme determines an atelic (ongoing) event at the level of VP (and/or IP/TP), e.g., *drink wine*, which can be modified by a durative, but not by a time span adverbial. e.g., *drink wine for five minutes/*in five minutes*. The referential properties of the arguments of predicates that do not specify an incremental relation in their lexical semantics do not affect the aspectual interpretation of the predicates headed by such verbs. For example, *carry the books* and *push a cart* are atelic although their internal arguments are quantized.

Max$_E$ defined in (45) applies to a set of partially ordered events denoted by a non-perfective/imperfective verb and returns the set of maximal events, which are the most developed events denoted by a verb and hence, are events with a final endpoint (cf. also Section 1 for discussion).[15] An event is maximal (and completed) relative to a parameter or dimension which determines what counts as a maximal event. According to Rothstein (2020: 167), most Russian verbs do not lexically express an endpoint, but "prefixes or the infix −*nu* add lexical information as to what the end point of the event is and this information determines the parameter with respect to which maximality is determined". For example, the cumulative prefix *na-* in ***na**stroit*^{P} 'build a lot' indicates that maximality is with respect to the quantity of the theme. The delimitative prefix *po-*, combined with an activity verb like *guljat*^{I} 'walk', indicates that maximality is with respect to the temporal parameter. A prefix in a paired incremental perfective verb, as in the pair *stroit*^{I}/***po**stroit*^{P} 'build', indicates that the parameter for maximalization is the incremental structure of the event denoted by the verb, i.e. the BECOME relation between an event of change and its incremental theme argument. Max$_E$ constrains the end point of the denoted event, enforcing the interpretation of the event as completed. At the same time, the maximalization operator enforces a maximal, quasi-definite interpretation of a bare plural or mass incremental theme argument, as illustrated in (46).

(46) *On*   ***vy**dal*^{P} *knigi*   *i*   *ušel*^{P} *domoj.*
       he.NOM   vy.gave   books.ACC   and   u.went   home
       'He gave out the/a specified quantity of books and went home.'
                                                                    (Rothstein 2020: 169)

A small set of underived verbs lexically specify the termination point. Included in this class are verbs of change of location like *javit'sa*^{P} 'arrive', verbs of change of possession like *dat*^{P} 'give' and verbs of change of position like *sest*^{P} 'sit down'. According to Rothstein (2020: 166), the termination point of the events described by *javit'sa*^{P} 'arrive', which "denotes sets of change-of-state events where the change is from a situation or state of not being in

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[15] Maximalization over events presupposes an external linear order/a scale associated with an event, which is a "measuring device" on the size of the events in the denotation of a predicate. To function as a measuring device, the scale must have a lexically or contextually specified endpoint (Filip 2008). According to Filip, in English/Germanic languages, the scale associated with an event of change is inferred in the presence of an incremental theme argument and/or a verb lexicalizing a property scale with a maximum degree/value, e.g. *cool*, *straighten* or *empty*. In Slavic, where not only verbs derived from upper-closed adjectives, but also verbs derived from an open scale can be perfective, the upper bound of a scale lexically associated with the open scale root adjective is supplied contextually. See Section 4 for further discussion.

a certain place to a state of being in that place," is "the beginning of the state of being in the new place."

Although perfective psych verbs in Polish are not underived and include a prefix in their stems, compatibility with a time span adverbial with the *after* interpretation, as in (35a), supports their analysis as denoting atomic events (Krifka 1992). In Rothstein's approach, such verbs cannot be interpreted by means of Max_E. The reason is Max_E operates over events while non-perfective/imperfective partners of perfective verbs like ***pokochać***^{P} in (30), ***zniechęcić***^{P} 'dishearthen' in (31) or ***za***interesować^P 'interest' in (35a), i.e. *kochać*^{I} 'love', ***zniechęcać***^{SI} 'dishearten' and *interesować*^{I} 'interest' respectively, take their denotation in the domain of states, which do not have stages, and not in the domain of events. Thus, on Rothstein's (2020) assumptions, the only way in which the events denoted by perfective psych verbs can be punctual is if the predicates are lexically atomic and denote unordered sets of indivisible singular events, similarly to the underived Russian achievement verbs mentioned above and to English achievement verbs like *die*, *arrive*, etc. However, if Polish perfective verbs denoting punctual events are lexically atomic, they should pattern with English achievements. In particular, a bare mass or plural argument should shift the denotation of the predicate to a plural denotation in Slavic, similarly to English, where the plural events denoted by achievement predicates cannot be ordered with respect to one another unless the bare plural argument can be interpreted in context as an incremental theme and support a mapping from the scale of objects to the scale of the event. As observed by Filip (2008), the predicate in (47a) denotes a plurality of punctual events which cannot be ordered with respect to one another because a dog does not circumscribe the amount of fleas that can be found on it. Hence, the predicate does not license a time span adverbial. While the predicate in (47b) also denotes a plurality of events, the events can be ordered with respect to one another, because our knowledge of plays allows for a construal on which the event is delimited by a finite number of actors needed to be cast in a play. In other words, the bare plural argument is an incremental theme in (47b), but not in (47a).

(47) a. John found crabgrass in his yard/fleas on his dog for six weeks/*in six weeks.
b. John found actors for his new play *for six weeks/^{OK} in six weeks.

(Filip 2008: 239)

As Filip (2008) points out, in contrast to (47a), a bare plural or a bare mass object argument of an achievement verb does not shift the denotation of the verb to a plural domain in Slavic. Unlike (47a), (48a) cannot be interpreted as ongoing. The Polish equivalent of (48a) also cannot be interpreted as ongoing (cf. (48b)).

(48) a. *Našla^P*   *mravence/smetí*   *na dvorku*   **celý   týden/* ^OK*za   týden.*
         found   ants.ACC dirt.ACC   in yard   whole   week   in   week
         'She found ants/dirt in the yard in a week.' [inchoative reading 'after a week']
         (adapted from Filip 2008: 243)

     b. *Znalazła^P*   *mrówki/śmieci*   *na podwórku*   **cały   tydzień/* ^OK*w tydzień.*
         found   ants.ACC dirt.ACC on yard   whole week   in week
         'She found ants/dirt in the yard in a week '[inchoative reading 'after a week']

To explain the difference between the durative (47a) and the non-durative
(48a), Filip (2008) suggests that although monomorphemic achievement
predicates denote sets of singular events in Slavic, they are nonetheless in-
terpreted by means of Max_E. Applying to the denotation of an achievement
verb by default in Slavic, Max_E preempts the shift into a plural interpreta-
tion. Thus, underived achievements can denote sets of (unordered) singular
events or pluralities thereof in English, but not in Slavic. The question that
arises is whether perfective psych predicates, despite not being underived,
can also be taken to denote sets of (unordered) singular events and to be in-
terpreted with the help of Max_E by default. The answer is negative, as Polish
perfective psych predicates do not just denote strictly instantaneous events,
but they can also denote durative events, depending on the mereological
complexity of the scale associated with Exp, as illustrated in (30) vs. (31), re-
peated for convenience below.

(30) *Jan*   ***po**kochał^P*   *Marię*   *(bardzo)*   *(w tydzień).*
      John   po.loved   Mary.ACC   a.lot   in week
      'John began to love Mary (a lot) (in a week).'

(31) *W*   *ciągu*   *dwóch*   *dekad*   *zachód*   *stopniowo*
      in   duration   two.GEN   decades.GEN   West.NOM   gradually
      zniechęcił^P   *się*   *do*   *Pakistanu.*
      z.disheartened   SE   to   Pakistan
      'The West has gradually become disheartened towards Pakistan over the course
      of (the last) two decades/Western countries have gradually become disheartened
      towards Pakistan over the course of (the last) two decades

To account for the punctual/durative alternation shown above, I suggest
here that as the transition events denoted by Polish perfective psych predi-
cates have two parts, viz. the set of states of Exp not being in the psych state
lexicalized by the verb(al root) and the set of states of Exp being in the giv-
en psych state, the two parts can be ordered as stages of one another. On
this assumption, although psych verbs do not have incrementality entail-
ments, the events they denote can be interpreted with the help of Max_E and
be associated with a scale. Building on Beavers (2008, 2012, 2013) and Rap-
paport Hovav (2008, 2014), I suggest here that punctual events denoted by
predicates with perfective psych verbs are associated with a two-point scale,

where the initial degree, represented with 0, corresponds to the set of states of Exp not being in a given psych state, and the final degree, represented with 1, corresponds to the set of states of Exp being in the given psych state. In (30), which describes a punctual event, Exp, the argument encoding the participant transitioning to the state of loving Mary, is atomic. Thus, the denoted event cannot be decomposed into parts. In (31), parts of Exp transition to the state of being disheartened in succession in the denoted event. Thus, Exp functions here as an incremental theme, supporting a mapping from the scale of individuals to the scale of the event. As the event is decomposed by parts of Exp, it is durative. However, to the extent that the scalar properties of the Exp argument interact with the aspectual structure of the events denoted by Polish perfective predicates, the aspectual structure of the predicate headed by a perfective psych verb is not determined at the V-level, *pace* Rothstein (2020).

Furthermore, apart from the verb's argument, also a modifier can contribute to determining the aspectual properties of the event denoted by a perfective psych verb, contra Rothstein's (2020: 155) claim that modifiers cannot contribute to determining what counts as a maximal event in Slavic. In (32), repeated below for convenience, the extent of change occurring in the denoted event is measured along the intensity scale, which correlates with the presence of the gradable (comparative) adverbial, a syntactic adjunct, as will be discussed in Section 4.

(32) *W*   *niecały*   *miesiąc*   *Jan*   *stopniowo*   ***po**kochał*[P]   *Marię*
      in   not.whole   month   John   gradually   po.loved   Mary.ACC
      jeszcze   *bardziej.*
      even   more
      'John gradually got to love Mary even more in less than a month.'

If predicates headed by perfective (psych) verbs are interpreted with the help of the null Max_E operator in Polish and the external argument (Exp) or a modifier contribute the criteria for deciding what counts as a maximal event, Max_E does not apply at the V-level. I suggest here that Max_E applies at the level of VoiceP/vP in Polish/Slavic, after all the arguments and adjuncts that can contribute to determining the aspectual structure of the denoted event have been merged.[16]

The next section addresses the relationship between the temporal scale onto which the events denoted by Polish perfective predicates are mapped, reference/assertion time and utterance time, which will be discussed mainly in reference to the stative perfect reading of past tense perfective psych verbs.

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[16] I return to the punctual/durative alternation exhibited by non-incremental and incremental predicates in Section 4.

3.3. Transitions to psych states and time

The psych state to which Exp transitions in an event denoted by a past tense perfective psych verb can hold at utterance time (cf. Biały 2005; Pastuchowa and Stawnicka 2008). This is illustrated with the example in (49), where Exp, who got angry with the speaker in the past, is still angry with the speaker at utterance time. By contrast, in (50), Exp is no longer angry with the speaker at utterance time.

(49) **Po**gniewała[P] *się na mnie, nie wiadomo o co, nie odzywa się i unika mnie.*
'She has got angry with me for no apparent reason, she will not speak to me, and she keeps avoiding me.'

(50) **Po**gniewała[P] *się na mnie, ale już przeprosiłem ją i przyznała mi rację.*
'She got angry with me, but I have already apologized to her and she has acknowledged that I was right.'

(Pastuchowa and Stawnicka 2008: 32)

The events denoted by the predicate headed by the perfective psych verb in (49)–(50) are punctual. Predicates denoting punctual events have been analyzed as true of two adjacent time moments, the final moment in which $\neg p$ holds and the stopping point, which is the adjacent moment in which p holds, among others, in Rothstein (2004: 185) and in Beavers (2013: 691). According to Beavers (2013), the first of the adjacent time moments is the beginning of the event and the final moment is its end. Following Filip (1999, et seq.) and Piñón (1997), who take predicates of punctual events to be true at a single time moment and not of two adjacent time moments, I suggest here that the temporal trace of punctual events denoted by Polish perfective psych predicates consists of a single time moment, which corresponds to the maximum degree on the binary scale associated with the event. This is the moment when the given psych state is instantiated in Exp. A stasis state cannot be the beginning of an event, contra Beavers. While the psych state to which Exp transitions can hold beyond the onset (cf., e.g., (44)), the interval over which the state can hold is not included in the temporal trace of the event.[17] The reason is that the temporal trace is a scale/total order, but states

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[17] As both the examples in (i) and (ii) are acceptable, that the psych state to which Exp transitions in an event denoted by a perfective psych predicate holds over an interval is implied rather than entailed.

(i) […] *miałaś do czynienia z mężczyzną, który w jednej minucie się **za**kochuje[SI], a w drugiej **od**kochuje[SI].* (Google)
'You were dealing with a man who falls in love one minute and falls out of love the next minute.'
(ii) *Czy można **za**kochać[P] się na całe życie?*
'Can one fall in love for the whole life? (Google)

are not associated with a scale as they do not develop in time (cf., among others, Beavers 2008, 2013). However, if the psych state to which Exp transitions in an event is expressed with a past perfective psych predicate, on the assumption that the perfective operator includes the entire event time within reference/assertion time (cf., a.o., Katz 2003; Paslawska and von Stechow 2003),[18, 19] or it orders reference/assertion time after event time (Demirdache and Uribe-Etxebarria 2000),[20] the psych state to which Exp transitions in the past should hold over a past interval, but not at utterance time.[21] To explain that a transition to a psych state can be in the past while the state can hold at utterance time, I follow Ramchand (2004, 2007) here, who argues that what is asserted and located in the past in situations described with past tense perfective predicates including a (result) state in their event structure, as in (51), is not the entire event, i.e. a process and a result state, which is the state of the theme's/undergoer's being in the attic, but only the transition to the result state. In this approach, the result state can be in existence at utterance time, which cannot be captured if perfective aspect locates the entire event within reference time or orders reference/assertion time after event time.

(51) Result Reading

Kto	***za**lez^P*	*na*	*čerdak?*
who	za.climbed	on	attic

'Who climbed to the attic? (assumption is that they are still there)'

(Ramchand 2004: 347)

In sharp contrast to the perfective predicate in (51), the imperfective predicate in (52) has an 'annulled result' reading.

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[18] Reference/assertion time is the time that the sentence refers to (Klein 1994). For example, T(ense) does not locate the entire interval over which Bill was watching the game in the situation described in (i) in the past, but only a specific interval about which the sentence makes a claim, which is the time when the speaker entered the room.

(i) Bill was watching the game (when I entered the room).

[19] For example, Katz (2003) defines the operator of perfective aspect as in (i) below, where $\tau(e)$ is the temporal trace of the event and t is assertion/reference time:

Perfective: $\lambda P \lambda t \exists e [P(e) \,\&\, \tau(e) \subset t]$

[20] See Ramchand (2004, 2007) for discussion.

[21] Filip (2008: 231) argues that the maximalization operator lexicalized in perfective verbs "operates on asserted and implicated meaning components." On this assumption, if the perfective operator relates an event to reference/assertion time, both the transition into a psych state and the interval over the state holds in an event expressed with a past tense perfective verb should be located by Tense in the past.

(52) Annulled Result

 Kto   **za***lezal^l*   *na*   *čerdak?*
 who   za.climbed   on   attic
 'Who climbed to the attic? (assumption is that they are not there any more)'
                    (Ramchand 2004: 346)

To account for the reading available in (51), Ramchand (2004, 2007) argues that event time is not introduced by VP, unlike in Demirdache and Uribe-Etxebarria (2000), but by the Asp head above the *v*P/VoiceP projection, which embeds VP as its complement. According to Ramchand, the job of Asp is to provide the temporal trace of the event ($\tau(e)$) and to specify a temporal individual variable, i.e. a time instant within the run time of an event and not after it, which is related to reference time and to utterance time by Tense. While *t* is one of the time moments in the temporal trace of the event *e* (cf. (53)), Ramchand (2004, 2007) argues that perfectivity is sensitive to a definite event time given by AspP. In (51), this moment is the endpoint of the dynamic process subevent that leads up to the result state, i.e. it is the final moment in the event's run time that represents the process part, which is at the same time the initial time moment in the interval over which the result state holds. In contrast to the perfective, defined in (54), the imperfective picks out an indefinite time moment in the event's run time, i.e. (53) is also a description of the imperfective aspect.

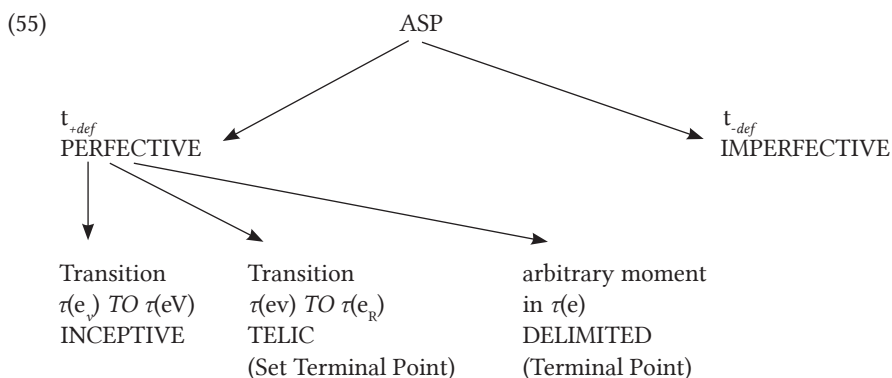(53) $[[\text{Asp}]] = \lambda P \lambda t \exists e:[P(e) \ \& \ t \subset \tau(e)]$

                    (Ramchand 2004: 344)

(54) $[[\text{Asp}]] = \lambda P \lambda t$[there is there is a single unique moment t_{def} in the event that is salient] $\exists e:[P(e) \ \& \ t = t_{def} \subset \tau(e)]$

                    (Ramchand 2004: 345)

Ramchand suggests that apart from the specific time moment corresponding to the culmination of a process and the transition to a result state as in (51), a definite time moment can also be imposed on the relation between the event and temporal anchoring by a prefix introducing the initial or final boundary on the temporal extent of an event. The initial boundary is encoded in the inceptive prefix *za-* combining with activity predicates, deriving verbs like **za***rabotat^p* 'start working'. The final boundary is encoded in *po-*, which delimits the run time of an activity event to some short time, as in **po***guljat^p* 'walk for a short while'. The typology of prefixes that introduce a definite time moment in the run time of the event denoted by a perfective predicate that can be picked out by the perfective aspect in Asp offered in Ramchand (2004: 354) is given in (55), where the 'set terminal point' corresponds to the time moment in which a process of change leading up to

a result state culminates and the 'terminal point' is an arbitrary final time moment on the time line of a dynamic event (Krifka 1989, 1992).[22]

(55)

ASP

t_{+def}
PERFECTIVE

t_{-def}
IMPERFECTIVE

Transition	Transition	arbitrary moment
$\tau(e_v)$ *TO* $\tau(eV)$	$\tau(ev)$ *TO* $\tau(e_R)$	in $\tau(e)$
INCEPTIVE	TELIC	DELIMITED
	(Set Terminal Point)	(Terminal Point)

However, while the 'set terminal point' is a unique and hence, a definite time moment on the time line of a denoted event, the same cannot be said about the final endpoint of an event derived with the delimitative *po-*, such as ***po**guljat'*[P] 'walk for a short while', which can fall at different time moments (cf. Filip 2000). To ensure that the end point of an activity delimited with *po-* is not vague but definite, what is needed is the Max$_E$ operator, as it is maximalization over events that enforces reference to the most developed event denoted by the predicate in a context, i.e. an event stage with a specified final endpoint. Max$_E$ is also needed to account for perfective degree achievement verbs (henceforth, DA verbs) like ***po**większyć*[P] 'be larger, get bigger' in (56), derived from open scale adjective roots, which are which are nonetheless compatible with a time span adverbial.

(56) *Plama   na   suficie   się   **po**większyła*[P]   *w   pięć   minut/   *pięć minut.*
     stain   on   ceiling   SE   po.enlarged   in   five   minutes   five minutes
     'The stain on the ceiling got bigger in five minutes/for five minutes.'

The compatibility of the perfective DA verb in (56) with a time span adverbial but not with a durative adverbial is in sharp contrast to English, where

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[22] Ramchand (2004, 2007) takes the prefixes that determine the set terminal point to be in R(esult) P(hrase), a syntactic projection within VP representing the state resulting from a process of change undergone in the event by some participant. The inceptive and delimitative prefixes are in Spec, AspP. So-called 'pure perfectivizers', i.e., the prefixes which perfectivize imperfective incremental verbs of consumption and creation like *pit'*[I] drink' and *stroit'*[I] respectively, and which are not potential argument structure modifiers, are outside RP, in AspP. Their sole contribution is to impose a final temporal bound on the denoted event. The prefixes perfectivizing verbs of change in property, such as *na-* in ***na**gret'*[P] 'warm', and prefixes perfectivizing stative verbs, such as *po-* in ***po**nravit'sja*[P] 'please', are also pure perfectivizers stipulating a definite terminus and hence they are also in Spec, AspP.

although DAs verbs manifest variable telicity, DA verbs lexicalizing opens scales cannot be interpreted telically in contexts comparable to (56), where neither the verb nor context or world knowledge supply a scale with a (functional/pragmatically determined) maximum (cf. Hay et al. 1999 for discussion). This is shown in (57).

(57) The gap between the boats widened for/??in a few minutes.

(Kennedy and Levin 2008: 160)

According to Filip (2008), that the final boundary on the property scale is reached in the event denoted in (56) is enforced by the null perfective/Max_E operator. In other words, while the perfective operator relates event time to reference and utterance time, as argued by Ramchand (2004, 2007), the endpoint on the time scale of the event that is picked by the perfective operator in (56) is the final endpoint on the most developed event in a context, as determined by Max_E (cf. (45)), and not by the prefix alone.

Following Forsyth (1970), Ramchand (2004, 2007) analyzes Russian perfective psych verbs like ***izdivit'sja***^{P} 'be surprised' in the same way that she analyzes culminations, i.e. as complex events consisting of a process and a result state. The main reason is that in contrast to Vendler (1957) and much subsequent research (cf., a.o., Pustejovsky 1991; Rothstein 2004; Beavers 2008, 2012, 2013; Rappaport Hovav 2008, 2014), Ramchand takes all dynamic events to include a process part in their event and aspectual structure, however short. Punctual events, in contrast to durative ones, are events with a process part that is minimally long (cf. also fn. 22). However, while culminations have a process subevent in their meaning, it is presupposed rather than asserted (Vendler 1957), and happenings do not come with a process part in their meaning, as discussed in Section 3.1. If perfective psych predicates denoting punctual events do not have a process subevent in their event structure, the salient time moment on the temporal trace of the denoted event, as in (30), is not a terminus (cf. fn. 24), but the time moment in which Exp transitions to the given psych state and it is at the same time the initial time moment in the interval over which the psych state holds of Exp. Strictly speaking, then, the moment of change is outside the boundaries of the denoted event, as argued in reference to punctual events denoted by Spanish reflexive psych verbs in Marín and McNally (2011). Furthermore, to the extent that the events denoted by perfective verbs can be maximal with respect to the temporal scale, as in the case of verbs derived with the delimitative prefix *po-* in ***po**guljat*$^{'P}$ 'walk for a short while' or the temporal use of *pere-*, as in ***pere**zimovat*$^{'P}$ 'pass the winter' in Russian (Kagan 2016) and their Polish counterparts, the temporal scale/trace function must be available before Asp is merged in the derivation. Departing from Ramchand, I suggest

here that the aspectual arguments (states and/or events) and their temporal traces/scales are available not later than at the level of the Voice head, which introduces the external argument, Exp in structures like (29a)–(29c), licenses VoiceP-related adjuncts, and focuses either the process leading up to the result state or the result state (cf. Gehrke and Grillo 2009). In this scenario, it is not the Asp head but Voice/v that marks the separation between the aspectual and the temporal domains in a clause, *pace* Ramchand (2004, 2007).

The next section is concerned with the gradual scalar change readings of Polish perfective predicates. I return there to the reading illustrated in (31), where parts of Exp transition to the psych state in succession, but the main focus is on the reading illustrated in (32), where there is a gradual increase in the intensity of the psych state holding of Exp in the course of the event. The main question that sentences like (32) raise is whether psych verbs, which can be modified by degree adverbials and occur in comparative (degree) structures lexicalize the scale of intensity in their meaning.

4. Polish perfective psych predicates and their scales

As discussed in Section 3.2, according to Rothstein (2020) (cf. also Filip and Rothstein 2006; Filip 2008), a perfective verb of change denotes a set of maximal events in Slavic, where an event is maximal with respect to the scale with respect to which the events denoted by the predicate are (partially) ordered. For a perfective verb to denote sets of plural events that can be (partially) ordered with respect to some measurement scale, which can be a property, path, extent, as well as the time scale, the scale must be multivalued. Departing from Rothstein (2020), I have suggested in Section 3.2 that also punctually interpreted events denoted by Polish perfective psych verbs are interpreted with the help of Max_E. Unlike in Filip (2008), where Max_E applies to predicates of punctual events (achievements) by default in Slavic, preempting a shift into the plural domain in the presence of bare plural or mass internal argument, I have suggested that Max_E can apply to the denotation of predicates headed by perfective psych verbs because the events consist of (exactly) two parts, which can be ordered as stages of the denoted event. Thus, the events denoted by perfective psych verbs can be associated with a scale with two values, the minimal and the maximal ([0, 1]), with no values in between. The events denoted by predicates associated with a binary scale are punctual and the punctual reading is the primary reading of predicates with perfective psych verbs in Polish. However, a perfective psych verb can also denote a durative event, as in (31), where the argument encoding the participant transitioning to the state of being disheartened

(Exp) is decomposable into parts and hence, the event described by the predicate is decomposable by parts of Exp. What the punctual/durative alternation that perfective psych verbs exhibit suggests is that while the events they denote are associated with a bounded scale, whether the scale is binary (cf. (30)) or multi-valued (cf. (31)) depends on the scalar properties of Exp, the argument transitioning to the given psych state in the denoted events. In (30), Exp is atomic and the abstract extent scale it provides is viewed as undecomposable. The reason is that the mental state of Exp does not undergo change in parts in the denoted event. By contrast, if the argument providing an extent scale is conceived of as decomposable, the predicate denotes a durative event, as in (31) and in (8) illustrated in Section 2 from Filip (2008: 236) and repeated for convenience below in (58).

(58) a.   John entered the icy water (very slowly).
       b.   At the turtle race, the winning turtle crossed the finish line in 42 seconds.

Thus, although perfective psych verbs do not specify an incremental relation, the events they denote can be durative and the predicates exhibit a punctual/durative alternation similarly to predicates headed by incremental verbs (cf. Beavers 2012: 47–56).[23] Unlike in (59a), where the time span adverbial has the *after* reading, in (59b), the time span adverbial can have the *after* or the *during* reading, depending on whether the theme/figure is interpreted as atomic or complex, as when two or more settlers cross the border in succession.[24] In (60a), the adverbial likely has the *after* interpretation, as the scale associated with *the border* is atomic, and in (60b), both the *after* and *during* readings of the adverbial are available, as *the desert* is associated with a multi-point scale. Predicates of consumption also give rise to punctual or durative events depending on the mereological complexity of the scale associated with the incremental theme. A complex/multi-valued scale can support a mapping from parts of the object to parts of the event, as in (61b).

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[23] Unlike in Filip and Rothstein (2006), Filip (2008) and Rothstein (2020), in Beavers (2008, 2012, 2013), all events of change are associated with a scale of change, where change is defined as "some theme transitioning to and maintaining a new value along some property scale, which is an incremental argument" (Beavers 2013: 684). Whether the denoted event is punctual or durative and telic or atelic depends on two factors: (1) the specificity of the endpoint along the scale of change associated with the events denoted by a predicate, and (2) the mereological complexity of the scale. Given that the theme (referred to as figure), can be atomic, having no non-trivial parts, the scale of change need not be multi-valued in Beavers' approach, unlike in Rothstein (2020) and Filip (2008).

[24] Unlike in Rothstein and Filip (2006), Filip (2008) and Rothstein (2020), in which the telicity (event maximalization) is due to a single incremental theme, in Beavers (2012, 2013), telic events are maximal with respect to multiple incremental themes.

(59) a. The settler will cross the border in ten days.   *after*
    b. The settlers will cross the border in ten days.   *after/during*

(60) a. The settler will cross the border in ten days.   *after*
    b. The settler will cross the desert in ten days.   *after/during*

(61) a. John will eat a piece of popcorn in 37 minutes.   *after*
    b. John will eat a whole fried chicken in 37 minutes.   *after/during*

While the punctual/durative alternation is found mainly with predicates headed by incremental verbs, whether the event denoted by a non-incremental predicate is punctual or durative can also depend on whether the event can be decomposed by parts of an argument of the verb, as shown in (62) from Filip (2012: 739) (cf. also Krifka 1992: 31, 45).

(62) a. Mary saw seventeen clouds for three minutes/in three minutes.
    b. Mary saw clouds for three minutes/*in three minutes.

Polish examples comparable to (62) display the same asymmetry, except that it is tied to the grammatical/viewpoint aspect of the verb, as shown in (63). The time span adverbial, available only in (63b), can have the after/during reading.

(63) a. *Jan*   *słyszał^I*   *trzy*   *samoloty*   (*w *pięć minut/^{OK}pięć minut).*
       John.NOM heard   three airplanes.ACC   in five minutes five minutes
       'John heard two planes (*in five minutes/for five minutes).
    b. *Jan*   ***u**słyszał^P* *trzy*   *samoloty*   (*w pięć minut/*pięć minut*).
       John.NOM u.heard three airplanes.ACC in five minutes five minutes
       'John got to hear three planes (in five minutes/*for five minutes).'

Thus, also non-incremental predicates can denote punctual or durative events depending on whether the denoted event can be decomposed by the parts of the argument undergoing change in the event. The punctual/durative alternation exhibited by Polish perfective psych verbs in (30)–(31), and by perfective verbs of perception, as in (63b), thus demonstrates that material outside the verb can contribute to determining the scale against which the events in the denotation of a perfective predicate in Polish/Slavic can be ordered, contrary to Rothstein's (2020) claim.

Perfective psych verbs have a prefix in their stems. Prefixes are also present in the secondary imperfective partner verbs, raising the question of the role that prefixes play in the verbs they derive. According to Filip (2008) and Rothstein (2020), Slavic prefixes are scalar expressions. Among the prefixes found in the stems of perfective psych verbs in Polish is *po-* (cf. (30) and (31)). However, *po-* is also found in some Polish perfective DA verbs (cf. (56)) and in incremental perfective verbs such as ***pomalować**^{P} (dom)* 'paint (the house)'. Approaching the well-known problem of the polysemy of verbal prefixes in

Russian/Slavic, Kagan (2016), who adopts Filip's (2000, 2008) stand on verbal prefixes as determining the scale against which the events in the denotation of a verb are ordered, claims that "a verbal prefix imposes a relation between two degrees on a scale, one of which is associated with the event denoted by the verbal predicate, and the other is the standard of comparison." Her main claim, stated as the Scale Hypothesis, is that all prefixes are instantiations of the same template, i.e., all the uses of a given prefix lexicalize the same relation (R), which specifies the amount of change that must be reached in a denoted event. In other words, a prefix applies to a gradable predicate, i.e. a predicate associated with a degree argument, and specifies relation R between the degree *d* of the gradable property and a comparison degree. The R-relation can be any of the following: ≤ (lower than or equal to), < (lower than), = (identity), ≥ (higher than or equal to), > (higher than), and ⊆ (inclusion). For example, the delimitative prefix *po-* deriving e.g. **poguljat'**[*p*] 'walk for a short time' in Russian, specifies that the final degree reached in the event is lower than the standard degree, which can be expressed linguistically with an adverbial of short duration, e.g. 10 minutes, or it is a context-dependent expectation value on the conventional length of walking events (cf. also Filip 2000). By contrast, the cumulative prefix *na-* deriving verbs like **nakupit'**[*p*] 'buy many X', indicates that the final degree on the event of buying X exceeds the expectation value on the events of buying X. While a prefix is claimed to express the same relation R between two degrees, it can apply to different scales and use different standards of comparison. For example, the Russian prefix *pro-* is claimed to impose the relation of identity between the standard of comparison (expressed linguistically or contextually) and the degree of change argument. In (64a), the interval covered on the path scale in the event equals two kilometers. In (64b), the interval covered on the time scale equals two hours. In (64c), the standard of comparison is different, corresponding to the bounded volume scale associated with the verb's object. In the event described by the VP in (64c), the whole interval occupied by the extent of the book is covered in the event. Thus, although in all of the events described in (64a)–(64c), the predicates express change along a scale, the scale is different in each case: it is a spatial path scale in (64a), a time scale in (64b), and an extent scale in (64c).

(64) a. **pro**bežat'[*p*] *dva kilometra* 'run two kilometers'
       b. **pro**rabotat'[*p*] *dva časa* work for two hours'
       c. **pro**čitat'[*p*] *knigu* 'read a/the book'

(adapted from Kagan 2016: 57)

However, the assumption that a prefix expresses the same relation R in all its uses is simply too strong. For example, not all uses of *po-* can be analyzed as expressing the ≤ (lower than or equal to) relation between the degree of

change and a degree that corresponds to a contextually specified standard/expectation value. Kagan (2016) analyzes *po-* in ***po**guljat'*^{P} 'walk for a short time' in Russian as delimitative, where the measure of the temporal extent that the prefix returns is lower than or equal to a context-dependent expectation value (on the length of walking events) (cf. also Filip 2000). However, *po-* also derives perfective psych verbs such as ***po**nravit'sja*^{P} 'please' in Russian (Forsyth 1970: 52), where it cannot be analyzed as expressing the 'lower than' relation, as ***po**nravit'sja*^{P} can be modified by an adverbial of high degrees such as the Russian equivalent(s) of *a lot/very much*. If *po-* expresses a different relation in ***po**guljat'*^{P} and ***po**nravit'sja*^{P}, a single prefix can in fact lexicalize different relations between two degrees rather than one, contra the Scale Hypothesis. Furthermore, regardless what relation is expressed by the prefix deriving e.g. ***po**kochać*^{P} 'start loving', this relation would have to be part of the meaning of all of the prefixes that happen to derive perfective psych verbs, including *za-*, *z-/s-*, *prze-*, *roz-*, and *u-*, which does not seem to be tenable, as e.g. *za-* in ***za**strajkować*^{P} 'go on strike' is analyzed as an inceptive prefix expressing the relation of upper inclusion in Kagan (2016), but it is not an inceptive prefix e.g. in ***za**mordować*^{P} 'murder'. Prefixed perfective verbs with secondary imperfective partner verbs raise yet another problem for Kagan's (2016) approach. For example, if the terminative prefix *do-* deriving verbs like ***do**čitat'*^{P} (*knigu*) 'finish reading (a/the book)' in and of itself provides information that the degree reached at the endpoint of the event is identical to the endpoint on the extent scale provided by the verb's argument (*kniga* 'a/the book'), it is not clear what role perfectivity plays in the semantics of the derived verb and why the secondary imperfective partner verb, which also contains the prefix in its stem, does not entail that the endpoint on the extent scale is reached at the endpoint of the event. Thus, although a prefix deriving a perfective verb may be specific about the final endpoint on the scale of the event, it is the perfective/maximalization operator and not the prefix in and of itself that requires that the maximum degree on the scale with respect to which the event is ordered is reached. The events denoted by perfective psych verbs are maximal, entailing that the endpoint on the scale of the event, i.e. the degree corresponding to the transition to a given psych state, is reached in the denoted event. The imperfective aspect in predicates with a secondary imperfective psych verb does not enforce Max$_E$. As a result, such predicates denote the set of psych states of Exp being in a given psych state, but not the transition to the state.

Psych verbs, both imperfective and perfective, are gradable and can be modified by degree modifiers. As (32) illustrates, a perfective psych predicate can denote an event of gradual change along the scale of intensity. The question that arises is whether psych verbs/roots lexicalize intensity,

which is a kind of property. According to Kagan (2016), a scale can measure
a property lexicalized in a verb regardless of whether there is a change in the
property in an event, as happens most often with DA verbs, or the property
does not change, as can happen with stative verbs such as ***pobalivat***$^{'p}$ 'ache
slightly', where the prefix measures the property lexicalized by the base verb.
On the assumption that stative verbs can lexicalize intensity, the denotation
of a VP headed by a psych verb like *kochać*^{d} 'love' is not as in (65a), but as in
(65b), where μ_{int} stands for an intensity measure function.

(65) a.   [[kochać]] = λx λe. kochać (e) ∧ Target (e, x).
       b.   [[kochać]] = λx λe. kochać (e) ∧ Target (e, x) ∧ μ_{int}(e) ≥ d .

The question whether psych verbs, which are state-denoting, lexicalize de-
grees is a debated issue. For example, Katz (2008) claims that intensity is lex-
icalized in psych verbs (cf. also Doetjes 2008). By contrast, Nicholas (2004)
argues that psych verbs do not involve any comparison in the positive and
do not lexicalize degrees. Following Tovena (2001), Baglini (2015) argues that
(all) states do not take their denotation in a mereology, but in an intensive
domain, which is partially ordered, but has no degrees in its semantics. This
is why an increase in the intensity of a state, which can be expressed with
an adverbial like *a lot*, as in *love a lot*, does not correspond to an increase or
extension in time or space compared with an unmodified predicate (*love*),
unlike in the case of DA verbs, which lexicalize extensive dimensions and
which express scalar change in all their uses, including a stative use of a DA
verb, as illustrated in (66) from Deo et al. (2013: 99, 100).[25]

(66) a.   The road narrows at the end.
       b.   The road widens between San Francisco and San Jose.

However, as states can be modified by degree adverbials, they can be associ-
ated with degrees (Baglini 2015; cf. also Márin and McNally 2011). To the ex-
tent that a psych verb/root does not lexicalize degrees, in (32), a gradual in-
crease along the scale of intensity is generated by the addition of the degree
argument to the denotation of a degreeless predicate (cf. (65b)). Once the
psych state denoted by a psych verb is discretized via degrees, the compara-
tive *jeszcze bardziej* 'even more', which compares the degree of the intensity
of Exp's psych state at two distinct time moments in an interval and gives
a difference degree, is licensed. Thus, also a modifier outside the verb, as
in (32), can contribute the parameter for maximality, *pace* Rothstein (2020).

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[25] The fact that the stative roots of DA verbs lexicalize scale structure and express a rela-
tion between degrees in the absence of a degree adverbial militates against the analysis of
state-denoting psych verb(al root)s as lexicalizing degrees as in (65b) (cf. Rappaport 2008, 2014).

However, as the final time moment in the interval in which change along the intensity scale happens in the event described in (32) is at the same time the initial time moment in the interval over which the result state holds, regardless of whether a predicate headed by a perfective psych verb is punctual or durative and regardless of whether the change undergone by Exp in a durative event is along the (abstract) extent scale associated with Exp conceived of as decomposable or along the intensity scale, the change is quantized and Exp transitions to a specified state.

5. Conclusion

This paper has focused on the punctual/durative alternation observed in the domain of perfective psych predicates in Polish. In Section 2, I have shown that the perfective/imperfective distinction does not affect the argument structure and argument realization patterns of Polish psych verbs. Departing from the approaches in which Slavic prefixes perfectivizing verb(al root)s that are not argument structure modifiers are merged above VP (cf., a. o., Ramchand 2004, 2007; Svenonius 2004), I have analyzed the prefixes deriving perfective psych verbs as VP-internal. To account for the punctual/durative alternation exhibited by Polish perfective psych verbs, I have adopted a scalar approach to the aspectual properties of verbal predicates, where the scales associated with the denoted events and with the arguments undergoing change in the denoted events can be binary or multi-valued (Beavers 2008, 2012, 2013). I have argued here that in punctual events denoted by perfective psych verbs, Exp undergoes change from a situation or state of not being in the psych state lexicalized in the state-denoting base verb(al root) to a situation or state of being in the given psych state. The events denoted by perfective psych verbs are typically punctual, but they can be durative if the event is decomposed into parts by the part-structure of Exp or by the part-structure of the intensity scale. When Exp is conceived of as decomposable into parts, the transition to a given psych state is gradual, with parts of Exp mapped successively onto parts of the event. Assuming with Nicholas (2004) and Baglini (2015) that state-denoting verbs do not lexicalize an intensity scale, I have suggested here that a degree argument can be added to the denotation of a psych verb and be saturated by a degree expression, e.g. by an adverbial like *bardzo* 'a lot'. In an intensity comparative construction featuring the comparative adverbial *jeszcze bardziej* 'even more', the function measuring the difference in the degree of the intensity of a psych state between the initial and the final time moments in an interval in which change happens is contributed by the comparative adverbial, a syntactic adjunct. To

the extent that the scales associated with the verb's argument or with a modifier interact with the scalar properties of the event denoted by a predicate headed by a psych verb, Polish perfective psych verbs provide some evidence against the view on which the aspectual properties of VPs and sentences headed by perfective verbs are determined at the V-level in Slavic languages, unlike in English and other Germanic languages. The empirical data analyzed here provide support for Rothstein's (2020) and Filip's (2008) account of (Slavic) prefixes as expressions that contribute an ordering criterion on the events denoted by the derived verb and for their account of perfectivity as maximalization over events. At the same time, the maximalization operation, which ensures event delimitation in Slavic and is argued to be lexicalized in Slavic verbs in Rothstein (2020) and in Filip (2008), has been analyzed here as applying after all the arguments and modifiers that can contribute to the scalar properties of the events denoted by predicates with perfective verbs have been merged. In this approach, the perfective operator is severed from the lexical domain and it is located in the functional domain in clausal structure, in AspP (scoping over Voice/vP), as argued independently in Tatevosov (2020) in reference to Russian.

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