Goals and sources are aspectually equal: evidence from Czech and Russian prefixes (to appear in *Lingua*)

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Abstract:

With respect to their semantic and syntactic behaviour, Slavic verbal prefixes fall into at least two groups. Internal prefixes are locative Ps that constitute a result state subevent, and events described by internally prefixed verbs are telic. External prefixes, on the other hand, are generated outside the VP and function as adverbial modifiers (Czech) or perfectivity markers (Russian). An apparent counter-example to this distinction comes from Czech, which shows an asymmetry between source and goal prefixes: only the former but not the latter are compatible with measure phrases. On grounds of such examples, Filip (2003) argues that only goal prefixes derive telic predicates, whereas source prefixes form atelic predicates. However, both prefixes display internal diagnostics and VPs containing either behave like telic predicates with respect to telicity tests. I propose an alternative account for the asymmetry, claiming that it results from different monotonicity properties of the particular result states. With source Ps the result state is topologically open and thus compatible with further modification by measure phrases, whereas a result state with a closed topology (with goal Ps) is not.

1 Introduction

Slavic languages productively employ verbal prefixes to express aspectual meanings. Despite efforts to capture their function as either markers of telicity (Piñón, 1994; Borer, 2005; among others) or markers of perfectivity (van Hout, 2003; among others), it does not seem to be possible to uniformly relegate their meaning contribution to either inner or outer aspect (see also Filip, 2000; Borik, 2002 for discussion). Rather, Slavic prefixes seem to fall into at least two distinct groups with respect to their semantic and syntactic behaviour, namely internal and external prefixes (di Sciullo & Slabakova, 2005 for Bulgarian; Gehrke, 2004 for Russian and Czech) or lexical and superlexical prefixes (Romanova, 2004; Ramchand, 2004, this volume; Svenonius, 2004 for Russian). In the course of this paper, it will be argued that internal prefixes participate in structuring the event by supplying or identifying a result state subevent and therefore marking telicity, whereas external prefixes are orthogonal to the telic/atelic distinction and rather function as adverbial modifiers (Czech) or perfectivity markers (Russian).

There are apparent counter-examples to the claim that all internal prefixes uniformly trigger telicity. Filip (2003) shows that there is an asymmetry between Czech goal and source prefixes, in the sense that only the latter but not the former are compatible with measure phrase modifiers like the prefix *po-* 'a bit' (1).

(1)   a.   **Po-vy**-táhl^p káru z příkopu.   (= (49) b. in Filip, 2003: 94)[1]
           PO-OUT-dragged cart.ACC from ditch.GEN
           'He dragged the cart out of the ditch a bit.'
      b.   ***Po-do**-táhl^p káru do příkopu.   (= (50) b. in Filip, 2003: 94)
           PO-(IN)TO-drag.PAST cart.ACC (in)to ditch.GEN
           'He dragged the cart (in)to the ditch a bit.'

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[1] The glosses make distinctions that will become clearer in subsequent sections. *Internal prefixes* are glossed with the literal meaning of their prepositional counterparts, whereas *external prefixes* keep their form in the glosses (e.g. PO, PRO, ZA). I use the abbreviations **i** in superscript or IPF in the glosses for grammatical imperfective aspect, and **p** in superscript or PF in the glosses for grammatical perfective aspect.

On grounds of this asymmetry, she claims that goal prefixes are telic whereas source prefixes are atelic predicates. The main aim of this paper is to argue that the asymmetry observed is in fact more fine-grained in that it follows from the semantics of spatial expressions rather than from an aspectual opposition between these two types of prefixes. Specifically, I will show that there is, in fact, no aspectual difference: both types are internal and thus telic.

The paper is organised as follows. After outlining the general system of Russian and Czech aspectual verbal affixes, section 2 presents diagnostics to distinguish between internal and external prefixes, and provides tests to show that internally prefixed predicates are telic. In section 3, I discuss an asymmetry between Czech goal and source prefixes in their (in)compatibility with measure phrase modifiers, which lead Filip (2003) to claim that this asymmetry is aspectual in nature. From their behaviour with respect to the proposed tests, however, one has to conclude that both types of prefixes are of the internal, telic type. Section 4 provides a general semantic and syntactic account of Slavic prefixes applying the framework of vector space semantics proposed for prepositions by Zwarts & Winter (2000) and Zwarts (2005), and Ramchand's (2004, this volume) approach to event structure. In section 5, an alternative account for the asymmetry between Czech goal and source prefixes is proposed. It will be argued to follow from the different nature of the particular result states rather than from an aspectual opposition between goals and sources. Section 6 concludes.

2 Russian and Czech verbal prefixes

2.1 Slavic aspect

This paper follows Smith (1991/97) and others in distinguishing between two different aspectual levels, where inner (predicational) aspect is associated with predicates that are

atelic or telic. Outer (grammatical) aspect, on the other hand, comprises the opposition between imperfective and perfective aspect, which is responsible for a reading of temporal (un)boundedness at the sentence level.

In all Slavic languages the grammatical verbal category of aspect is obligatory, which means that each verb form is either perfective or imperfective. There are at least two criteria to set Russian and Czech perfective verbs apart from imperfective ones.[2] First, only imperfective but not perfective verbs can combine with phase verbs such as *start* or *stop* (2) (Filip, 1999; Borik, 2002).

(2)   On **načal pisat'** / ***na-pisat'*** / ***po-pisat'*** pis'mo.   RUSSIAN
         he began.PF write.IPF / *ON-write.PF / *PO-write.PF letter.ACC
         'He began writing a / the letter.'

Second, only imperfective but not perfective verbs derive periphrastic future forms with future forms of the auxiliary *byt'* 'to be' (3) (Schoorlemmer, 1995; Filip, 1999).

(3)   On **budet pisat'** / ***na-pisat'*** / ***po-pisat'*** pis'mo.   RUSSIAN
         he will write.IPF / *ON-write.PF / *PO-write.PF letter.ACC
         'He will write a / the letter.'

Aspectual information on Russian and Czech verbs is generally provided by affixes. Most morphologically simple verbs are imperfective, but a few are perfective (4).

(4)   a. ipf. **spat'** 'to sleep'   RUSSIAN
           ipf. **pisat'** 'to write'
      b. pf. **dat'**   'to give'

Prefixed verbs without additional suffixes, on the other hand, are always perfective (5).

(5)   pf. **po-spat'** 'to sleep'   RUSSIAN
        pf. **po-pisat'** 'to write'
        pf. **na-pisat'** 'to write (up)' (lit. on-write)
        pf. **pod-pisat'** 'to sign' (lit. under-write)
        pf. **iz-dat'**   'to edit' (lit. out-give)

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[2] For expository reasons, section 2 concentrates on Russian data, but the same holds for Czech unless explicitly stated otherwise. The particular Czech data will be discussed in detail in section 3.

A subclass of the prefixed verbs, as well as perfective simple verbs of the type in (4) (b.), can undergo suffixation[3], the output of which is always imperfective (6).

(6)   pf. pod-pisat' > ipf. pod-pis-**yva**-t' 'to sign'   RUSSIAN
         pf. iz-dat'   > ipf. iz-da-**va**-t'   'to edit' (lit. out-give)
         pf. dat'   > ipf. da-**va**-t'   'to give'

In the traditional literature, these imperfective verbs are called SECONDARY IMPERFECTIVES (SI)[4], and such pairs of perfective and imperfective verbs with identical lexical meaning are referred to as ASPECTUAL PAIRS.

Finally, there are instances where a prefix can stack on top of another prefix. In Russian, such stacking prefixes can only apply to SIs ((7) a.), whereas in Czech, they can combine directly with (some) perfective verbs ((7) b.).

(7)   a. ipf. **vy**-da-va-t' > pf. **po-vy**-da-va-t'   'to hand out, distribute' RUSSIAN
         b. pf. **od**-stoupit   > pf. **po-od**-stoupit   'to step aside (a bit)'   CZECH

In sum, the data show that there are imperfective verbs containing prefixes (6) as well as perfective verbs with no prefixes ((4) b.). Furthermore, prefixation does not always equal perfectivisation, since prefixes can be added to already perfective verbs such as *dat'* 'to give' (last example in (5)), and since they can stack (7). Therefore, I conclude that despite the fact that prefixed verbs without any further suffixes are always perfective (5), prefixes cannot be treated as uniform markers of grammatical perfectivity (see also Filip, 2000, 2003). In the course of this paper, I will show that prefixes are not uniform markers of telicity, either, because some VPs containing prefixes do not pass telicity tests. Furthermore, it will become clear that perfectivity is distinct from telicity,

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[3] There are also cases with vowel alternation, which is not productive anymore.
[4] These derivations are traditionally called SECONDARY IMPERFECTIVES because in most cases, they are derived from a prefixed perfective verb, which in turn is derived from a simple imperfective. However, the simple imperfective usually has a different lexical meaning than the prefixed verb. Furthermore, there are cases where a SI is derived from a simple perfective such as pf. *dat'* > ipf. *da-va-t'* 'to give'. I will nevertheless continue using the traditional term as a mere descriptive term for any imperfective verb with

since predicates described by perfective verbs can be either telic or atelic (see also Borik, 2002; among others). To make sense of the data and capture the aspectual contributions of Russian and Czech prefixes, the following section divides them into internal and external prefixes and provides diagnostics to distinguish between these.

2.2   Internal and external prefixes

As a first rough characterisation, internally prefixed verbs are lexically distinct from their non-prefixed counterparts and such prefixes often contribute some idiosyncratic meaning. External prefixes, on the other hand, modify the event as a whole and their meaning effect is predictable and compositional. Example (8) shows that the Russian imperfective verb *pisat'* 'to write' can have the following perfective counterparts.

(8)   a. pf. **pod**-pisat'   'to sign' (lit.: under-write)   **(internal)**
       b. pf. **po**-pisat'   'to write (for a while)'   **(externals)**
           pf. **za**-pisat'   'to (begin to) write'

As indicated by the translations, the internal prefix *pod*- in (8) a., the literary meaning of which is 'under', adds lexical meaning, whereas the external prefixes in (8) b. only modify the meaning of the simple verb. The delimitative prefix *po*-, for example, conveys the temporal meaning of roughly 'for a (short) while', whereas *za*- has an ingressive meaning and signals the transition into an event.[5]

In the following, I will provide four criteria to distinguish internal from external prefixes. First, the application of an internal prefix can alter the argument structure of the verb, i.e. add or delete an argument, change the thematic role or license different case requirements (9).

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a suffix (vowel alternation) that is morphologically derived from a perfective verb without this suffix (vowel alternation).
[5] This is different in Czech (see also Gehrke, 2003 and section 4.3.4). Czech *po*- is not necessarily temporal but functions as a measure phrase modifier ('a bit') in all kinds of domains, most often the spatial domain (as in (1)). Furthermore, ingressive *za*- does not exist in Czech.

(9) pf. dat' **komu čto** 'to give who.**DAT** what.**ACC**' RUSSIAN
   pf. **iz**-dat' **(*komu) čto** 'to publish (*whom) what' **(internal)**

The morphologically simple Russian verb *dat'* 'to give' in (9) is ditransitive and requires a direct object (the theme) in the accusative case and an indirect object (the recipient) in the dative case. The internally prefixed *iz-dat'* 'to publish (lit. out-give)', on the other hand, is transitive and only requires a direct object in the accusative case. Adding an indirect object in the dative case results in ungrammaticality.

With external prefixes, there are no such argument structure effects (10).

(10) ipf. sidet' (*gde / dolgo*) 'to sit (where / for long)' RUSSIAN
   pf. **po**-sidet' ***čto,*kogo** / ***čemu, *komu** (gde / dolgo) **(externals)**
      PO-sit.INF *what.ACC, *who.ACC / *what.DAT, *who.DAT
   pf. **pro**-sidet' ***čto**,***kogo** / ***čemu**, ***komu** (gde / dolgo)

In (10), the externally prefixed derivations of *sidet'* 'to sit' remain intransitive and just like the imperfective base verb only combine with adjuncts. Adding an argument DP in either accusative or dative case leads to ungrammaticality.[6]

A similar point is made in (11).

(11) ipf. pisat' (pis'mo) 'to write (a letter)' RUSSIAN
   a. pf. **po**-pisat' **(pis'mo)** 'to write (a letter)' **(external)**
   b. pf. **na**-pisat' ***(pis'mo)** 'to write (up) *(a letter)' **(internal)**

Here, the externally prefixed verb patterns with the simple imperfective in that the internal argument is optional. With the internally prefixed verb, however, the internal argument becomes obligatory and leaving it out is ungrammatical (unless the argument is contextually given, see Młynarczyk, 2004).

A second diagnostic to distinguish between internal and external prefixes is the possibility of a prefixed perfective verb to derive SIs by means of the imperfectivising suffix (12).

(12)   a.   **internal**:   pf. **iz**-dat'   'to publish'   > ipf. **iz**-da-**va**-t'   RUSSIAN
                           pf. **pod**-pisat' 'to sign'   > ipf. **pod**-pis-**yva**-t'
       b.   **external**:   pf. **pro**-sidet' 'to sit (for longer)'   > ipf. ***pro**-siž-**iva**-t'
                           pf. **za**-pisat' 'to (begin to) write' > ipf. ***za**-pis-**yva**-t'

(12) illustrates that internally prefixed verbs regularly derive SIs, whereas externally

prefixed verbs do not.

Third, only internally prefixed verbs derive complex event nominals, and there are no

such derivations from externally prefixed verbs (see also Schoorlemmer, 1995). For

example, the Russian internally prefixed *na-pisat'* derives a noun with the meaning

'writing', whereas there are no such derivations of the externally prefixed counterparts

with *po-* or *za-* (with the ingressive meaning) (13).

(13)   a.   **na**-pisat'$^{\text{p}}$ 'to write (up)'   > **na-pisanie**   **(internal)**
       b.   **po**-pisat'$^{\text{p}}$ 'to write (for a while)' > ***po-pisanie**   **(external)**
            za-pisat'$^{\text{p}}$ 'to (begin to) write'   > ***za-pisanie**

A similar behaviour can be observed with participle formations of Slavic verbs, and to

my knowledge, this has not been noted before. For instance, the Russian internally

prefixed verb *(na)pisat'* 'to write' can derive the participles in (14). Similar derivations

from externally prefixed verbs such as *po-pisat'* 'to write (for a while)' or *za-pisat'* 'to

(begin to) write' are ungrammatical (15).[7]

(14)   **na-pisa-všij**   (past active)   RUSSIAN
       na-pisa-nnyj   (past passive)

(15)   ***popisavšij**, ***zapisavšij**   RUSSIAN
       ***popisannyj**, ***zapisannyj**

Finally, only external but not internal prefixes can stack on top of other prefixes (16),

(17).

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[6] The external prefix *pro-* conveys the temporal meaning 'for a (longer) while'.
[7] The full paradigm of participles is never available for all imperfectives or all perfectives in Russian, whereas Czech is not restricted in this way (see also section 4). For example, Russian present participles

(16) **vy-dat'** 'OUT-give'   RUSSIAN
    a. (> ipf. vy-da-va-t') > pf. **po-vy**-da-**va**-t'
    b. ***vy-po**-da-**va**-t'
    c. ***vy-iz**-da-**va**-t' / ***iz-vy**-da-**va**-t' (*iz-dat'* 'edit', lit. out-give)

(17) **od**-*stoupit* 'FROM-step'   CZECH
    a. **po-od**-stoupit
    b. ***od-po**-stoupit
    c. ***od-u**-stoupit / ***u-od**-stoupit   (*u-stoupit* 'yield', lit. away-step)

The a. examples show that the external prefix *po-* can stack on top of internal ones like Russian *vy-* 'out' or Czech *od-* 'from', whereas the reverse order is ungrammatical (b.). Czech *po-* in this case acts as a measure phrase modifier meaning 'a bit', whereas Russian *po-* conveys a distributive meaning (e.g. a librarian handing out books, one by one). The c. examples additionally illustrate that, as a rule, there can only be one internal prefix on a verb, no matter which order is chosen.

The table in (18) summarises the properties that distinguish internal from external prefixes in Russian and Czech.[8]

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can only be derived from imperfective verbs. Nevertheless, there are some participles of internally prefixed verbs but never any of externally prefixed ones, so the point argued for here is still valid.

[8] There is one group of prefixes that do not behave uniformly with respect to the diagnostics for internal and external prefixes, the so-called EMPTY PREFIXES (e.g. *na-pisat'* 'to DOWN-write', *pročitat'* 'to THROUGH-read', among others). These are traditionally called 'empty' because their meaning is quite bleached and it is often assumed that they only derive perfective verbs from imperfective ones. In most cases, they also do not derive SIs. So at first sight, these prefixes seem to have more in common with the external prefixes. However, with respect to the other diagnostics, they behave like internal prefixes, since they can affect the argument structure (recall (11)), regularly derive complex event nominals and participles (recall (13) and (14)), and since they cannot stack. Furthermore, each of these verbs has a different kind of prefix. Hence, there is some lexical relation between the prefix and the verb. Finally, events containing such prefixes are always telic, and I will argue in the next section that all internal prefixes mark telicity. Therefore, I conclude that these prefixes are in fact internal (but see Ramchand, 2004, this volume, for a different view). This leaves the fact that verbs which such prefixes do not derive SIs unaccounted for, which I will have to leave for future research.

    It is interesting to note, that the Russian and Czech verbs that combine with 'empty prefixes' correspond to English verbs (and presumably verbs in other languages), whose internal arguments are incremental themes or gradual patients, which are often optional. The internal structure of these internal argument DPs is often assumed to be mapped to the event structure, being responsible for the event being telic (with quantised DPs) or atelic (with homogeneous DPs) (see Krifka, 1998 for discussion).

(18)   **Russian and Czech internal vs. external prefixes**

	internal prefixes	external prefixes
argument structure effects possible	√	*
derive SIs	√	*
derive event nominals and participles	√	*
stacking	*	√

In the next section, I will argue that Slavic internal prefixes uniformly mark telicity. Indicative of this is the fact that there can only be one internal prefix on a verb (recall (16) c. / (17) c.), an observation which has also been made for Bulgarian by di Sciullo & Slabakova (2005). This is in line with Tenny (1994), who observes that an event described by a verb may only have one measuring-out and be delimited only once.

2.3   Internal prefixes induce telicity

One of the most common tests to show whether a predicate is telic or not, is the compatibility with temporal adverbials (Vendler, 1957; Verkuyl, 1972; among others). Atelic predicates are compatible with *for*-adverbials but not with *in*-adverbials, whereas the opposite holds for telic predicates.

Russian predicates containing internal prefixes (if not further modified by the imperfectivising suffix) are only compatible with *in*-adverbials (19).

(19)   On **ot-kryl^p** okno *(za) dva minuty.   **(internal)**
        he FROM-cover.PAST window *(in) two minutes
        'He opened the window in / *for two minutes.'

In contrast, some external prefixes are only compatible with *for*-adverbials (20).

(20)   On **po-spal^p** (*za) dva minuty.   **(external)**
        he PO-sleep.PAST (*in) two minutes
        'He slept *in / for two minutes.'

Filip (2000) notes, that Russian and Czech prefixes do not behave uniformly with respect to common telicity tests. Whereas *pro-* 'for a longer while', which is classified here as an external prefix, behaves just like external *po-*, the ingressive external prefix

za- displays reverse behaviour and is only compatible with *in*-adverbials. In this case, though, the temporal adverbial specifies the time before the event starts and does not measure the running time of the event itself. In section 4.3, I will adopt a syntactic account of Slavic prefixes proposed by Ramchand (2004, this volume), according to which only internal prefixes are directly related to telicity as a result of their being resultatives. External prefixes, on the other hand, are orthogonal to the (a)telicity distinction and fulfil other functions.

A second test found in the literature on telicity is the progressivity entailment test. An English sentence in the present progressive entails the same sentence in the present perfect with atelic but not with telic predicates (Vendler, 1957; Bach, 1986; among others) (21).

(21) a. He is sleeping.   =>   He has slept.   **(atelic)**
      b. He is drawing a picture. ≠>   He has drawn a picture.   **(telic)**

In order for such a test to be applicable to Slavic languages, which have neither progressive nor perfect tenses, Borik (2002) suggests to reverse it: A sentence with a telic predicate describing a situation in the past entails that the situation does not hold anymore in the present. (22) shows for Russian that this entailment holds for all internally prefixed predicates but not if the predicate is atelic and externally prefixed.

(22) a. Ja **na-pisal^P** pis'mo$_i$.   => Ja (bol'še) ne **pišu^i** pis'mo$_i$.   **(internal / telic)**
          I ON-write.PAST letter.ACC   I (anymore) not write.PRES letter.ACC
      b. Ja **po-pisal^P** pis'mo$_i$.   ≠> Ja (bol'še) ne **pišu^i** pis'mo$_i$.   **(external / atelic)**
          I PO-write.PAST letter.ACC   I (anymore) not write.PRES letter.ACC

In sum, predicates containing internal prefixes behave like telic ones according to two tests for telicity, namely the (in)compatibility with *in*- or *for*-adverbials and an entailment test. Internal prefixes can thus be treated as some kind of telicity marker.

External prefixes, on the other hand, do not behave uniformly with respect to the telicity

tests. I will come back to why this should be so in section 4.3.2.

The next section discusses apparent counter-examples to the distinction between

internal and external prefixes.

3   An apparent problem: the goal-source asymmetry

Filip (2003) shows that Czech source prefixes can combine with measure expressions

such as *metr* 'a metre' or the prefix *po-* with the meaning 'a bit', which are both

ungrammatical on verbs with goal prefixes (23).[9],[10]

(23)   a.   **Po-vy-táhl^P** káru z příkopu.   (= (49) b. in Filip, 2003: 94)
            PO-OUT-dragged cart.ACC from ditch.GEN
            'He dragged the cart out of the ditch a bit.'
        b.   ***Po-do-táhl^P** káru do příkopu.   (= (50) b. in Filip, 2003: 94)
            PO-(IN)TO-drag.PAST cart.ACC (in)to ditch.GEN
                'He dragged the cart (in)to the ditch a bit.'

Following Tenny (1994), who observes that an event described by a verb may only have

one measuring-out and be delimited only once, Filip states the Telicity Constraint (24).

(24)   **The Telicity Constraint** (Filip, 2003: 63)
        Telicity modifiers[11] express functions that map atelic (homogeneous) predicates
        onto telic predicates: $\lambda P\lambda e\ [P(e) \wedge \text{HOM}(P)(e)] \rightarrow \lambda P\lambda e\ [P(e) \wedge \text{TEL}(P)(e)]$.

She concludes from this constraint and the empirical facts in (23) that there is a

semantic asymmetry between sources and goals with respect to telicity (25).

(25)   **Goal-Source Telicity Asymmetry** (Filip, 2003: 79)
        The spatial orientation of directional modifiers determines the telicity status of a
        derived predicate. Source-modifiers form atelic (homogeneous) predicates.
        Goal-modifiers form telic predicates.

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[9] If the prefix *po-* is omitted, both sentences with either goal or source prefix are grammatical.

[10] Russian does not display any asymmetry in this respect. The direct Russian translations of (23), where *po-* applies to perfective goal- and source-prefixed verbs, are both ungrammatical. The same holds for bare spatial measure phrases of the type 'two metres'. Furthermore, distributive *po-*, which was encountered in (16), is compatible with both goal- and source-prefixed SIs.

[11] Filip provides the following examples for telicity modifiers: directional PPs with motion verbs (e.g. *to the store*), temporally delimiting adverbials (e.g. *for an hour*), resultatives (e.g. *to hammer the metal **flat***).

Filip follows Rothstein's (2003) definition of telicity (26).

(26)   *A verbal predicate is* **telic** *if it denotes either*   (Filip, 2003: 61)
         (i) *a set* P_C, *i.e., a set of single atomic events contextually restricted by* t *(a time index) and* M *(a measure statement for* P*), or*
         (ii) *a plural set of atomic events of a definite cardinality.*
         Otherwise the predicate is atelic.
         M: $\forall e [P(e) \wedge Q(e) \rightarrow |e| = 1]$, *where Q is a context-dependent variable.*

Hence, telicity involves the identification of atomic events relative to a given context.

In the previous section, it was shown that Russian and Czech verbal prefixes can be divided into internal and external ones. Internal prefixes were argued to regularly derive telic predicates, whereas external prefixes do not. There are two ways, then, to make Filip's (2003) claims coherent with this division. First, goal prefixes could be internal and source prefixes external, since, according to Filip, only goals yield telic predicates. This option will be addressed in section 3.1. A second solution would lead to a revision of my claim about internal prefixes as telicity markers and to a subdivision among the internal prefixes: both goal and source prefixes are internal but not all internal prefixes mark telicity, in particular source prefixes do not. This hypothesis will be tested in section 3.2. It will become evident that both solutions face empirical problems, since both types of prefixes behave like internal, telic ones according to the diagnostics. An alternative account of the data will be proposed in section 5.

3.1   Hypothesis I: source prefixes are external

According to Filip, only goal but not source prefixes induce telicity. To make this compatible with my claim in section 2.3 that all internal prefixes induce telicity, I have to consider the possibility of source prefixes being VP-external. The properties distinguishing internal from external prefixes are repeated in (27) for convenience.

(27)   **Russian and Czech internal vs. external prefixes**

	internal prefixes	external prefixes
argument structure effects possible	√	*
derive SIs	√	*
derive event nominals and participles	√	*
stacking	*	√

Judging from these properties, the option of treating source prefixes as external ones faces serious problems. First, both source and goal prefixes affect the argument structure of the Czech base verb (28).

(28)   a.   root *skočit*^{p} 'jump':   CZECH
           při-skočit **k čemu / komu**   'TO-jump to s.th. / s.o.'
           od-skočit **od čeho / koho**   'AWAY-jump from s.th. / s.o.'
       b.   root *táhnout*^{i} *něco* 'draw, pull, drag s.th.':
           do-táhnout něco **do čeho**   'IN-drag s.th. into s.th.'
           vy-táhnout něco **z čeho**   'OUT-drag s.th. out of s.th.'

Whereas directional PPs are optional with non-prefixed verbs such as (pf.) *skočit* 'jump' or (ipf.) *táhnout* 'drag' and could thus arguable be treated as adjuncts, such PPs are obligatory with the prefixed verbs and behave like proper arguments in these cases.

Second, Czech verbs with source prefixes regularly undergo secondary imperfectivisation, and therefore behave just like verbs with goal prefixes (29).

(29)   a.   **při**-skočit^p > **při**-skákat^i 'TO-jump'   CZECH
           od-skočit^p > **od**-skákat^i 'AWAY-jump'
       b.   **do**-táhnout^p > **od**-tahovat^i 'IN-drag'
           vy-táhnout^p > **při**-tahovat^i 'OUT-drag'

Third, Czech verbs with both types of prefixes derive complex event nominals and participles. I will show this for the particular past passive participles, which regularly serve as a basis for deriving event nominals in Czech (30), (31).

(30)   a.   past passive participle **do**-táhnutý > **do**-táhnutí   'IN-dragging'   CZECH
       b.   past passive participle **vy**-táhnutý > **vy**-táhnutí   'OUT-dragging'

(31)   a.   past passive participle **při**-skočený   > **při**-skočení 'TO-jumping'
       b.   past passive participle **od**-skočený   > **od**-skočení 'FROM-jumping'

Hence, according to the first three diagnostics, source and goal prefixes behave alike, namely like internal prefixes.[12]

This leaves us with the last property, i.e. stacking, which is related to another empirical claim brought forward by Filip (2003). We saw in (23) that the measure prefix *po-* can stack on a source but not on a goal prefix. Filip claims that the asymmetry between goals and sources is further supported by the fact that with source prefixes this stacking can go either way (at least for the speakers she consulted, Filip p.c.). With goal prefixes, on the other hand, stacking in either direction is impossible (32), (33).

(32)   root *skočit^p* 'to jump':   (Filip's claim for Czech)
    a. **po-od-**skočit^p, **od-po-**skočit^p (AWAY-jump + *po-*)
    b. ***po-při-**skočit^p, ***při-po-**skočit^p (TO-jump + *po-*)
    (see (43) and (45) in Filip, 2003: 89 & 92)

(33)   root *sednout^p si* 'to sit down':   (Filip's claim for Czech)
    a. **po-od-**sednout^p si, **od-po-**sednout^p si (AWAY-sit-down + *po-*)
    b. ***po-při-**sednout^p si, ***při-po-**sednout^p si (TO-sit-down + *po-*)
    (see (46) and (47) in Filip, 2003: 93)

If this is correct, source prefixes in the system proposed here display external behaviour by being able to appear outside an external prefix like *po-*. According to the other diagnostics mentioned before, however, source prefixes behave like internal ones. This would suggest that the diagnostics proposed in section 2.2 to distinguish internal from external prefixes are not sensitive to the same phenomenon, since source prefixes behave like internal ones with respect to one group of tests, but like external ones according to Filip's data in (32) and (33).

Other native speakers, however, disagree with this particular set of Filip's data in the following way. All seven Czech speakers I consulted found the order, under which the source prefix applied after *po-* ungrammatical (34).

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[12] The same holds for the Russian cognates.

(34) a. ***od-po**-skočit   (Czech consultants)
        b. ***od-po**-sednout si

When *po-* applies after the source or the goal prefix, all speakers share Filip's judgments in ruling *po-* with source prefix in and *po-* with goal prefix out (35).

(35) a. **po-od**-sednout si   (Czech consultants)
        b. ***po-při**-sednout si

In sum, according to the four criteria presented in section 2.2, both source and goal prefixes behave like internal prefixes. However, the empirical claim in Filip's paper that is robust is that the external measure prefix *po-* can apply only to verbs with source prefixes but not to those with goal-oriented ones. We therefore have to ask the question why this is so and whether this really has to do with some sort of aspectual goal-source asymmetry. Therefore, I will test a second hypothesis, which still maintains the claim of a general aspectual asymmetry between sources and goals.

3.2   Hypothesis II: only a subset of the internal prefixes mark telicity

If both source and goal prefixes are VP-internal, as just shown, and if furthermore only goal PPs induce telicity but source-oriented ones do not, as claimed by Filip (2003), the system proposed for Slavic prefixes in section 2 has to be modified in the sense that only a subset of the internal prefixes act as telicity markers.

This hypothesis has to be discarded as well, since events described by Czech verbs with either source or goal prefixes behave like telic ones with respect to the diagnostics for telicity proposed in section 2.3 (36), (37).

(36) a. **Vy-táhl^P** káru z příkopu ***(za) hodinu**.   CZECH
        OUT-dragged cart.ACC from ditch.GEN *(in) hour.ACC
        'He dragged the cart out of the ditch (in / *for) an hour.'
        b. **Do-táhl^P** káru do příkopu ***(za) hodinu**.
        (IN)TO-dragged cart.ACC (in)to ditch.GEN *(in) hour.ACC
        'He dragged the cart (in)to the ditch (in / *for) an hour.'

(37) a. **Vy-táhl[P]** káru z příkopu. => **Už ne-vy-tahuje[i]** káru z příkopu.
                            anymore not-OUT-drag.PRES cart out of ditch
      b. **Do-táhl[P]** káru do příkopu.=> **Už ne-do-tahuje[i]** káru do příkopu.
                            anymore not-(IN)TO-drag.PRES cart into ditch

Therefore, I conclude that predicates containing either source or goal prefixes in Czech are telic.[13] This in turn means that the asymmetry in Filip's example (23), i.e. the fact that only source but not goal prefixes are compatible with measure phrase modifiers like the external prefix *po*-, cannot be related to a general aspectual asymmetry anymore. However, this asymmetry still needs to be addressed, which will be done in section 5. First, though, I will outline the theoretical assumptions underlying this paper and propose a general account for the semantics and syntax of Slavic verbal prefixes.

4   Theoretical assumptions

Matushansky (2002) convincingly shows that Russian prefixes and prepositions obey the same phonological rules and claims that both belong to the same category P. Apparent semantic differences such as aspectual prefixes vs. predicational PPs are argued to be direct consequences of the immediate syntactic context – attachment to VP or DP/CP – rather than due to a difference between prefixes and prepositions per se. Furthermore, nearly all Slavic prefixes can be used as or are homophonous to prepositions. Their meaning is fairly spatially transparent in most cases and only occasionally there is a deviation from the prepositional meaning. I will therefore assume that syntactically and semantically, Slavic prefixes can be treated like P elements. Section 4.1 will account for the semantic contribution of verbal prefixes in the framework of vector space semantics developed for English prepositions in Zwarts & Winter (2000) and Zwarts (2005). Section 4.2 will argue that internal prefixes are

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[13] Again, the same holds for Russian.

related to locative prepositions. Section 4.3 will discuss the relation of internal and external prefixes to the structure of events, building on Ramchand (this volume).

4.1   Vector space semantics and prepositional aspect

This paper follows the standard assumption that spatial PPs can be divided into locative and directional ones. Furthermore, it follows Jackendoff (1983) in distinguishing between three types of directional PPs. ROUTE PPs describe a trajectory without an (initial or final) end-point of the path; examples are PPs involving *across, around, through, past, along*. In contrast, SOURCE prepositions such as *from, out of, off* and GOAL prepositions such as *to, into, onto* specify where the path starts and ends, respectively.

Zwarts and Winter (2000) and Zwarts (2005) propose a vector space semantic account for locative and directional PPs. For example, the locative PP *behind the house* is associated with the set of vectors that go from the house to points behind it.[14] The semantics of directional PPs is addressed more directly in Zwarts (2005), where the denotation of a directional PP is treated as an algebraically structured set of paths (see also Zwarts & Winter, 2000, with path defined as in (38)).

(38)   *A* **path** *is a function of type iv from the real interval* $[0,1] \subset \mathbf{R}$ *(type i) to vectors (type v)*.

Directional prepositions are assumed to map the reference object (the GROUND in Talmy, 2000) to a set of sequences of vectors (paths), where each of these sequences determines a potential change in position of the located object (Talmy's FIGURE).

One of the main ideas of Zwarts (2005) is to compare the prepositional domain to the verbal and nominal domains, and to explore parallels between these. He assumes that locative PPs can be compared to states in the verbal domain, whereas directional PPs

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[14] For the complete definitions for prepositional aspect and vector space semantics, the reader is referred directly to Zwarts (2005: 775f.) and Zwarts & Winter (2000: 208ff.).

are very much like dynamic events. He furthermore argues that a property like boundedness, which is relevant to distinguish between atelic (unbounded) and telic (bounded) events in the verbal domain, or between mass (unbounded) and count (bounded) nouns in the nominal domain (see, for instance, Bach, 1986), is also at play in the prepositional domain. This leads him to make a further subdivision of directional PPs into atelic / unbounded and telic / bounded ones (39).

(39) a. *bounded, telic*: to, into, onto, from, out of, off, away from, past, via
      b. *unbounded, atelic*: towards, along
      c. *(un)bounded, (a)telic*: across, around, down, over, through, up

Zwarts convincingly shows that the distinguishing property between telic and atelic reference in the prepositional domain is cumulativity rather than divisivity or quantisedness. Cumulativity in the verbal and nominal domain is exemplified in (40).

(40) *drink water* (cumulative) vs. *drink a glass of water* (non-cumulative)

For example, an event described by *drink water* can be added to another event of *drinking water* and the resulting event is still in the denotation of *drink water*. Such predicates are therefore cumulative. Summing up two events of *drinking a glass of water*, however, is not in the same denotation anymore, but describes a different event, one of *drinking two glasses of water*. Such predicates are therefore not cumulative.

A PP, then, is bounded (telic) iff it does not have cumulative reference, which is defined in (41) (with **p** and **q** as variables over paths).

(41) *A set of paths* **X** *is* **cumulative** *iff*   (Zwarts, 2005: 12)
      (i)   *there are* **p** *and* **q** $\in$ **X** *such that* **p**+**q** *exists and*
      (ii) *for all* **p**, **q** $\in$ **X**, *if* **p**+**q** *exists, then* **p**+**q** $\in$ **X**.

The crucial operation involved here is concatenation (closure under sums), which is a partial operation subject to the condition that the second path has to start where the first

path ends. Atelic PPs are closed under sums whereas telic PPs are not. For example, *into* is defined as a transition into a location INSIDE the reference object (42).

(42)   [[into the house]] = { **p**: there is an interval $I \subset [0,1]$ that includes 1 and that
        consists of all the indices $i \in [0,1]$ for which **p**(i) is INSIDE the house }

To and *onto* are defined in a parallel fashion where the location is AT and ON (instead of INSIDE), respectively. These three goal-expressions are not cumulative, as they contain no paths that can be concatenated. For example, there are no two paths in the denotation of *to* that can be concatenated, since the final end-point (1) of a *to*-path is always just outside the reference object whereas the initial end-point (0) is not.

The denotations of the source prepositions *out of*, *from* and *off* do not involve any paths that can be concatenated, either, and are therefore non-cumulative as well; they are defined as the reverse of the goal ones. A full list of the definitions is given in (43).

(43)   { **p**: there is an interval $I \subset [0,1]$ including…
        … 0 and consisting of all the $i \in [0,1]$ for which **p**(i) is AT x } = [[from x]]
        … 0 and consisting of all the $i \in [0,1]$ for which **p**(i) is ON x } = [[off x]]
        … 0 and consisting of all the $i \in [0,1]$ for which **p**(i) is IN x } = [[out of x]]
        … 1 and consisting of all the $i \in [0,1]$ for which **p**(i) is AT x } = [[to x]]
        … 1 and consisting of all the $i \in [0,1]$ for which **p**(i) is ON x } = [[onto x]]
        … 1 and consisting of all the $i \in [0,1]$ for which **p**(i) is IN x } = [[into x]]

In other words, all of these prepositions have in common that they involve a two-stage structure, a negative and a positive phase. They all have exactly one positive phase that overlaps either with the starting point **p**(0) or the ending point **p**(1). This is similar to Fong's (1997) treatment of the semantics of directional PPs in terms of phase quantification. The definitions furthermore indicate that all these PPs involve some final location such as AT, ON, IN x (smallcaps in the definitions by me). Hence, both goal and source PPs are complex in referring to a transition into a final location and are thus comparable to telic events, which are complex in referring to a transition into a result state (see Pustejovsky 1991, among others).

It is a well-known fact that situations described by manner of motion verbs are usually atelic (e.g. *He walked *in / for an hour*) but telic in combination with particular directional PPs (e.g. *He walked to the store in / *for an hour*). Following Jackendoff (1996), Krifka (1998), among others, I assume, then, that the properties of the path as bounded or unbounded determine the properties of the event (telic or atelic) as a whole due to a homomorphism between events and paths (Krifka, 1998) or structure-preserving binding between the axis projected by the path and the axis projected by the event (Jackendoff, 1996). Since nothing in this paper hinges on the precise implementation of this notion, I will leave it open. What is relevant here is that whenever a bounded PP combines with a manner of motion verb in English, the event is telic. In other words, the boundedness property of the path directly influences the telicity property of the motion event.

In sum, English route prepositions (except for *past* and *via*) are aspectually ambiguous, whereas *towards* and *along* are the only atelic (unbounded) prepositions. Apart from *towards*[15], then, all goal and source prepositions in Zwarts' (2005) system are telic. Therefore, the events containing either goal or source PPs should be telic as well. Such an account stands in sharp contrast to Filip's (2003) claim about an aspectual difference between sources and goals. Therefore, the following section will concentrate on the semantics of Slavic goal and source prefixes in more detail.

4.2 Slavic goal and source prefixes as locative Ps

Contrary to the general assumption that prefixes on motion verbs are directional and therefore dynamic in nature (e.g. Filip, 2003), I will assume that at least the internal

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[15] Zwarts (2005) defines *towards* as the comparative of *to*: [[towards the gate]] = { $\mathbf{p}$: there is a $\mathbf{q} \in$ [[to the gate]] such that $\mathbf{p} \leq \mathbf{q}$ and $\mathbf{p}(1)$ is nearer to the gate than $\mathbf{p}(0)$ }.

ones should rather be treated as locative Ps and thus as states. A similar claim can be found in Žaucer (2004) for Slovenian. In particular, I will argue that all internal prefixes directly denote a state, which in turn is interpreted as the result state of the event. In order to show this, I will discuss Russian and Czech goal and source prepositions and prefixes.

The tables in (44) and (45) contain the Russian and Czech prepositional and prefixal counterparts to most of the English goal and source prepositions dealt with in Zwarts (2005).

(44) **Russian goal and source prepositions and prefixes**

meaning	prepositions	verbal prefixes
to	*do* (+ GEN), *k* (+ DAT)	*do-*, *pri-*
towards	*k* (+ DAT)	---
in / into	*v* (+ ACC) / (+ PREP)	*v-*, *za-*
on / onto	*na* (+ ACC) / (+ PREP)	*(na-)*
(away) from	*ot* (+ GEN)	*ot-*, *u-*
out of	*iz* (+ GEN)	*iz-*, *vy-*

(45) **Czech goal and source prepositions and prefixes**

meaning	prepositions	verbal prefixes
to	*do* (+ GEN), *k* (+ DAT)	*do-*, *pri-*
towards	*k* (+ DAT), *vůči* (+ DAT)	---
into	*do* (+ GEN)	*do-*
on / onto	*na* (+ ACC) / (+ PREP)	*(na-)*
(away) from	*od* (+ GEN)	*od-*, *u-*
out of	*z* (+ GEN)	*vy-*

An apparent differences between Russian and Czech is that only Czech has a preposition like *towards* distinct from *to*, namely *vůči*. In addition, Czech does not lexically *into* from *to* but uses the preposition *do* in both cases.[16]

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[16] In both Russian and Czech, the prefixal counterpart to the preposition *na* 'on' is only found on the motion verb Russian *idti* / Czech *jít* 'go'. *Najti* and *najít*, however, do not convey the meaning of a motion on foot *onto* something but have the different lexical meaning of 'find'. To describe a motion *onto* something, other prefixes are used depending on the particular perspective, such as Russian *so-jti* 'descend' (lit. down-go) or Czech *vze-stoupit* 'ascend' (lit. up-step).

At first sight, the gaps or mismatches in the preposition-prefix correlation (marked in bold-faced letters) seemingly pose a problem for the claim that they belong to the same category. There are direct prefixal counterparts to all prepositions that can have a locative meaning, but not to the purely directional ones *k* and *vůči*. On the other hand, there are cases, where the prefixes used to refer to goals or sources do not have prepositional counterparts with the same meaning. These prefixes are, in fact, often preferred over the direct counterparts to render the particular goal and source meanings. One can show, however, that prefixes on Slavic motion verbs convey locative rather than directional meanings in general, which accounts for the gaps and mismatches, maintaining a unified treatment of prefixes and prepositions under the category P.

  Apart from Czech *vůči* (+ DAT) 'towards', Russian *v* (+ ACC) 'into', and Russian and Czech *k* (+ DAT) 'to(wards)' and *na* (+ ACC) 'on', all goal and source prepositions can appear in both directional and locative contexts (e.g. they can appear as complements of *be*). Moreover, *na* and *v* convey the locative meanings of 'on' and 'in', respectively, when they select prepositional case[17], as the examples from Russian (46).[18]

(46) a. Ona položila[p] knigu **na stol**. / **v sumku**.   (directional)
          she put.PAST book.ACC on table.ACC / in bag.ACC
          'She put the book on(to) the table / in(to) the bag.'
      b. Kniga byla[i] **na stole** / **v sumke**.   (locative)
          book.NOM was on table.PREP / in bag.PREP
          'The book was on the table / in the bag.'

Hence, these prepositions also occur in locative contexts. The only prepositions that cannot appear in a locative context are therefore Russian and Czech *k* 'to(wards)' and

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[17] The prepositional case in Slavic languages is sometimes also called locative case. I chose this term to avoid confusion with the term *locative*, which I reserve for the spatial meaning of places / locations in contrast to *directional*, which relates to paths.
[18] Czech *na* 'on' behaves the same. This is in general comparable to German *in* 'in' and *auf* 'on', which select accusative case in the directional meaning but dative case in the locative meaning.

Czech *vůči* 'towards', which are exactly those prepositions which do not have prefixal counterparts.

The prepositional counterparts of the additional prefixes that are often preferred over the direct counterparts to render the particular goal and source meanings, partially convey different meanings (47).

(47)   **prepositional counterparts of additional prefixes**:
   a.   *pri* / *při* (+ PREP) 'at, by'
   b.   *u* (+ GEN) 'at'
   c.   *za* (+ ACC / INSTR) 'within; behind, at, with, …'
   d.   Old Slavonic *vъn* (+ GEN) > Russ. / Czech adverbial *von* / *ven* 'outside'

The most common prefixes used for a motion involving an arrival or leaving have the prepositional counterparts in (47) a. and b. As prepositions, these P elements convey the purely locative meaning of 'at'. This is quite interesting in the light of the fact that Zwarts (2005) integrates AT in the definitions of the directional PPs *from x* and *to x* (recall (43)). Furthermore, the prefix *za-* 'in' has the prepositional counterpart *za* 'within; behind', which can be used directionally only in the meaning 'behind', then selecting accusative case. As a prefix, however, it denotes 'in', so only the locative meaning is available. Finally, the prefix *vy-* 'out', which no longer has a prepositional counterpart, is historically related to the Old Slavonic preposition *vъn* (+ GEN). Reflexes of this preposition are the modern Russian and Czech adverbials *von* / *ven* 'outside', so that we can assume that this element is not directional either.

In sum, none of the prepositions that are only directional appear as prefixes. On the other hand, there are purely locative prepositions that do. To maintain the strict relation between prepositions and prefixes as argued for by Matushansky (2002), I therefore conclude that these prefixes are in fact related to locative prepositions and denote a state. This result is in principle compatible with Basilico's (this volume) account of

Russian (internal) prefixes creating an altered Root (introducing an argument position), which is interpreted as a state. However, I will follow a different account which also addresses the role of external prefixes.

4.3   Slavic prefixes in syntax

In this section, I will combine the semantic account just presented with Ramchand's (2004, this volume) syntactic account of Slavic prefixes. I will assume with her that internal prefixes directly identify a result state subevent, since they are themselves states. From this it follows that Slavic internally prefixed predicates are always telic.

4.3.1   Internal prefixes

In Ramchand's (2004, this volume) system, internal (lexical) prefixes lexically specify a Result Phrase (RP) that is subordinated to the VP (48) (see also Arsenijević, 2004 for a similar account).

(48)   **The internal prefixes**
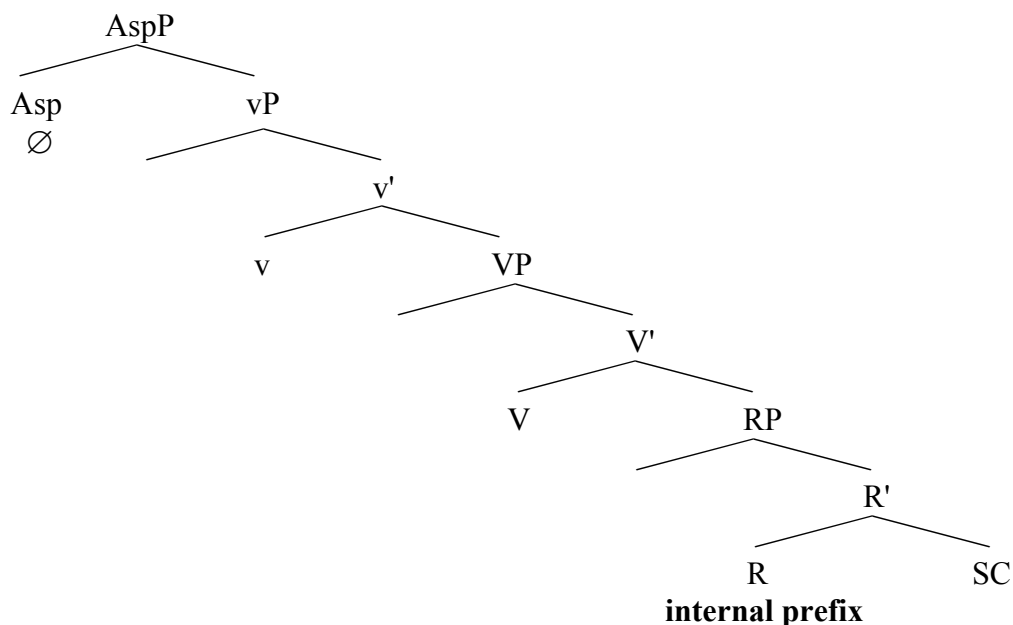
The verbal root in this case (a transitive verb) identifies both vP and VP, whereas the internal prefix licenses a Result Phrase.

The structure in (48) straightforwardly accounts for the properties of internal prefixes as outlined in section 2, which are repeated in (49) for convenience.

(49)   **Russian and Czech internal vs. external prefixes**

	internal prefixes	external prefixes
argument structure effects possible	√	*
derive SIs	√	*
derive event nominals and participles	√	*
stacking	*	√
telicity	√	*

Since internal prefixes participate in structuring the event by providing a result state subevent, they can affect the argument structure of the verb they apply to. Following Ramchand & Svenonius (2002), these prefixes (just like Germanic participles) bear a predicational relation to the DP in object position, which is simultaneously the subject of the process. Given their base-generation at the lexical syntactic level, which – according to Ramchand (2004, this volume) – is the locus for encyclopaedic information, their meaning contribution can be idiosyncratic.

Furthermore, Ramchand (2004, this volume) claims that the SI suffix is base-generated in Asp° and states that the assertion time (Reichenbach's Reference Time) falls within the process portion of the event. She assumes there to be a lexical requirement on the imperfectivising suffix to take a vP with internal subevental complexity as its complement. Given that internal prefixes directly supply the result state subevent, this requirement is met and the particular verbs regularly derive SIs.[19]

Third, it is generally assumed that the derivations of complex event nominals and participles contain (at least) a VP. Since internal prefixes are embedded within the VP as R heads, they naturally participate in such derivations. Finally, internal prefixes
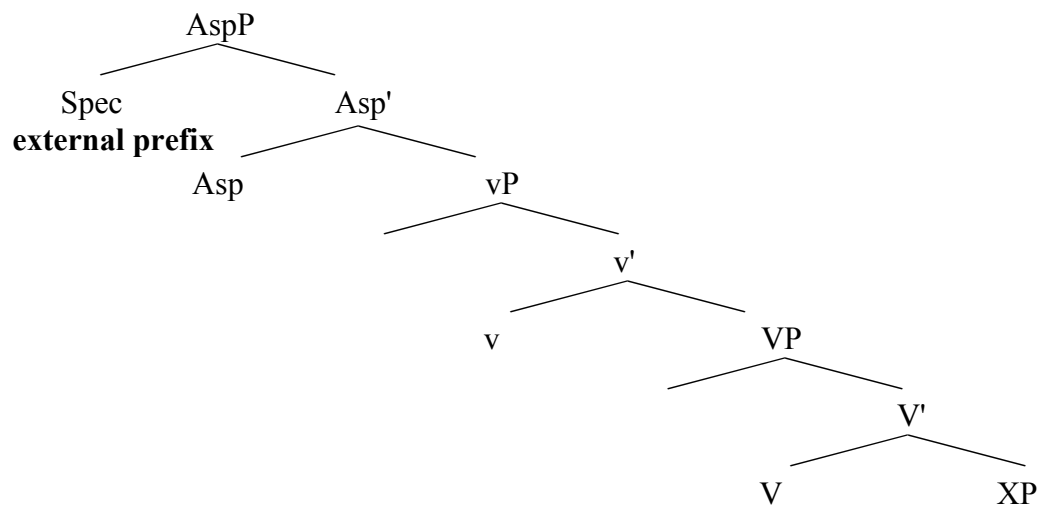
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[19] Again, it is not clear why verbs with EMPTY PREFIXES usually do not derive SIs, although they otherwise behave like internal prefixes (recall footnote 8).

cannot stack, because there can only be one Result Phrase per event, otherwise we would be dealing with a separate event. Since resultativity is the transition from a process to a result state, and following Ramchand's (2004, this volume) suggestion that vP denotes some predicate over events, events containing internal prefixes will always be telic.

4.3.2   External prefixes

I will now turn to Ramchand's (2004, this volume) account for Russian external (superlexical) prefixes. These are assumed to be base-generated in Spec, AspP and to assert a definite time point (50).

(50)   **The external prefixes**

```
                 AspP
              ┌────┴────┐
           Spec          Asp'
      external prefix  ┌───┴────┐
                     Asp          vP
                              ┌────┴────┐
                                         v'
                                   ┌─────┴─────┐
                                   v            VP
                                           ┌────┴────┐
                                                      V'
                                                 ┌────┴────┐
                                                 V          XP
```

According to Ramchand, the application of an external prefix leads to the assertion time being a definite time moment within the event, which she identifies as the core semantics of the Russian perfective aspect.

The structure in (50) captures the properties of Russian external prefixes outlined in section 2 in the following way. Being base-generated outside the vP, external prefixes cannot affect the argument structure and cannot add idiosyncratic meaning. Rather, they have a uniform semantics, and their meaning contribution is compositional.

For instance, Ramchand identifies the semantics of the Russian external prefixes in (51).

(51)   a.   [[za-]] = $\lambda P \lambda t$ [P(t) & t occurs at the onset of the temporal trace]
           b.   [[po-]] = $\lambda P \lambda t$ [P(t) & t is a specific moment a short way into the temporal trace]

Since Russian external prefixes are base-generated in Spec, AspP and supply a definite assertion time, they are incompatible with the imperfective suffix because of the conflicting aspectual values.

Furthermore, Russian externally prefixed verbs cannot derive complex event nominals. Schoorlemmer (1995) shows, that such derivations only take bare VPs (vPs) as their input, but crucially not AspP. Supporting evidence comes from the incompatibility of event nominals with manner adverbs or accusative time expressions and the fact that there are no aspectual pairs among Russian event nominals. Within the same line of reasoning, we can assume that AspP is not part of Russian participles, either. For instance, there are no aspectual pairs for each type of participle. If Russian external prefixes are base-generated in Spec, AspP and if furthermore event nominals and participles do not contain AspP, it follows straightforwardly that externally prefixed verbs cannot derive such forms.

We should also expect external prefixes to be able to stack because there is no reason a priori to assume that an aspectual (perfective) prefix should be incompatible with a result state subevent (RP). Finally, with respect to the telicity tests, Ramchand (2004, this volume) proposes that *in*-adverbials are ungrammatical if no lexically specified event transition points are present. Therefore, internally prefixed verbs are always compatible with *in*-adverbials because they regularly specify the transition into a result state (unless further modified by the imperfective suffix). Ramchand furthermore notes, that "in the absence of a result, the telicity tests are influenced by other factors." Hence,

external prefixes, which apply to events without a result state subevent, may have selectional restrictions with respect to telicity but never change the telicity status of the predicate they apply to. Thus, they do not behave uniformly with respect to telicity tests.

4.3.3   Is there more than one AspP?

What is not directly noted in Ramchand (2004, this volume), but what should follow straightforwardly, is that Russian external prefixes are semantically compatible only with events with an indefinite assertion time, since they provide a definite assertion time. There are at least two possibilities for an event to have an indefinite assertion time. Either the input is a homogeneous event which does not contain a result state subevent, i.e. a vp/VP without RP. Without an external prefix, such vPs/VPs will be imperfective (examples were given in (4) a.). A second type of input can be SIs, since the imperfectivising suffix asserts that the assertion time falls within the process portion of the event. According to Ramchand, this is an arbitrary time moment within the process event, so that the assertion time itself is indefinite. At this point we might run into problems, since the syntax in Ramchand's (2004, this volume) only provides one AspP. Asp°, then, would be occupied by the imperfective suffix, signaling that the assertion time is indefinite, whereas Spec, Asp would contain the external prefix, which provides a definite assertion time. Since these are conflicting aspectual values, such a construction should be ungrammatical. However, we saw in (7), repeated here as (52), that the application of both a prefix and a suffix to the same verb is possible.

(52)   ipf. **vy**-da-va-t' > pf. **po-vy**-da-**va**-t' 'to hand out, distribute'   RUSSIAN

In fact, the Russian external prefix *po-* can only be applied to an imperfective verb, and the application to the perfective prefixed verb without the additional imperfectivising suffix is ungrammatical (53).

(53)   pf. **vy**-dat' > pf. ***po-vy**-dat'   Russian

There is a way out of this apparent dilemma, though, and Ramchand herself hints at it in a footnote. In general, the Russian external prefixes that stack take pluralities of events as their input. For instance, *po-* in (52) has a distributive reading. Therefore, it could very well be that this prefix is the head of yet another aspectual projection (e.g. DistP) higher up in the structure, which takes an unspecified plurality of events as its input. The SI in such a case does not contribute a process reading but rather an iterative or habitual reading, which is another common meaning that Russian imperfective verbs can convey, besides the 'progressive' one. Since nothing in this paper hinges on the precise syntactic implementation of grammatical aspect but rather focuses on the internal prefixes and in particular on goal and source prefixes, I will leave it at this.[20] In any case, it should be noted that the only possibilities of prefix and suffix co-occurring on the same verb are those in (54) a., but not the one in b. (adapted and extended from Ramchand, 2004, this volume).

(54)   a.   [[internal-[V-v]^{ipf}]^{pf} -SI]^{ipf}
             [external-[[internal-[V-v]^{ipf}]^{pf} -SI]^{ipf}]^{pf}
        b.   * [[external-[V-v]^{ipf}]^{pf} -SI]^{ipf}

In other words, the imperfectivising suffix can never outscope an external prefix but only an internal prefix, thereby deriving an imperfective verb.

4.3.4   Czech external prefixes

The careful reader should have noted by now, that I only addressed *Russian* external prefixes. Things differ when it comes to Czech external prefixes. It has been argued by Dickey (2000) that the semantics of grammatical aspect differs from one Slavic language to the other. He identifies the semantics of the Russian (im)perfective aspect

as temporal (in)definiteness, which is compatible with Ramchand's (2004, this volume) account, whereas Czech grammatical aspect is sensitive to whether a situation is viewed in its totality or not.

So although we find the same properties that distinguish between Czech internal and external prefixes as in Russian, there are reasons to assume that Czech external prefixes do not mark perfectivity. For example, whereas internal prefixes appear in more or less the same contexts in Russian and Czech, these languages differ severely in the usage of external prefixes and SIs in narrative discourse (Gehrke, 2003). Furthermore, we have seen in (17) that a Czech external prefix can stack on top of an internal one even if the particular verb has not undergone secondary imperfectivisation. The schema for this example is given in (55).

(55) *po-od-stoupit* 'away-step a bit'
[external-[internal-[V-v]^{ipf}]^{pf}]^{pf}

Given that the verb, which the second prefix applies to, is already perfective, this prefix, then, does not mark perfectivity. It rather functions as an adverbial modifier (in this case as a measure phrase modifier). I therefore assume that Czech external prefixes, unlike the Russian ones, are not base-generated in Spec, AspP and do not function as perfectivity markers.[21] At this point, I cannot say much about the precise syntax of Czech external prefixes, but with respect to their semantics, the reader is referred to Filip (2000, 2003) and Součková (2004). In the remainder of this paper, I will be concerned with Czech internal prefixes.

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[20] For a treatment of the syntactic role of Russian external prefixes, see also Romanova (2004) and Svenonius (2004).

[21] This also explains why the goal-source asymmetry is absent in Russian, where both goal and source prefixes are incompatible with *po-* (recall footnote 10). Unlike Czech *po-*, which provides spatial bounds as a measure phrase modifier, Russian delimitative *po-* temporally bounds by marking perfective aspect.

In sum, internal prefixes in both Russian and Czech are state morphemes that supply the result state of the event. Thus, such events are telic. External prefixes, on the other hand, are base-generated outside the vP/VP domain and fulfil functions that are not related to telicity. Russian external prefixes mark perfectivity and are generated in Spec, AspP, whereas Czech external prefixes act as adverbial modifiers, with their precise syntactic position still to be worked out. In the next and final section, I will provide an account for the asymmetry between goal and source prefixes, which does not rely on their aspectual contribution.

5   The nature of the goal-source asymmetry in Czech

On grounds of data like (23), repeated here as (56), Filip (2003) argues for an aspectual difference between goal and source modifiers.

(56)   a.   **Po-vy**-táhl^p káru z příkopu.   (= (49) b. in Filip, 2003: 94)
                PO-OUT-dragged cart.ACC from ditch.GEN
                'He dragged the cart out of the ditch a bit.'
         b.   ***Po-do**-táhl^p káru do příkopu.   (= (50) b. in Filip, 2003: 94)
                PO-(IN)TO-drag.PAST cart.ACC (in)to ditch.GEN
                'He dragged the cart (in)to the ditch a bit.'

However, section 3 showed that both types of prefixes behave uniformly like internal, telic ones with respect to the particular diagnostics. Hence, we should look for an alternative account for the asymmetry. In section 4, I argued that internal prefixes are state morphemes that are related to locative prepositions. Since Czech *po-* functions as a measure phrase, modifying a locative PP (in this case, the result state denoted by the prefix), we should look at the way in which measure phrase modification of locative PPs is restricted. This is addressed in Zwarts & Winter (2000), who propose a general

Since goal- and source-oriented events are already temporally bounded (both goal- and source-prefixed verbs are perfective), the additional application of *po-* is not possible in Russian.

account of how to compositionally deal with modified PPs. In the following, I will extend this account to Slavic prefixes, directly treating them as locative PPs.[22]

5.1 The modification condition (Zwarts & Winter 2000)

Recall that a locative PP like *behind the house* can be associated with the set of vectors that go from the house to points behind it. The modified PP *5 metres behind the house*, then, is a simple composition, namely the intersection of two sets of vectors, those that are five metres long and those that are behind the house. Zwarts & Winter (2000) note that there are restrictions as to when a locative PP can be modified by measure phrases. Locative PPs headed by *behind* or *outside* are modifiable by measure phrases, locative PPs headed by *between* or *in(side)* are not (57).

(57) a. **two metres behind** the car
          two kilometres outside the village
      b. ***two metres between** the houses
          *two metres in / inside the house

To generalise over this kind of data, Zwarts & Winter argue that for a locative PP to be modifiable by a measure phrase it has to be both upward and downward monotone (58).

(58) **Modification Condition:** *A set of located vectors $W \subseteq V \times V$ satisfies the modification condition iff W is* VMON↑, VMON↓ *and non-empty*.

This condition incorporates the fact that modification using measure phrases is possible only if the modified set of non-zero vectors and the intersection of the two sets does not lead to an empty set.

The relevant notion of monotonicity is defined in (59) (with **u** and **v** as variables over located vectors).

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[22] The particular account of the apparent asymmetry in Czech can also be couched in an approach where prefixes are directional PPs; we would then need some kind of operator mapping directional expressions to locative ones with result states in the spirit of Cresswell (1978), Jackendoff (1983), or Zwarts & Winter (2000) (see Gehrke, 2005 for discussion).

(59)   **Vector monotonicity:** *Let P be a prepositional function and $X \subseteq D_{pt}$.*
    a. *P is* **upward vector-monotone** *over x* (VMON↑) *iff*
       $\forall A \in X \ \forall \mathbf{u}, \mathbf{v} \in D_v \, [\mathbf{u} \leq \mathbf{v} \rightarrow (P(A)(\mathbf{u}) \rightarrow P(A)(\mathbf{v}))]$.
    b. *P is* **downward vector-monotone** *over x* (VMON↓) *iff*
       $\forall A \in X \ \forall \mathbf{u}, \mathbf{v} \in D_v \, [\mathbf{u} \leq \mathbf{v} \rightarrow (P(A)(\mathbf{v}) \rightarrow P(A)(\mathbf{u}))]$.

The intuition behind this definition is that of truth preservation when the located object gets further from / closer to the reference object.

Zwarts & Winter (2000) furthermore show that the following universal is at play in the domain of locative prepositions (60).

(60)   **Universal:** *All simple locative Ps in natural language are downward monotone.*

Thus, to determine, whether a locative PP can be modified by a measure phrase or not, it is enough to focus on upward monotonicity. English examples for upward monotone locative prepositions and those that are not upward monotone are given in (61).

(61)   VMON↑: in front of, behind; above, over, below, under; beside; outside
      not VMON↑: near, on, at; inside, in; between

For example, *outside* is upward monotone; if a vector that points to x is in the denotation of outside A, then also any lengthening of this vector is in the denotation of outside A. This does not hold for *inside*, though, because lengthening of vectors that go inside could eventually end up going outside again. Hence, *inside* is not upward monotone and does not meet the Modification Condition.[23]

In the following, I will extend this account to Slavic prefixes, directly treating them as locative Ps. In particular, I will argue that the asymmetry in Filip's Czech example (23) can be explained by the monotonicity properties of the result states of the particular events under description.

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[23] This is a bit of a simplification. There are some further complications with non-projective reference objects, with which *in*-phrases can be modified again (see Zwarts & Winter, 2000 for discussion).

5.2 Czech *po-* as a modifier of the result state

In section 4.2, I proposed that Slavic prefixes are locative P elements that identify a result state subevent. This subevent is stative in nature and is predicated over an event participant. In the case of motion verbs with directional PPs involving either goals or sources, the event structure involves something like (62).[24]

(62) a. *drag the cart into the ditch*
$\lambda x \exists y \exists z \exists e_1 \exists e_2$ [cart(y) & ditch(z) & drag(x,y, e_1) & inside(y,z, e_2) & $e_1 \rightarrow e_2$]
in words: x causes the cart to be in(side) the ditch by dragging it

   b. *drag the cart out of the ditch*
$\lambda x \exists y \exists z \exists e_1 \exists e_2$ [cart(y) & ditch(z) & drag(x,y, e_1) & outside(y,z, e_2) & $e_1 \rightarrow e_2$]
in words: x causes the cart to be outside the ditch by dragging it

If the particular predicates combine with measure phrases, such phrases apply to the result state of the cart being **inside** or **outside** the ditch and thus modify a locative PP. The asymmetry in Filip's example (23), then, where only source but not goal prefixes can be modified by the measuring prefix *po-* 'a bit', receives a natural explanation, which does not rely on proposing an aspectual difference. The external prefix *po-* modifies the result state, i.e. the internal prefix on the verb. Since only the result state of the source-oriented VP, namely *outside the ditch*, is upward monotone under the definition of Zwarts & Winter (2000) in (59), only this one can be modified by *po-*. The goal-oriented VP, on the other hand, cannot combine with *po-* since its result state *inside the ditch* is not upward monotone and thus does not meet the Modification Condition in (58). Hence, the asymmetry in Filip's example is not an aspectual one,

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[24] I follow the Event Composition Rule in Ramchand (2004, this volume) as stated in (i).
    (i) $e = e_1 \rightarrow e_2$: e consists of two subevents, e_1 and e_2, such that e_1 causally implicates e_2.

since both events contain a result state subevent and are therefore telic. It is rather

related to the nature of the particular result states denoting an open or closed topology.[25]

Finally, if this asymmetry were aspectual in Filip's (2003) sense, *po-* should be

compatible also with SIs containing source prefixes, since also these should be atelic

with respect to her goal-source telicity asymmetry.[26] However, the opposite holds; just

like imperfective goal-prefixed verbs, all imperfective source-prefixed verbs are

ungrammatical with *po-* (63).

(63)　　a. *po-vy-tahovat^p, *po-do-tahovat^p – pull + out / in (imperfective) + *po-*[27]
　　　　　b. *po-od-skákat^p, *po-při-skákat^p　– jump + away / to (imperfective) + *po-*
　　　　　c. *po-od-sedět^p, *po-při-sedět^p　　– sit down + away / to (imperfective) + *po-*

Under the account proposed here, SIs of the type in (63) without the additional prefix

po- are still marked for telicity by the particular internal prefixes, whereas

imperfectivity is located at the higher level of outer aspect. Under the assumption that

the imperfective operator brings about that the result state subevent cannot be

accessed[28], it also cannot be modified by *po-*, which needs a result state. Thus, we have

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[25] In English, there is a restriction on measure phrase modification similar to the one in the Czech example (23):

　　　(ii)　　a. ?two metres in(side) / into the ditch
　　　　　　　b. two metres outside / out of the ditch

At this point, it is not clear to me why the English example is only degraded and not as ungrammatical as the Czech counterpart.

[26] Under Filip's account we might even expect all imperfectives to be compatible with *po-*, given statements about "homogeneous predicates expressed by an ipf verb" (Filip, 2003: 67). However, she does not directly address imperfectivity in this particular paper, so it is not clear what her predictions concerning *po-* with imperfectives would actually look like.

[27] Apparently, it is possible to derive SIs of *povytáhnout* and *podotáhnout*, which look like the verbs in (63) a. (*povytahovat^i, podotahovat^i*). However, in these cases the imperfective scopes over the *po-*, and as a result such verbs are imperfective as the following scheme illustrates.

　　　(iii)　　[[external-[internal-[V-v]^{ipf}]^{pf}]^{pf}-SI]^{ipf}

So they are different from the verbs in (63), which are perfective, where *po-* applies to the SIs *vytahovat^i* or *dotahovat^i*, in addition perfectivising these. In other words, *po-* in (63) scopes over the imperfective as the scheme in (iv) illustrates.

　　　(iv)　　[external-[internal-[V-v]^{ipf}]^{pf}-SI]^{ipf}]^{pf}

independent support for the claim that *po-* modifies the result state subevent with telic predicates. In general, Czech *po-* seems to always apply to some state, either a result state with telic predicates or the state of a state verb itself. If there is no state available, Czech *po-* is not applicable.[29]

6   Summary and outlook

This paper argued for the division of Slavic prefixes into internal and external prefixes. Internal prefixes were treated as locative Ps that constitute a result state subevent. External prefixes, on the other hand, were argued to be generated outside the VP and to function as adverbial modifiers; therefore, their meaning contribution is orthogonal to the telic / atelic distinction. I presented apparent counter-examples to these claims, which showed an asymmetry between source and goal prefixes in Czech, where only the former but not the latter are compatible with measure phrases. Such examples lead Filip (2003) to argue that only goal prefixes derive telic predicates, whereas source-oriented ones form atelic predicates. I showed that the asymmetry in Filip's data cannot be related to an aspectual asymmetry between source and goal expressions since both prefixes display internal diagnostics and since VPs containing either behave like telic predicates with respect to the diagnostics for telicity. Finally, it was shown that the asymmetry rather results from the different topology denoted by the relevant result states. In particular, a result state with an open topology is compatible with further modification by measure phrases, whereas a result state with a closed topology is not.

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[28] See, for example, a treatment of imperfectivity along such lines in Arsenijević (2004).
[29] For an extensive discussion of Czech *po-*, see Součková (2004). She independently proposes a similar account of Filip's data relying on Schwarzschild's (2002) definition of monotonicity. However, her account does not rely on *po-* specifically modifying the result state and therefore she cannot directly account for the data in (63).

In the course of this paper, I tried to show that Slavic internal prefixes are always resultative and I followed Ramchand (2004, this volume) in assuming that they are resultative heads sitting directly in res° (see also Romanova, 2004). An alternative account, which is compatible with the claims of this paper, is found in Svenonius (2004), who argues that Slavic prefixes are always phrasal, in which case they would head some (locative) PP in the complement of resP. However, we might even stipulate a third option, namely that internal prefixes are loc° in some extended PP structure, where locP is interpreted as the final location of the path. Especially if we recast Zwarts' (2005) definitions for goal and source prepositions in syntactic terms, there should be some room for the endpoints described by AT, IN or ON (recall (42)). I will leave this for future research.

Acknowledgments

7   References

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