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The prepositional aspect of Slavic prefixes and the goal-source asymmetry

1 INTRODUCTION

Matushansky (2002):

Russian prefixes and prepositions constitute a single category P

- same morpho-phonological status
- semantic differences are consequences of the immediate syntactic context – attachment to VP or DP/CP
- nearly all Slavic prefixes can be used as or are homophonous to prepositions

the semantics of prefixes and prepositions can be treated alike

proposal: vector space semantics (Zwarts & Winter 2000)
prepositional aspect (Zwarts 2005)

2 INNER AND OUTER ASPECT

- inner aspect: predicates at VP level that are atelic or telic (lexical aspect)
- outer aspect: temporal boundedness at sentence level (e.g. grammatical aspect)

2.1 grammatical aspect

Slavic: obligatory grammatical verbal category of aspect

- each Slavic verb form is either perfective or imperfective

criteria to set perfective and imperfective verbs apart:

- only imperfective but not perfective verbs can combine with phase verbs:
  
  (1) On načal pisat’ / *na-pisat’ / *po-pisat’ pis’mo.

  ‘He began writing a / the letter.’

- only imperfective but not perfective verbs derive periphrastic future forms:

  (2) On budet pisat’ / *na-pisat’ / *po-pisat’ pis’mo.

  ‘He will write a / the letter.’

aspectual information on the verb:

- perfectivizing prefixes
- imperfectivizing suffixes (vowel alternation)
- most morphologically simple verbs are imperfective

(3) a. ipf. spat’ > pf. po-spät’ – ‘to sleep’
    Russian
    ipf. pisat’ > pf. po-pisat’ – ‘to write’
    ipf. pisat’ pis’mo > pf. na-pisat’ pis’mo – ‘to write a / the letter’

b. pf. dat’ > ipf. da-vat’ – ‘to give’
    pf. pod-pisat’ > ipf. pod-pis-yvat’ – ‘to sign (lit. under-write)’
    pf. iz-dat’ > ipf. iz-da-vat’ – ‘to edit (lit. out-give)’

c. ipf. vy-da-vat’ knigi > pf. po-vy-da-vat’ knigi – ‘to give out / distribute (the) books’

no uniform marking of the perfective or the imperfective aspect

- not every perfective verb form contains a prefix
- not every imperfective verb form contains a suffix
- prefixes do not exclusively mark perfectivity (see below)

2.2 telicity

- property of the VP, which constitutes an event
- one instantiation of telicity: resultativity

resultativity is syntactically represented in terms of a result state sub-event in a tripartite event structure, following Ramchand (2005):

(4) (initial state e1) → [process event e2 → (final state e3)]

  init(iator)P proc(ess)P res(ult)P
3 TESTING TELICITY IN SLAVIC

3.1 (in)compatibility with temporal adverbials for an hour and in an hour

(5) On ot-kryl okno *(za) čas.

he opened.PF window.ACC *(in) hour.ACC

‘He opened a / the window in / *for an hour.’

(6) On po-spal *(za) čas.

he PO-slept.PF *(in) hour.ACC

‘He slept *in / for an hour.’

3.2 entailment test: x Ved (y) as (not) entailing x no longer Vs (y) (Borik 2002)

(7) a. Ja na-pisal* pis’mo. entails Ja (uže) ne pišu* pis’mo.

I ON-write.PAST letter.ACC I (anymore) not write.PRES letter.ACC

‘I wrote a / the letter.’ ‘I don’t write the letter anymore.’

b. Ja po-pisal* pis’mo. doesn’t entail Ja (uže) ne pišu* pis’mo.

I PO-write.PAST letter.ACC I (anymore) not write.PRES letter.ACC

‘I wrote (at) a / the letter.’ ‘I don’t write (at) the letter anymore.’

4 VECTOR SPACE SEMANTICS AND PREPOSITIONAL ASPECT

• Zwarts (2005): locative (stative) vs. directional (dynamic) prepositions

• Zwarts & Winter (2000): semantics of locative prepositions

element: locative PP behind the house

set of vectors that go from the house to points behind it

location function derives sets of located vectors, mapping an e-type denotation of the
reference object to a vector that describes its location or dimension

☞ non-projective locative Ps: in, on, at

require only spatial knowledge about the location of figure and ground with respect to
one another; defined as boundary vectors on sets of points:

(8) a. in’ = λA.λv.in(v,A)

(Zwarts & Winter 2000, p. 4)

(with r₀ = 0, A as a set of points, v as a boundary vector of A)

☞ projective locative Ps: over, under, behind

involve a certain axis modelled along the lines of three orthogonal unit vectors in the
vector space V for up, right and front:

(9) a. under’ = λA.λv.in(v,A) ∧ c(-up,v) > |v|_{up}

b. behind’ = λA.λv.in(v,A) ∧ c(-front,v) > |v|_{front}

☞ directional Ps

map the reference object to a set of sequences of vectors (paths), each of these
sequences determines a potential change in position of the figure.

(10) A path is a function of type iv from the real interval [0,1] ⊂ R (type i) to

vectors (type v).

(11) A PP is bounded (telic) iff it does not have cumulative reference

(12) A set of paths X is cumulative iff

(i) there are p and q ∈ X such that p+q exists and

(ii) for all p, q ∈ X, if p+q exists, then p+q ∈ X.

concatenation: partial operation subject to the condition that the second path has to start
where the first path ends

atelic PP are closed under sums, telic PP are not

(13) 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

goal and source prepositions: transitions from one phase to another (Zwarts 2005):

(14) { p: there is an interval I ⊂ [0,1] including…

… 0 and consisting of all the i ∈ [0,1] for which p(i) is at x } = [[ from x ]]

… 0 and consisting of all the i ∈ [0,1] for which p(i) is on x ] = [[ off x ]]

… 0 and consisting of all the i ∈ [0,1] for which p(i) is in x } = [[ out of x ]]

… 1 and consisting of all the i ∈ [0,1] for which p(i) is at x ] = [[ to x ]]

… 1 and consisting of all the i ∈ [0,1] for which p(i) is on x ] = [[ onto x ]]

… 1 and consisting of all the i ∈ [0,1] for which p(i) is in x } = [[ into x ]]
5 SLAVIC PREFIXES AS PS

(15) Russian and Czech goal and source prepositions:

<table>
<thead>
<tr>
<th>Russian</th>
<th>Czech</th>
</tr>
</thead>
<tbody>
<tr>
<td>do (+ GEN), k (+ DAT)</td>
<td>do (+ GEN), k (+ DAT)</td>
</tr>
<tr>
<td>k (+ DAT)</td>
<td>k (+ DAT), víči (+ DAT)</td>
</tr>
<tr>
<td>v (+ ACC)</td>
<td>do (+ GEN)</td>
</tr>
<tr>
<td>na (+ ACC)</td>
<td>na (+ ACC)</td>
</tr>
<tr>
<td>at (+ GEN)</td>
<td>ad (+ GEN)</td>
</tr>
<tr>
<td>iz (+ GEN)</td>
<td>z (+ GEN)</td>
</tr>
</tbody>
</table>

exclusively directional:

- Russian and Czech k (+ DAT) 'to(wards)' and na (+ ACC) 'onto'
- Czech víči (+ DAT) 'towards'
- Russian v (+ ACC) 'into'

exclusively locative:

- Russian and Czech na (+ PREP) 'on'
- Russian and Czech v (+ PREP) 'in'

(16) Russian and Czech goal and source prefixes:

<table>
<thead>
<tr>
<th>Russian</th>
<th>Czech</th>
</tr>
</thead>
<tbody>
<tr>
<td>do-, při-, *k-</td>
<td>do-, při-, *k-, *víči-</td>
</tr>
<tr>
<td>v-, za-</td>
<td>do-</td>
</tr>
<tr>
<td>(na-)</td>
<td>(na-)</td>
</tr>
<tr>
<td>at-, u-</td>
<td>od-, u-</td>
</tr>
<tr>
<td>iz-, vy-</td>
<td>vy-</td>
</tr>
</tbody>
</table>

prepositional counterparts of additional prefixes:

- za (+ ACC) 'within' (never directional)
- u (+ GEN) 'at'
- při (při) (+ PREP) 'by'

contra Filip (2003), among others, with Žaucer (2004):

Slavic prefixes are locative Ps, identifying a result state subevent
- no prefixal counterparts to exclusively directional prepositions
- prefixal counterparts to purely locative prepositions
- the prefixes are stative and license / identify a result state subevent
- such prefixed predicates are always telic

6 AN APPARENT PROBLEM: THE GOAL-SOURCE ASYMMETRY

syntactic and semantic asymmetries between goal and source Ps

- Nam (2004)
  - goal PPs are generated under the lower VP of the extended VP-structure and compose a result state subevent
  - source PPs are generated under the higher VP, modifying a process subevent
  - goal-oriented PPs induce telicity whereas source-oriented ones do not
- Filip (2003)
  - Czech source prefixes grammatical with measure expressions
  - Czech goal prefixes ungrammatical with measure expressions

(17) a. Po-vy-táhl káru z příkopu. (= (49) b. in Filip 2003, p. 94)
  PO-OUT-dragged.PF cart.ACC from ditch.GEN
  'He dragged the cart out of the ditch a bit.'

b. *Po-do-táhl káru do příkopu. (= (50) b. in Filip 2003, p. 94)
  PO-(IN)TO-dragged.PF cart.ACC (in)to ditch.GEN
  'He dragged the cart (in)to the ditch a bit.'

(18) Goal-Source Telicity Asymmetry (Filip 2003, p. 79)

(19) Filip (2003), p. 61: A verbal predicate is telic if it denotes either
(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.
\[ M: \forall e [ P(e) \land Q(e) \rightarrow |e| = 1], \text{ where } Q \text{ is a context-dependent variable.} \]
6.1 Russian and Czech goal and source prefixed predicates are telic

**Russian:**

(20) a. *On pri-letelp v Moskvu “den” / za den” (do prazdnika).*
   He arrived in Moscow ACC *day.ACC / in day.ACC to holiday.GEN
   ‘He arrived in Moscow (by plane) *for a day / a day before the holiday.’

b. *On u-letelp iz Moskvy “den” / za den” (do prazdnika).*
   He left Moscow (by plane) *for a day / a day before the holiday.‘

(21) a. *On pri-letelp v Moskvu.*
   He more not TO-fly.PRES in Moscow

b. *On u-letelp iz Moskvy.*
   He more not AWAY-fly.PRES out of Moscow

**Czech:**

(22) a. *Vy-tahlp káru z příkopu *(za) hodinu.*
   OUT-dragged cart.ACC from ditch.GEN *(in) hour.ACC
   ‘He dragged the cart out of the ditch (in / *for) an hour.’

b. *Do-tahlp 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.’

(23) a. *Vy-tahlp káru z příkopu.*
   He more not OUT-drag.PRES cart out of ditch

b. *Do-tahlp káru do příkopu.*
   He more not INTO-drag.PRES cart into ditch

7 THE NATURE OF THE GOAL-SOURCE ASYMMETRY

Zwarts & Winter (2000): not all locative PPs can be modified by measure phrases

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

(25) **vector monotonicity:** Let \( P \) be a prepositional function and \( X \subseteq D_N^P \).
   a. \( P \) is upward vector-monotone over \( x \) (VMON↑) iff
      \[ \forall A \subseteq X \forall u, v \in D_p \{ u \leq v \rightarrow (P(A)(u) \rightarrow P(A)(v)) \}. \]
   b. \( P \) is downward vector-monotone over \( x \) (VMON↓) iff
      \[ \forall A \subseteq X \forall u, v \in D_p \{ u \leq v \rightarrow (P(A)(v) \rightarrow P(A)(u)) \}. \]

(26) **Universal:** All simple locative prepositions in natural language are downward monotone.

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

**basic assumption:** Slavic prefixes as locative Ps identify the result state subevent which is predicated over an event participant:

- he dragged the cart into the ditch ≈ dragging, he caused the cart to be **inside** the ditch
- he dragged the cart out of the ditch ≈ dragging, he caused the cart to be **outside** the ditch

**PO- MODIFIES THE RESULT STATE DENOTED BY THE SOURCE PREFIX, A LOCATIVE PP**

\( \Leftrightarrow \) only the result state of the source-oriented VP (outside the ditch) is upward monotone, hence only this VP can be modified by po-

- goal-oriented VPs cannot combine with po-, since their result states (e.g. inside the ditch) are not upward monotone
- both events are telic and contain a result state subevent

**alternative (as proposed in the proceedings paper): Slavic prefixes as directional Ps**

- Zwarts & Winter (2000): dir operator for the mapping between a locative preposition and the corresponding directional preposition
- Cresswell’s (1978) path-to-place function (e.g. the train is through the tunnel)
  \[ \text{[PLACE]} \rightarrow [\text{place ON ([Path X])}] \]

**further support for po- as modifier of the result state:**

- neither imperfective source-prefixed nor imperfective goal-prefixed verbs can combine with po-:
  (28) *po-vy-tahovatp*, *po-do-tahovatp* – pull + out / in (imperfective) with po-
     *po-od-skákatp*, *po-při-skákatp* – jump + away / to (imperfective) with po-
     *po-od-sedětě*, *po-při-sedětě* – sit down + away / to (imperfective) with po-

*explanation:* if the imperfective operator brings about that the result state subevent cannot be accessed anymore (Arsenijević 2004), the result state subevent is not accessible anymore and cannot be modified by po-
8 CONCLUSIONS

- Slavic prefixes and prepositions constitute a single category P (Matushansky 2002)
- Slavic predicates containing either goal or source prefixes are telic since the particular prefixes contribute the result state subevent
- asymmetries between sources and goals are not aspectual in nature
- the particular asymmetry between Czech source and goal prefixes (i.e. only source- but not goal-prefixed predicates can combine with measure phrase modifiers) is due to different topological properties of the particular result states

9 REFERENCES