Distributive *po-* in Polish

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FDSL-5
Universität Leipzig
28 November 2003

Abstract

This talk has three main parts:

1. Introduction
2. A previous proposal: Filip and Carlson (2001)
3. A new analysis

Introduction

Polish, like many other Slavic languages, has a fairly productive prefix *po-* with a distributive meaning (whence 'distributive *po-*') that is used to create perfective verbs out of imperfective verbs:

(1) chować^{i}, s·chować^{p} 'hide'
po·chować^{p} 'hide (successively)'

(2) a. Sara s·chowała^{p} książki.
Sarah hid books-ACC
'Sarah hid the books.'
b. Sara po·chowała^{p} książki.
Sarah *po*-hid books-ACC
'Sarah hid the books (successively).'

(3) z[e]·rwać^{p}, zrywać^{i} 'pick'
po·zrywać^{p} 'pick (successively)'

(4) a. Rebeka z[e]·rwała^{p} kwiaty.
Rebecca picked flowers.ACC
'Rebecca picked the flowers.'
b. Rebeka po·zrywała^{p} kwiaty.
Rebecca *po*-picked flowers.ACC
'Rebecca picked the flowers (successively).'

(5) pękać^{i}, pęknąć^{p} 'crack [intr.]'
po·pękać^{p} 'crack [intr.] (successively)'

(6) a. Drzewo pęknęło^{p}.
tree cracked
'The tree cracked.'
b. Drzewo po·pękało^{p}.
tree *po*-cracked
'The tree (successively) cracked.'

(7) u·mrzeć^{p}, umierać^{i} 'die'
po·umierać^{p} 'die (successively)'

(8) a. Domownicy umarli^{p} z głodu.
housemates died from hunger.GEN
'The housemates died from hunger.'
b. Domownicy po·umierali^{p} z głodu.
housemates *po*-died from hunger.GEN
'The housemates (successively) died from hunger.'

Distributive *po-* is compatible with a variety of overt determiners:

(9) a. Rebeka po·zrywała^{p} wszystkie kwiaty.
Rebecca *po*-picked all.ACC flowers.ACC
'Rebecca picked all the flowers (successively).'
b. Rebeka po·zrywała^{p} wiele kwiatów.
Rebecca *po*-picked many.ACC flowers.GEN
'Rebecca picked many flowers (successively).'
c. Rebeka po·zrywała^{p} część kwiatów.
Rebecca *po*-picked part.ACC flowers.GEN
'Rebecca picked part of flowers (successively).'

d. Rebeka po·zrywała^{p} kilka kwiatów.
Rebecca *po*-picked several.ACC flowers.GEN
'Rebecca picked several flowers (successively).'
e. Rebeka po·zrywała^{p} większość kwiatów.
Rebecca *po*-picked majority.ACC flowers.GEN
'Rebecca picked most of the flowers (successively).'

However, it is sometimes incompatible with a singular NP (but see (6b)) or the universal determiner *każdy* 'every':

(10) a. #Rebeka po·zrywała^{p} kwiat.
Rebecca *po*-picked flower.ACC
b. #Rebeka po·zrywała^{p} każdy kwiat.
Rebecca *po*-picked every.ACC flower.ACC

The meaning of distributive *po-* also suggests that the distribution is temporally realized as succession (though not necessarily as immediate succession):

(11) a. Sara po·otwierała^{p} wszystkie okna jedno
Sarah *po*-opened all-ACC windows-ACC one-ACC
po drugim.
after other-LOC
'Sarah opened all the windows one after another.'
b. #Sara po·otwierała^{p} wszystkie okna
Sarah *po*-opened all-ACC windows-ACC
naraz.
at-the-same-time
'Sarah opened all the windows at the same time.'

A previous proposal: Filip and Carlson (2001)

In an article on the interaction of distributivity and collectivity with reciprocity, Filip and Carlson (2001, p. 452) discuss distributive *po-* in Czech and propose the following semantic analysis:

(12) *po-* $\rightsquigarrow$

$$\lambda P \lambda Q \lambda e \forall u[u \sqsubseteq \sigma x(P(x)) \wedge \Diamond \exists e'[e' \sqsubseteq e \wedge Q(u, e')] \rightarrow \exists e'[e' \sqsubseteq e \wedge Q(u, e')]]$$

(13) a. Členové delegace se po·objímali^{p}.
members delegation.GEN RECIPR *po*-embraced
'The members of the delegation embraced each other (successively).'

b. analysis of (13a):

$$\exists e \forall u[u \sqsubseteq \sigma x(\textit{delegates}(x)) \wedge \Diamond \exists e'[e' \sqsubseteq e \wedge \textit{RECIPR}(\textit{embraced})(u, e')] \rightarrow \exists e'[e' \sqsubseteq e \wedge \textit{RECIPR}(\textit{embraced})(u, e')]]$$

There are at least four difficulties with Filip and Carlson's analysis of distributive *po-* in (12):

1. Filip and Carlson treat *po-* akin to a universal determiner (e.g., *każdy* 'every') that first applies to a nominal predicate P and then to a verbal predicate Q. Syntactically, this means that *po-* first combines with an N′ and then with a V. However, Polish (Czech) morphology indicates that *po-* combines with a V, the result of which then combines with an NP. Consequently,

Filip and Carlson's account cannot naturally handle examples in which the NP cannot be analyzed as a nominal predicate, e.g., *każde drzewo* in (14).

(14) Każde drzewo po·pękało^{p}. (cf. (10b))
every tree *po*-cracked
'Every tree (successively) cracked.'

2. The definition of distributive *po-* says nothing about how the distribution over objects is temporally realized. However, it seems to be an ingredient of the meaning of *po-* that the distribution over objects should be temporally realized as succession (see (11)).

3. Most of the events in the denotation of the event predicate defined by distributive *po-* are intuitively 'too big' in that they may contain many events that have nothing to do with the meaning of the corresponding sentence. For example, according to the analysis in (13b), an event in which the members of the delegation embraced each other and in which President Kwaśniewski shook hands with President Bush in Kraków in June, 2003 would also make the sentence in (13a) true.

4. There is no apparent reason why distributive *po-* should sometimes be incompatible with a singular NP or the universal determiner *każdy* 'every' (see (10)).

A new analysis

The prerequisites for the semantic analysis are:

- a domain of *physical objects*: x, y, z, ...
- a domain of *events* (broadly construed): e, e', e'', ...
- a domain of *times*: t, t', t'', ...
- a *proper part* relation on these three domains: $\sqsubseteq$
- a *temporal trace* function from events to times: τ

In what follows, a, b, c, ... are unsorted individual variables and P, Q are unsorted one-plce predicate variables, R is an unsorted two-place relation variable, and S is an unsorted three-place relation variable.

(15) a. $a \sqsubseteq b := a \sqsubset b \vee a = b$
(a is part of b)

b. $a \circ b := \exists c[c \sqsubseteq a \wedge c \sqsubseteq b]$
(a and b overlap)

(16) *mpartn*$(P, a) :=$
$\forall b[P(b) \rightarrow b \sqsubseteq a] \wedge$
$\forall b[b \sqsubseteq a \rightarrow \exists c[P(c) \wedge b \circ c]] \wedge$
$\forall b \forall c[P(b) \wedge P(c) \wedge b \circ c \rightarrow b = c]$
(P is a *mereological partition* of a)

(17) *prop-mpartn*$(P, a) :=$
mpartn$(P, a) \wedge \exists b \exists c[P(b) \wedge P(c) \wedge \neg(b = c)]$
(P is a *proper mereological partition* of a)

(18) *biject*(R, P, Q) :=
$\forall a[P(a) \rightarrow \exists b[Q(b) \wedge R(a,b)]] \wedge$
$\forall a[Q(a) \rightarrow \exists b[P(b) \wedge R(b,a)]] \wedge$
$\forall a \forall b \forall c \forall d[P(a) \wedge P(b) \wedge Q(c) \wedge Q(d) \wedge$
$R(a,c) \wedge R(b,d) \rightarrow$
$a = b \leftrightarrow c = d]$
(R is a *bijection* between P and Q)

(19) *tdiscr-prop-mpartn*(P, e) :=
prop-mpartn$(P, e) \wedge$
$\forall e' \forall e''[P(e') \wedge P(e'') \wedge \tau(e') \circ \tau(e'') \rightarrow e' = e'']$
(P is a *temporally discrete proper mereological partition* of e)

(20) (distributive) po: [$_{V[+perf]}$ — [$_{V[-perf_e;\ -int]}$ α]]

(21) (distributive) po $\rightsquigarrow$
$\lambda R \lambda x \lambda e[\exists P \exists Q[$*tdiscr-prop-mpartn*$(P, e) \wedge$
prop-mpartn$(Q, x) \wedge$ *biject*$(R, P, Q)]]$
=: *distr-po*

(22) $\sigma(P) := \iota a[\forall b[b \circ a \leftrightarrow \exists c[P(c) \wedge c \circ b]]$
(the sum of P)

A sample derivation:

(23) Rebeka pozrywała^{p} wszystkie kwiaty. (= (9a))
'Rebecca picked all the flowers (successively).'

(24) a. z[e]·rwać^{p} ‘pick’ $\rightsquigarrow \lambda y \lambda x \lambda e[\textit{pick}(e, x, y)]$

b. $\textit{impf}_e \rightsquigarrow \lambda S \lambda y \lambda x \lambda e[S(e, x, y)]$
(*Remark*: the meaning of $\textit{impf}_e$ is the identity function)

c. $\textit{impf}_e$(z[e]·rwać^{p}) (= zrywać^{i}) $\rightsquigarrow$
$\lambda y \lambda x \lambda e[\textit{pick}(e, x, y)]$

(25) a. $\textit{distr-po}' \rightsquigarrow \lambda S \lambda y \lambda x \lambda e[\textit{distr-po}(e, y, S(x))]$
(*Remark*: this is *po-* for transitive verbs)

b. po·zrywać^{p} $\rightsquigarrow \textit{distr-po}'(\textit{pick}) =$
$\lambda y \lambda x \lambda e[\exists P \exists Q[\textit{tdiscr-prop-mpartn}(P, e) \wedge$
$\textit{prop-mpartn}(Q, y) \wedge \textit{biject}(\textit{pick}(x), P, Q)]]$

(26) a. wszystkie kwiaty ‘all the flowers’ $\rightsquigarrow$
$\iota y[y = \sigma(\lambda z[\textit{flowers}(z)]) \wedge \textit{flowers}(y)]$
$=: \textit{all-the-flowers}$

b. Rebeka $\rightsquigarrow$ *rebecca*

(27) [Rebeka [[po·zrywać^{p}] wszystkie kwiaty]] $\rightsquigarrow$
$\lambda e[\exists P \exists Q[\textit{tdiscr-prop-mpartn}(P, e) \wedge$
$\textit{prop-mpartn}(Q, \textit{all-the-flowers}) \wedge$
$\textit{biject}(\textit{pick}(\textit{rebecca}), P, Q)]]$

An unacceptable example:

(28) #Rebeka po·zrywała^{p} kwiat. (= (10a))
‘Rebecca pick the/a flower (successively).’

(29) #[Rebeka [[po·zrywać^{p}] kwiat]] $\rightsquigarrow$
$\lambda e[\exists P \exists Q[$*tdiscr-prop-mpartn*$(P, e) \wedge$
prop-mpartn$(Q,$ *the-flower*$) \wedge$
biject$($*pick*$($*rebecca*$), P, Q)]]$

The problem is that there is no natural way of picking at least two nonoverlapping parts of the flower, but this would be required by the meaning of the sentence.

References

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