Polysemy of verbal prefixes in Russian: conceptual structure versus syntax

Abstract This paper explains polysemy of Russian verbal prefixes through existence of two sources of meaning: structure and lexicon. The lexical entry remains constant throughout all uses of a given prefix, and is thus the source of the similarities in meaning, while the structure into which a prefix is inserted varies, and serves as the source of differences. I show that the semantic differences go hand in hand with structural differences, and the meaning of a prefix is predictable based on the event structure of the verb it attaches to. If the verb lexicalizes a scale of change, the prefix must measure out the result, mapping the event onto a scale, which is the complement of the result. If the verb contains conflated material and is incompatible with a result, the only available position is above aspect, where the superlexical prefix measures out the time of the event. A direct object may serve either as the resultee undergoing change of state, or as the measuring scale (as in the case of spatial and consumption verbs). Many verbs are flexible, and then the structure is selected according to whether the event involves change.

1. Introduction

The polysemy of Russian verbal prefixes is a well known problem. The examples below illustrate how a single prefix can take on eight different meanings with the same verb, depending on the structure of the sentence. Though the prefix and the verb remain the same throughout the examples, a native speaker has no trouble interpreting these sentences.

(1) a. Pianist pere-igral   ruku
         pianist pere-played hand
         'The pianist over-exercised a hand by playing too much' (about musicians)
     b. Akter pere-igral   svoju rolj
         actor pere-played his   part
         'The actor over-acted his part'
     c. Geroj   pytalsja pere-igratj svoju žiznj
         character tried   pere-play   his   life
         'The character tried to re-act his life (repetition)'
     d. Komanda pere-igrala protivnik-a
         team   pere-played opponent-ACC
         'The team out-played the opponent' (to win, in sports)
     e. Rebenok segodnja pere-igral   i   kapriznicaet
         child   today   pere-played and grizzles
         'The child played for too long today and is cranky'

  f. Orkestr pere-igral vse marši
    orchestra pere-played all marches
    'The orchestra played every march' (distributive)

In this paper I show how the different uses of a single prefix share a core conceptual meaning, while the source of the differences is the structural meaning component which is a function of the syntactic position of the prefix.

There are several logically possible directions of analysis. The least desirable alternative is homophony, where there are several idiomatic meanings per prefix, and the fact that they sound the same is historically grounded, but synchronically irrelevant. An exhaustive list of all the uses is descriptively adequate, e.g. in the classic Ožegov (2001) dictionary, as well as in Švedova's (1980) grammar, all the prefixes are listed with at least two meanings. Yet, these meanings are interrelated, and the relations between them are predictable. Treating the polysemy as homophony does not allow one to capture the synchronic generalizations about these relations.

Homophony would also present a problem for language acquisition, as the historical data cannot be available to a language learner. A child, encountering two identical morphemes, which have some overlap in meaning, should initially assume that it is the same lexeme, and try to establish rules for its distribution, rather than freely assume homophony. Thus, the preferable solution would unite the prefixes, so that each prefix would have one meaning, which would vary predictably depending on its function.

There have been several works within cognitive linguistics (e.g. Dobrushina et al. (2001), Endresen et al. (2012), Janda and Lyashevskaya (2013), Sokolova (2012)) showing that the prefix always retains its meaning. The general idea is that there is a single central, prototypical, meaning, and a web of interrelated meanings is derived from it. Descriptively, this model is very adequate and accounts for the similarities in meanings, while fully acknowledging their differences. One of the problems is lack of agreement on which meaning to choose as the prototype, and a certain arbitrariness of which meaning in the web is chosen in a given context. Constructivist approaches allow the meaning to depend upon the construction in which the prefix appears, thus relating the choice of meaning of the prefix to the argument structure, but seem to lack predictive or explanatory power.

The opposite direction concentrates on the structural differences, ignoring the similarity in meaning. The works of this direction (e.g. in Svenonius (2004a)) divide the prefixes into classes according to their syntactic properties (Lexical, Superlexical, and purely perfectivizing). However, many prefixes (e.g. *za-, ot-, s-, pro-, po-, do-, pere-, na-*) have a corresponding instantiation in all of these classes, and this distribution seems systematic. There are several exceptions (e.g. *raz-, pri-, v-*), which are always lexical, but these are also systematic.

My analysis rests on the results of both approaches, as I claim there are two sources of prefix interpretation: I assume that one part of the meaning comes from the lexicon and another part of the meaning comes from the syntactic structure (cf. Borer (2005), Ramchand (2008b)). The conceptual

Table 1 Prefix position and interpretation

	pere-	pro-	do-	ot-	za-
	'exceeding'	'through'	'up to'	'off' $(+\,-)$	'into' $(-\,+\,)$
I. Idiomatic lit.	pere-varitj over-cook digest	pro-bratj through-take affect deeply	do-bitj up.to - beat complete	ot-vertetjsja away-twist-REF avoid	za-pastj into-fall fall in love
II. R(p; ground)	pere-bežatj run across	pro-bežatj run through	do-bežatj run up to	ot-bežatj run away	za-bežatj run into
III. R(p, theme)	pere-goroditj block	pro-bitj break through			
IV. R(p, scale)	pere-varitj over-cook	pro-varitj cook through	do-varitj complete cooking	ot-varitj cook completely	za-varitj brew (tea)
V. R(e, time)	pere-plavatj over-swim	pro-plavatj swim for a time	do-plavatj complete swimming	ot-plavatj stop swimming	za-plavatj start swimming

meaning remains constant in all instantiations of the prefix, while the syntactic structure provide the difference. This dual source of meaning creates a structure that is systematic, predictable and possible to acquire.

In table 1 I illustrate how the meaning combines with the structure. Each prefix has a single lexical entry, specifying a relationship (e.g. 'exceed' for *pere-*) between an event and a scale with respect to which the event is measured out. This is similar to the Scale Hypothesis, independently suggested by Kagan (2013), according to which "a verbal prefix imposes a relation between two degrees on a scale, one of which is associated with the event denoted by the verbal predicate, and the other is the standard of comparison." However, in my analysis the structure tells us what exceeds what: an event may exceed the width of a boundary in space, the dimensions of the direct object, a scale, lexicalized by the verb, or a temporal scale. Thus, in table 1, the relationship, specified by the prefix, remains constant in each of the structural configurations (the vertical dimension), and the argument structure of the relationship remains constant for each prefix inserted into the configuration (horizontally).

Thus, the relationship introduced by *pere-* is 'exceed'. *Pro-* is similar to 'through', and the syntax decides what interval (temporal, spatial or degree) is covered. *Do-* refers to reaching a certain point, and this point (temporal, spatial, readiness) is specified by syntax. *Za-* refers to entering a certain location, state or activity, while *ot-* is the reverse transition, out of it.

The structure of the paper is as follows: in section one I introduce the background assumptions, particularly interaction of Ramchandian first phase syntax with telicity and perfectivity, and show how the choice of a lexical vs. superlexical prefix depends on whether the verb lexicalizes a bound scale of change. Then in the subsequent sections I look at each structural configuration (i.e. each row of the table) in detail, showing how each interpretation of each prefix emerges in a particular context. I start with directional motion verbs and paths, and then move on to a spatial configuration where the direct object itself serves as a measure rather than a holder of the result state. Then I discuss the lexicalized scales and their shapes, and show how the prefix choice depends on the scale shape. Then the discussion proceeds to the higher superlexical prefixes. In conclusion I discuss the predictive value

of my analysis, illustrating how the prefix meaning depends on the structural properties of the verb that the prefix combines with.
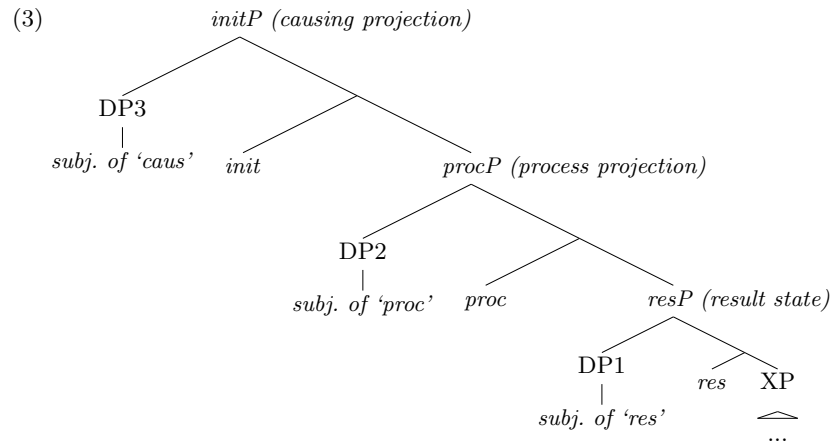
2. Lexical and Superlexical Prefixes in First Phase Syntax

I adopt a 'neo-constructivist' viewpoint, in particular 'the first-phase syntax' of Ramchand (2008) and a cartographic approach to syntax, where syntactic trees are built from individual atomic features. Furthermore, I rely crucially on the lexical/superlexical distinction (Isačenko (1960), Romanova (2004), Svenonius (2004b), Babko-Malaya (1999), Schoorlemmer (1995)).

2.1. Event decomposition

In first-phase syntax an event may contain initiation, process and result subevents. Such decomposition is governed by the Principle of Event Composition (Ramchand 2008b), where initiation leads to process and process potentially leads to a result state. Each of these subevents, when present, is represented as its own projection, ordered in the hierarchical embedding relation as shown below in (2).

(2)   *Principle of Event Composition* (Ramchand 2008b: 46): If a head X which introduces an eventuality variable e_x, embeds a projection YP where Y introduces the eventuality variable e_y, then the structure is interpreted as $e_x \rightarrow e_y$ (e_x 'leads to' e_y).

(3)   *initP (causing projection)*

DP3
|
subj. of 'caus'   *init*   *procP (process projection)*

DP2
|
subj. of 'proc'   *proc*   *resP (result state)*

DP1
|
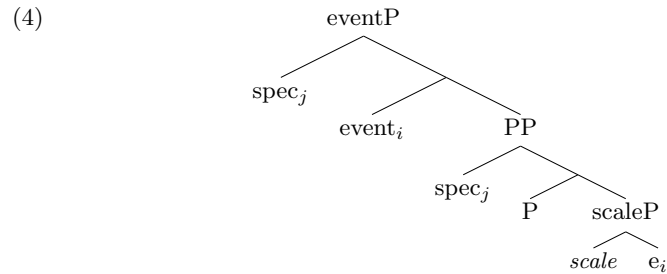*subj. of 'res'*   *res*   XP
...

A prefix may be attached at different levels: the lexical prefixes, as potential argument-structure modifiers, are attached to *res*. The intermediate prefixes (Tatevosov 2008) demonstrate mixed properties and are in *proc*P, but will not be discussed in detail as this class is only exemplified by two prefixes.

The temporal superlexical prefixes (referring to inception, duration and completion) modify the event itself and do not change the argument structure

or the core meaning of the base verb and are outside of the scope of secondary imperfectivization, and are therefore syntactically higher, above the aspect head (Pereltsvaig 2006), where they relate the definite time of the event to its temporal trace.

It has been argued that the P elements have some similar structural properties, whether used as prepositions, particles or prefixes (Asbury et al. (2006), Matushansky (2002), Zeller (2001), Pantcheva (2007)), Svenonius (2004b), Gehrke (2008)). Accordingly, I suggest that in every use the P element heads a PP, with a scaleP (of which path is a subclass) as a possible complement, and the PP is a complement to an event-head: *result*, *aspect*, or *process* projection.

Thus, the generic structure looks as follows:

(4)

```
                        eventP
                       /      \
                  spec_j       \
                          event_i    PP
                                    /    \
                               spec_j     \
                                       P    scaleP
                                            /    \
                                        scale     e_i
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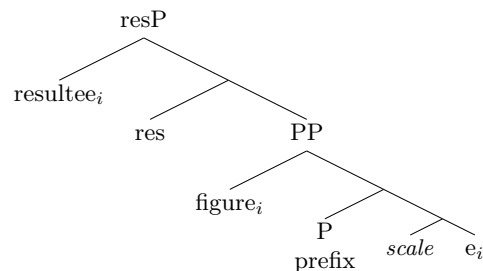
The scale head creates a scale, i.e. an ordered set of values associated with the event variable, which is closed at the event phrase level. This ensures that the scale is associated with the closest event head, i.e. is a set of evaluations of the contextually relevant quality of that event.

The P heads is the RHEME which is defined by Ramchand (2008b) as the true internal argument of a subevent head, that acts as a further modifier or description of the event, with which it combines by event identification.
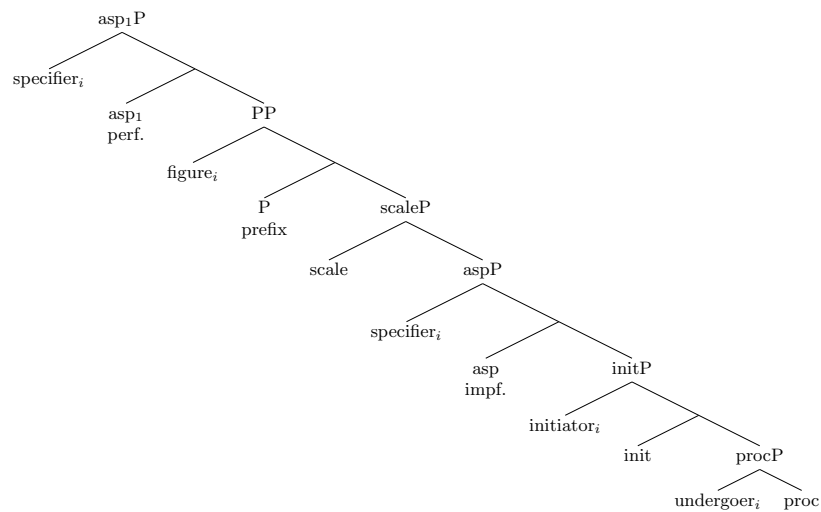
The relevant event head can be the *result* head, in which case the scale measures the extent of the result state, or *aspect* in which case the temporal trace of the event provides the scale and the temporal boundaries of the event are established by the prefix.

(5)   Lexical Prefix as a complement of the result head:

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                        resP
                       /     \
                resultee_i     \
                          res      PP
                                  /    \
                             figure_i    \
                                      P      scale    e_i
                                    prefix
```

Temporal superlexical prefixes appear with *init-proc* verbs, where initiator is coindexed with the undergoer, so the subject is the specifier of all the event projections in (6).

(6)   Superlexical prefix as a complement to an aspect head (the temporal trace introduced by Asp_2 provides the scale):

asp$_1$P
specifier$_i$
asp$_1$ perf.
PP
figure$_i$
P prefix
scaleP
scale
aspP
specifier$_i$
asp impf.
initP
initiator$_i$
init
procP
undergoer$_i$ proc

These different positions yield contrastive syntactic properties. The prefixes in *res* are the lexical prefixes, they attach mostly to perfective or telic stems (if the verb is supplied with the option), allow the verb to form secondary imperfectives, and can change the argument structure of the verb. The prefixes above Asp are the superlexical prefixes, they attach to imperfective or atelic stems, do not fall inside the scope of secondary imperfectives, and do not change the argument structure of the verb.

Both lexical and superlexical prefixes, being attached to an imperfective verb, invariably change the aspectual value of the hosting verb to perfective (Borik 2009). While prefixation is not the only morphological mechanism associated with aspect, but exists along with semelfactive suffixation, stem alternations, and purely perfective unprefixed stems, the connection is quite robust.

I follow Ramchand (2008a) in interpreting perfectivity as definiteness. The Asp head is a function that yields a time variable t in the temporal trace of the event e, and t may be definite (if perfective) or indefinite (imperfective). Ramchand (2008a) uses a second, lower Asp head to host the secondary imperfective suffix. Then two Aspect heads are required to handle cases with a superlexical prefix stacking above secondary imperfective. I suggest that two Asp heads are always present, where the higher Asp head introduces definite

or indefinite t variable, while the lower Asp_2 is a function that creates the temporal trace of the event.

The syntactic position of the prefix (lexical vs. superlexical) is directly linked with the event type. The verbs that obligatorily involve change, particularly verbs involving change of location or change of possession, cooccur only with the lexical prefixes and are incompatible with superlexical prefixes. Verbs that are incompatible with a change of state reading, on the other hand, only appear with the superlexical prefixes. There is also a large class in the middle compatible with both, where the event may or may not involve change, depending on context.

If a verb lexicalizes a scale of change, the scale is gradable and has a direction. In many cases this change can be reversed. If there is no directed scale of change, such reversal is impossible. Hence I use the possibility of adding *obratno* 'back' to a verb as a test for existence of the scale of change. It has to be admitted that in some cases the scale of change is clearly present, as in verbs of cooking, but reversal is impossible for semantic reasons. If something is cooked, the change cannot be undone.

Thus, to check the relationship between the presence of scale of change and prefix selection I searched for combinations of a hundred verbs from a list of common verbs with the prefixes *za-, ot-, do-, pere-* and *pro-*, and checked whether the prefixes are used as lexical, superlexical, or both. The choice is generally clear from context, and I also searched for secondary imperfectives to exclude superlexical prefixes, which are incompatible with secondary imperfectivization. Then I checked whether each verb is compatible with the restitutive *obratno*. I performed online searches for the desired combination using blogs.yandex.ru search mechanism. It turned out more productive to use the search mechanism at blogs than corpora, as the language use there is more colloquial and the prefix use appears freer than in literary sources.

It turns out that the verbs entailing scalar change, as checked by compatibility with the restitutive *obratno*, are precisely the verbs that are only compatible with the lexical prefixes and perfectivity entails telicity for them. There is also a class of verbs incompatible with result readings and lexical prefixes (e.g. 'smile', 'love', non-directional motion verbs), and are always atelic. However, there is also a large class of flexible verbs that allow both lexical and superlexical prefixes, as exemplified by the table below, which is a small subpart of the data (see full table in appendix 1), which is not as straightforward, with some accidental gaps and idiomatic meanings, which I will discuss later. Yet the sample in table 2 illustrates the general pattern clearly: prefix selection is tightly connected to the presence of a scale of change, and the more lexical prefixes are compatible with the verb, the more super lexical prefixes are ruled out. Thus, even the verbs that allow both seem to demonstrate a preference towards one class where they are frequent with a wide range of prefixes, while the prefixes from the other class are less frequent and under more restricted contexts.

Table 2 Compatibility with prefixes and the result feature

Verb	translation	lexical		superlexical			obratno
		za	ot	za	ot	pro	
letetj	fly.dir	yes	yes	no	no	no	yes
bratj	take	yes	yes	no	no	no	yes
lovitj	catch	yes	yes	no	no	?yes	yes
uchitj	teach	yes	yes	no	no	?yes	yes
sidetj	sit	yes	yes	no	yes	yes	no
lezhatj	lie down	yes	yes	no	yes	yes	no
govoritj	talk	yes	yes	yes	yes	yes	no
xoditj	walk.nondir	no	yes	yes	yes	yes	no
petj	sing	no	yes	yes	yes	yes	no
letatj	fly.nondir	no	no	yes	yes	yes	no
ulybatjsja	smile	no	no	yes	yes	yes	no

The verbs compatible with *obratno*, as exemplified by the first four lines, involve transfer of location, or of possession (sometimes in a metaphorical sense, as in the case of teaching as transfer of knowledge). The directional verbs obligatory have a path, expressed by an overt PP or an adverb, or obvious from context. The verbs of transfer of possession also require a goal. This seems consistent with the assumption that these verbs always involve change, as (directional) running cannot happen without a change of location in the process. The meaning of the prefix is thus usually predictable, even though it is lexical, and maps the event to the path. Some verbs, exemplified by 'teaching' and 'catching' in the table 2, can be coerced into a result-less reading for some speakers, and to the extent that they can be envisaged without producing change, they are compatible with the durational superlexical prefixes. For example, it is possible to spend all summer catching butterflies, if the general population of the butterflies does not decrease, or to spend years teaching without the amount of knowledge significantly affected. Uses of such verbs with *obratno* 'back' are rare, but the following examples were found on the internet and sound quite natural.

(7) a. On kidal   shariki vverx i **lovil**   ix **obratno**.
         he threw.IMPF balls   up   and caught.IMPF them back
         'He (the juggler) threw the balls up and caught them back.'
     b. Ot-učil   mozg dumatj, nado sročno **učitj obratno**
         OT-teach brain think   need urgently teach back
         'I disaccustomed my brain from thinking, it is urgently necessary to teach it back.'

Out of 105 common verbs, 48 verbs follow the pattern of being compatible exclusively with lexical prefixes and with the restitutive *obratno* 'back'. When such verbs are transitive ('throw', 'give') the direct object is obligatorily present and undergoing change. If they are intransitive ('walk', 'run'), then it is the subject undergoing change of location.

There are 17 verbs on the other end of the spectrum, as exemplified by 'fly' and 'smile' in the last rows of table 2. These verbs are incompatible

with lexical prefixes, but freely compatible with superlexical prefixes. Most of these verbs are intransitive, or if there is a direct object it is optional and not undergoing any change.

The remaining 40 verbs display mixed properties: five verbs (seek, catch, build, do, teach/learn) fall into the pattern discussed above: they normally entail a result and prefer the lexical prefixes, but some speakers under certain condition accept them with durational superlexical prefixes in an interpretation not involving any change to the object. These verbs are transitive and the direct object cannot usually be dropped.

Eight more transitive verbs (write, cook, play, watch, read, listen) are compatible with both lexical and superlexical prefixes, and semantically incompatible with restitutive *obratno* as they involve an unrecoverable change. These verbs are flexible, and can easily be used in a transitive resultative reading, or as an atelic process.

The other 27 verbs prefer superlexical prefixes, but are compatible with some lexical prefixes with an idiomatic meaning and an unselected object. The meaning with the lexical prefix is highly idiomatic (though the meaning component of the prefix is still present). Twelve verbs are intransitive when unprefixed but combine with an unselected object when the prefix is added. For examples when the verb 'to sit' is combined with the prefix *ot-* which introduces movement away from ground, the resulting verb *ot-sidetj* is a transitive verb selecting body parts, mostly feet, as objects, with the meaning of, literary 'to sit off one's foot', i.e. to sit uncomfortably causing a foot to become numb. However, when the same prefix combines with the verb 'to sing', the 'departing' meaning component is still there, but the resulting transitive verb *ot-petj* 'to sing off' refers to the burial rite, and the direct object is the person buried.

To sum up the discussion above, the pattern shows that if a scale of change is obligatorily present (and change cannot be denied), then the verb is compatible only with lexical prefixes; if the verb is incompatible with scalar change, then only superlexical prefixes may be added. However, the scale-less verbs are highly flexible and frequently allow coercion into a scalar change reading, which is an ongoing productive process. For example, I have found several examples with the verb *ot-klikatj* which results from the combination of the prefix *ot-* and the English verb 'to click', recently borrowed to refer to mouse-clicking. The newly created verb refers to painful sensation in a finger caused by excessive mouse-use. The resultative verbs can, occasionally, be also coerced into a resultless meaning, but this process is much more restrictive and not as freely accepted.

The following question begs an answer: why, while with some verbs both lexical and superlexical prefixation is possible, many verbs are only compatible with one class of prefixes. For example, superlexical prefixation is entirely impossible with verbs lexicalizing a scale of change, and particularly with verbs of directional motion. Thus the verb *za-plytj* 'ZA-swim.DIR' can mean 'to swim in/behind something', but cannot possibly mean 'to start swimming'.

A possible explanation is that such verbs obligatorily lexicalize a scale of change with a salient transition point. If the lexicalized scale is bounded, the temporal trace of the event is bounded, and if the perfective Asp head introduces a definite t variable (after Ramchand (2008a)) this definite temporal point corresponds to the pre-specified bound of the temporal trace and cannot be further bounded by a superlexical prefix.

The relationship between perfectivity and boundedness of the Rheme is a well known phenomenon with verbs of consumption and creation:

(8)   a.   on el   jabloki
                he ate.IMPF apples
                'He was eating apples'.
        b.   on s-jel   jabloki
                he ate.PF apples
                'He has eaten the apples'.

Similarly, if we make a perfective out of a verb lexicalizing a scale, the scale is bounded, with a definite orientation, which is achieved by its combination with a lexical prefix. Thus, (9a) is imperfective, the process is mapped to the entire path to the forest, and the time on the temporal trace of the event is indefinite, and the subject can be located anywhere on the path. (9b) is perfective, and the result state is mapped to the end of the path, so the time moment of the event is definite, precisely when the subject enters the forest. The definite t can only correspond to the salient transition point specified by the path, so it is impossible for a superlexical prefix to select a different, arbitrary, definite t, e.g. at the beginning point of the event.

(9)   a.   on šol   v les
                he walked.IMPF to forest
                'He was walking to the forest'
        b.   on za-šol   v les
                he za-walked.PF in forest
                'He entered the forest'.

Thus, a superlexical prefix may only adjoin to a verb without a bounded scale of change, where the superlexical prefix selects the definite point, such as beginning or completion, on the unbound temporal trace.

3. Prefix position and interpretation

In the previous section I showed the relationship between the structure of an event and the syntactic position of the prefix it may combine with. In this section I show how prefix interpretation is related to its syntactic position and argument structure. In the subsequent subsections each syntactic configuration (corresponding to the rows in table 1) is discussed in detail. After a brief discussion of the idiomatic interpretation, I look at three possible configurations of the result projection, depending on the possible complements. Then I move up the tree to discuss the superlexical prefixes.

3.1. Idiomatic Meaning

The first class is the idiomatic prefixes. Like regular lexical prefixes, they are located in the result phrase, and introduce the relationship denoted by the lexical entry of the prefix, but the meaning of the verb is not completely predictable. Many verbs in this group contain empty, obscene (not exemplified) or unrelated roots, so the main source of the meaning is the prefix.

The prefix, however, contributes its regular conceptual meaning, thus making the structural part of interpretation somewhat systematic and predictable. Thus, *pere-* introducess the notion of exceeding even when the verb is substituted by a non-verbal root (*togo*, genitive of 'that'), (1) in the table below. The prefix *pro-* (2) introduces the notion of missing or losing something (the origin of the idiom is the notion of counting crows as a useless distraction, so the meaning is to count crows throughout the relevant interval, e.g. when the subject was supposed to watch for his turn, or his things). *do-* introduces reaching a certain point, which, in the idiomatic use, tends to be something unpleasant, such as annoying someone to the point of boiling temper (3). *Ot-* involves removing an annoying figure from the annoyed person (4, 5). *Za-* involves entering a new state, which can be death (6), or making something new (7).

So when the verbal root does not contribute a regular meaning, the main sources of interpretation of the idiom is the prefix.

(10)

verb	gloss	idiomatic usage
1. pere-togo	over-that.GEN	overdo
2. pro-voron-itj	through-crow-V	lose/miss
3. do-statj	up.to-become (reach/get)	frazzle out
4. ot-statj	away-become	leave alone
5. ot-šitj	away-sew	to rebuff
6. za-močitj	za-make.wet	kill
7. za-figačitj	za-fig-inf	make / hit

When these same verbs are used non-idiomatically, their properties, as well as meaning, may be different (e.g. (3) can mean 'to reach', (5) 'to sew', (6) 'to make wet').

3.2. Directional motion

The directional verbs involve a path and a goal, e.g. *bežat*j means 'to run in a certain direction, as opposed to *begatj* 'to run back and forth', or 'run regularly', or 'run around', crucially without a spatial goal. These verbs may be intransitive, like 'run', or transitive, like 'to carry':

(11)   List of directional motion verbs, adopted from Janda (2006):

bežatj	run
bresti	walk with difficulty
vezti	carry (by vehicle)
vesti	lead
gnatj	drive, chase
exatj	drive
idti	walk
katitj	roll
leztj	climb
letetj	fly
nesti	carry (on foot)
plytj	swim, sail
polzti	crawl
taschitj	drag

The rheme complement of directional verbs is a path PP, which is usually overt, or at least recoverable from context. E.g. in (12) the unprefixed form of *leztj* 'to climb' lexicalises *init* and *proc*, and the process is mapped to the path PP ('up the mountain').

(12) Alpinisty lez-ut   v goru.
      alpinists climb$^{\text{dir, impf}}$-3PL in mountain-ACC
      Alpinists are climbing a mountain.

(13)
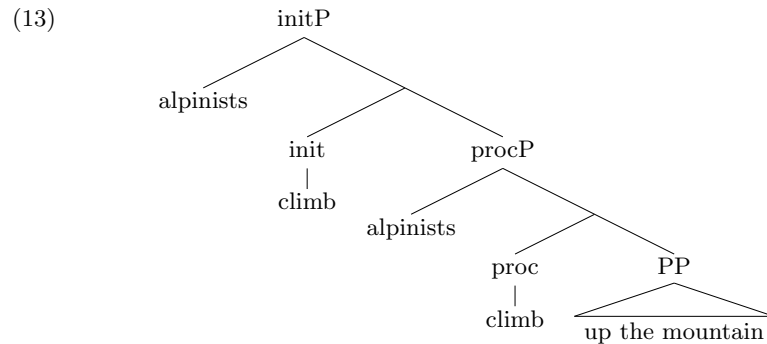
The unprefixed directional verb is atelic, but has the potential to become telic, as expressed by the culmination condition. Here, Kratzer's (2004) distinction between culmination condition and culmination requirements is useful. The atelic verbal phrase 'to climb the mountain' contains the information, where the event culminates, i.e. the direction of climbing:

(14) $Climb : \lambda x \lambda e [climb{-}up(x)(e) \& [culminate(x)(e) \leftrightarrow \text{climb-to-top-of}(x)(e)]]$
      (Kratzer 2004)

The result projection turns the culmination condition into a requirement. A path provides a bounded scale of change, so reaching the end of the path is the natural culmination condition. The non-directional motion verbs, on the other hand, can have no culmination condition nor requirement, because

the lexical entry does not lexicalize a bound path. The *proc* complement is the unbounded Z-path (Zwarts (2005), Romanova (2007)), which stands for Zwartsian path, that is paths that overlap, cross and go back, which describes the sporadic movement without a goal, denoted by non-directional motion verbs, hence no final point may be specified.

Thus, because the lexical entry of directional verbs contains the culmination condition, they may spell out *init-proc-res* function sequences, and the subject (or direct object) is the figure undergoing change.

(15)   Vor pere-lez   čerez zabor.
        thief over-climbed across fence.
        The thief climbed over the fence.

(16)
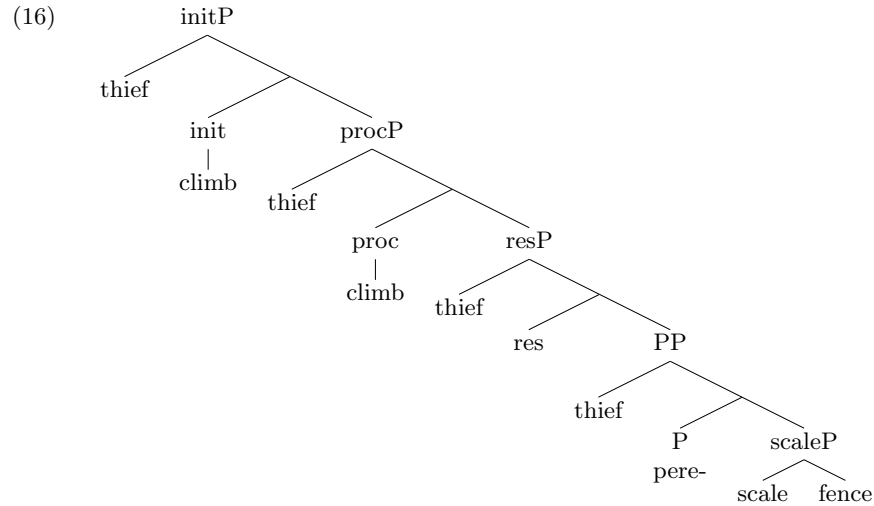
(17)   a. $\exists e, e', e'', p, s.climb(e)\&initiator(e)(thief)\&[e \rightarrow e']\&climb(e')$
             $\&undergoer(e')(thief)\&[e' \rightarrow e'']\&climb(e'')\&resultee(e'')(thief)$
             $\&rheme(e'')(p)\&figure(p)(thief)\&pere(p)(s)\&scale(s)(fence)$

(18)   The climbing event, of which the thief was the initiator, leads to a climbing event e', of which thief is the undergoer, which leads to result climbing event e", of which the thief is the resultee, which is mapped to the path p, of which the thief is the figure. The path p is in an exceeding (pere-) relationship with the scale s, created by the scale head, which a set of values of the contextually relevant dimensions of the fence.

The exceeding mapping relationship means that for every subpart of the fence-scale there is a corresponding subpart of the path (i.e. every subpart of the fence was climbed over), and there is an extra subpart of the event-path to climb off the fence. This coincides with Kagan's (2013) observation that in the prototypical cases, such as 'crossing the border' or 'crossing the bridge' "crossing involves moving beyond a certain location, since that is the purpose

with which crossing is performed", i.e. crossing the bridge entails stepping off the bridge. Thus, my claim that the conceptual meaning of the prefix *pere-* is 'exceeding' does not contradict the intuition (cf. Janda (1988)) that the most basic sub-meaning of *pere-* is 'crossing', as crossing, according to Kagan (2013) entails that "an event participant advances along some scale or other (the path scale under the literal, spatial meaning), covers a particular interval on this scale, and reaches or exceeds the upper boundary of this interval." I choose the 'exceeding' sub-meaning as the most basic, because it is more general, as it fits best the examples in (1-b,d,e), and is also easier to formally define through a relationship between subparts of an event and a scale.

Similarly, the prefixes *pro-, do-, za-*, and *ot-* specify the relationship between the result event and the ground.

(19)   Prefix meanings:

    a.   *pere-* exceeding mapping relationship between the path of the event and the dimensions of the ground

    b.   *pro-* 'through', the successive one-to-one mapping of subparts of the event-path and the dimensions of the ground

    c.   *do-* 'up to', relates the end boundary of the path with the end boundary of the ground.

    d.   *za-* a minus to plus transition, the beginning edge of the path is outside of a certain location, and the end boundary is at the ground

    e.   *ot-* a plus to minus transition, the beginning edge of the path is at a certain location, and the end boundary is away from it.

(20)   a.   Vor pere-lez   (čerez) zabor.
        thief over-climbed (across) fence.
        The thief climbed over the fence.

    b.   Vor pro-lez   v fortočku.
        thief through-climbed in window
        The thief climbed in through a window.

    c.   Alpinisty do-lezli   do   samogo verxa.
        alpinists up.to-climbed up.to very   top
        The alpinists climbed up to the very top.

    d.   Malčik za-lez   na čerdak
        boy   into-climbed on attic
        The boy climbed up to the attic.

    e.   Malčik ot-skočil   ot   kostra
        boy   from-jumped from fire
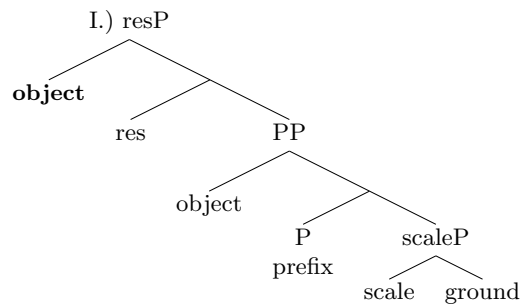   The boy jumped away from the fire.

Thus, the *res* head, coindexed with the *proc* and *init* heads, selects the obligatory path complement, and the result event is mapped to the PP RHEME complement headed by the prefix, which creates an oriented RHEME path based on the scale provided by the complement.
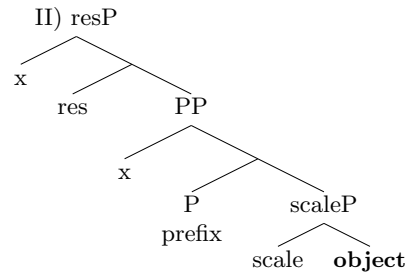
3.3. Spatial reading

The spatial reading of prefixes forms another subclass of the lexical prefix readings, i.e. these prefixes are also located in the result projection, and, consequently, allow secondary prefixation and superlexical prefixes stacked above. What makes them special is that the direct object of the verb corresponds to ground rather than to figure.

There are two logical possibilities for a transitive verb to unify its argument structure with that of the prefix: either the direct object is the specifier of the PP (I), as demonstrated in the previous section, or the object is in the complement of P (II).

(21)

```
        I.) resP
          /\
         /  \
    object   \
           res  PP
               /\
              /  \
          object  \
                 P    scaleP
               prefix   /\
                       /  \
                    scale  ground
```

(22)

```
        II) resP
          /\
         /  \
        x    \
           res  PP
               /\
              /  \
             x    \
                 P    scaleP
               prefix   /\
                       /  \
                    scale  object
```

The crucial difference, which results in the different reading, is that the verbal direct object is located in the complement of *res*. E.g. if one makes a hole through the wall, either the hole or the wall may be the direct object in Russian. However, the underlying result is the same: "the hole is through the wall", so the hole (or the tool) is the external (figure) argument of the result phrase specified by the prefix, while the wall is the internal (ground) argument, but either of the two may surface as the direct object.

When inserted into this configuration, the prefix *pere-* denotes a separation in material integrity (Hale and Keyser 1987) brought about with the help of some instrument or means (Levin 1993).

(23)   pere-rezatj   cut across
              pere-čerknutj   cross out
              pere-bitj   smash into two parts
              pere-krytj   cover (a flow)
              pere-rubitj   chop into two parts
              pere-goroditj   block
              pere-rytj   dig across
              pere-lomitj   break into two parts

When the direct object is the specifier, a complement is required, as we saw in the previous section. The spatial/ dividing meaning, on the other hand, emerges when the direct object itself is the complement of the prefix, thus no other complement is allowed (24b). The figure is a contextually bound variable, so it may be implied by context ('the hole is through the wall'), it may be bound by an instrument ((24a): 'the hammer went through the wall'), or by the subject ('This drill can easily drill through any wall').

(24)   a.   pro-bitj   stenu (molotkom).
              THROUGH-hit wall   hammer-INSTR
              'to breach a wall (with a hammer)'
              There is a hitting event, which leads to hitting process, of which the wall is the undergoer, which leads to the hitting result event, and there is a one to one mapping relationship ('through') between the hitting path and the dimensions of the wall, and the resultee is a variable x, possibly bound by an instrument
    b. *pro-rubitj   stenu na ulicu.
              THROUGH-hew wall   on street
              'to breach the wall into the street'
              The wall is the ground, so no PP (na ulicu) may be added, the res complement position is occupied by the wall

In the absence of the prefix the verb is not necessarily compatible with the same direct object, at least under the same interpretation:

(25)   a. #bitj stenu
           beat wall
    b. *goroditj proxod
           block   way
    c. #rytj dorogu
           dig road

A secondary imperfective of the prefixed verb would be used in the given context. Thus, the derivation of these result projections is different from the ones described in the previous section, where the *res* projection obligatorily selected the same complement as the *proc* projection. These verbs do not select a rheme in the unprefixed form, however, the prefix requires a complement. The exceptional strategy used in this case is to put the direct object as the complement position. Only one of the arguments may receive case

from the verb, so when the direct object is the rheme, the resultee cannot receive case, thus only a variable may appear there, bound by a subject or instrument that receives case elsewhere.

3.3.1. *Pere-* 'over'

The sentence below describes a situation where the riot-police blocked the way, and the instrument (the object standing across the way) may be overt, e.g. trucks, or covert, so the result here is that there is something across the way:

(26)　OMON　　pere-gorodil　proxod　(mašinami)
　　　riot-police over-blocked way.ACC (machines-INSTR)
　　　'The riot police blocked the way (with trucks)'

(27)
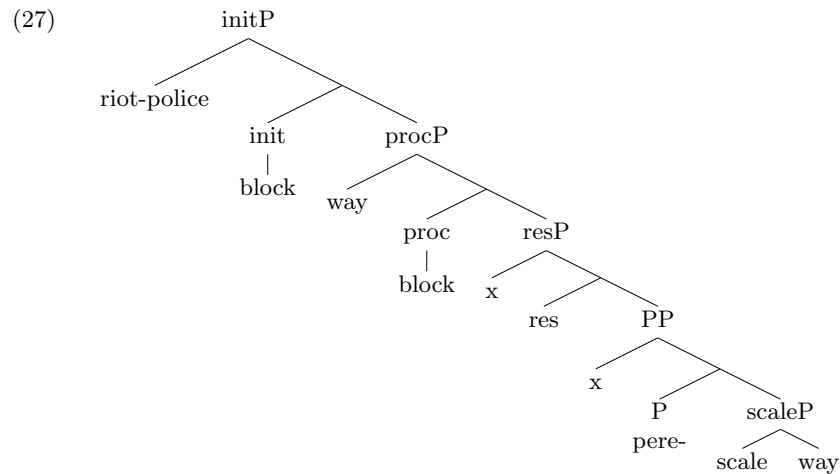
In the tree above, we see that in the result state there is something across the way. Now recall from the previous chapter that the lexical entry for *pere-* is 'exceed'. In a static situation it is the dimensions of the object exceeding the usable part of the path. In a dynamic situation, like cutting, the path travelled by the instrument (e.g. an axe) exceeds the dimensions of the object.

The 'exceed' part of the meaning of *pere-* is quite salient. A corpus search of the verbs from this group shows that the most frequent objects are ropes, cords, wires, chains, throats, spines, roads, etc., i.e. the objects are long and narrow, so that the length of the trajectory of the instrument is greater than the dimensions of the object cut. Furthermore, this prefix is usually incompatible (surprisingly, at a first glance) with a situation where something is cut on a cutting board, because the trajectory of the instrument starts above and expands beyond the object in a forceful movement. In the blocking situation, too, the instrument is generally something large and impassable, while the path blocked has to be rather narrow.

As pointed out by Levin (1993:157), the semantics of these verbs involves the notion of motion. In the course of the events denoted by the verbs, the instrument moves through the affected object, which brings about the separation in integrity. (Kagan 2013: 14) also argues that "although these are not, strictly speaking, verbs of motion, the stems do introduce a component of moving along a path (on the part of the instrument, rather than the agent or theme). In the course of this movement, the instrument crosses a spatial interval that extends through the affected object. Compare the verbs listed above to the non-existent *pere-rvat* (pere-tear). The verb *rvat* tear, too, denotes a separation in material integrity, but this separation is not accompanied by the motion component of an instrument moving through the theme. As a result, the stem does not introduce a path scale; it is thus not compatible with spatial *pere-*".

So, both motion along a spatial scale and crossing a boundary, i.e. exceeding, are salient parts of meaning of this sub-meaning of the prefix *pere-*.

3.3.2. *Pro-* 'through'

The prefix *pro-*, 'through,' displays the similar contrast, allowing the direct object either as the external or internal argument. For *pro-* this contrast is even available with the same verb:

(28)   a.   pro-bitj   dyrku (v stene)
                THROUGH-hit hole   in wall
                to make a hole (in a wall) (directional motion, II)
        b.   pro-bitj   stenu (molotkom).
                 THROUGH-hit wall   hammer-INSTR
                to breach a wall (with a hammer) (spatial meaning, III)
        c.   pro-rubitj   tunnel (skvozj skalu)
                 THROUGH-hew tunnel through rock
                to cut a tunnel through rock (directional motion, II)
        d. *pro-rubitj   stenu na   ulicu. (spatial, III)
                 THROUGH-hew wall   into street
        e.   eta drelj lyubuju stenu pro-sverlit.
                 this drill any   wall through-drill.FUT
                This drill can drill through any wall. (spatial, III, instrument as subject)

The difference between (28a) and (28b) is the difference between directional and spatial readings:

(29)   There is a hitting event, which leads to hitting process, of which the wall is the undergoer, which leads to the result event, which is a through' type of event and...
        a.   The result of the hitting event is through the (unpronounced) wall, and the resultee is the hole (directional reading).
        b.   The result of the hitting event is through the wall, and the resultee is an (unpronounced) instrument (spatial reading).

Such a configuration is possible only with two prefixes: *pro-* and *pere-*. It is hardly a coincidence that these two prefixes are also the only two that may assign an accusative case to the ground in the absence of a preposition:

(30)   a.   pro-exatj ostanovk-u
                 pro-drive bus.stop-ACC
        b.   pere-exatj rek-u
                 pere-drive river-ACC

These prefixes also do not have corresponding prepositions. Pantcheva (2012) suggested that these two prefixes have more complex substructure, so that they lexicalize both the preposition and prefix, and hence can assign case to the noun phrase. I will not go into the details of the analysis of the inner structure of prefixes and prepositions here, as this is a vast topic beyond the scope of this paper.

3.4. Lexicalized scale

Rappaport Hovav (2008) describes scalar change as follows:
    'Verbs which denote events of scalar change are those which lexically specify a scale. A scale is an ordered set of values for a particular attribute. A scalar change is one which involves an ordered set of changes in a particular direction of the values of a single attribute and so can be characterized as movement in a particular direction along the scale. In the case of the verb 'warm', the scale is composed of ordered values of the attribute warm, and a warming event necessarily involves an increase in the value of [warm]."
    Verbs that offer a scale of gradual change and an end point (culmination) can combine with the result projection in such a way that the prefix relates the object being changed (figure) to the scale lexicalized by the verb. The undergoer, which is undergoing the change, is the resultee, and the unpronounced scale is the complement of *res*: in the result state the object undergoes every change in the ordered set of changes along the scale, as the verbs below:

(31)   solitj   salt
           varitj   cook
           žaritj   fry
           gretj   warm
           oxladitj   cool
           gruzitj   load
           litj   pour
           -polnitj   fill
           sušitj   dry

3.4.1. Volume extent scales

Rappaport Hovav (2008) mentions three kinds of scales recognized in the literature: property scales, path scales (scales of position along a path) and

volume/extent scale. Property scales are discussed in this section, path scales were discussed in the section on directional motion.

The crucial difference between property scales and volume extent scales, according to Rappaport Hovav (2008), is that "volume/extent scales are not actually lexicalized in the verb, but are rather provided by the direct object argument." E.g. when the verb 'to cook' is combined with *pere-* (excess) the resulting meaning is that too much cooking has happened to the object, while when a volume extent verb 'to eat' is combined with *pere-* (excess) the resulting meaning 'to over-eat' refers to an excessive amount of food consumed, rather than to excessive eating that the food is undergoing. The object of property scale verbs is a proper undergoer and a figure undergoing change, so it receives accusative case as the resultee and allows passivization (*perevarennaja kartoška* 'overcooked potatoes'). The objects of consumption verbs prefixed with *pere-* cannot appear in accusative, but rather in genitive (cf. 'over-eat ON potatoes'), and no passives may be formed.

Thus, the property scale is the complement selected by the *proc* or *res* head, while the object is the resultee, the figure moving along the scale, or undergoes the consecutive changes along the scale. These must be distinguished from volume extent scales, where the direct object itself providing the scale is the complement of *res*, i.e. the event is happening to each subpart of the object, so the structure is similar to the spatial verbs discussed in the previous section, and, similarly, no overt complements nor instruments may be present. However, the resultee is the subject, i.e. the person who initiated the eating suffers the result of over-eating. As such, the verb is intransitive in structure, with initiator, undergoer, and resultee coindexed.

The verbs with volume extent scales are characterized by inconsistent prefix selection. E.g. when the verbs 'eat' and 'drink' are combined with *pere-, pro-,* and *do-* the consumed amount provides the scale of measurement. With *pro-,* possibly idiomatically, the meaning is to spend money/valuables on food/alcohol (*pro-pitj imuschestvo* 'through-drink possessions'). With *ot-* and *za-* the readings are spatial (take a bite off, with *ot-*) and to eat/drink to conceal something unpleasant (in *za-pitj lekarstvo* 'za-drink a medicine' the result is medicine behind water).

Having differentiated types of scales, we return to the verbs of scalar change with various prefixes, starting with *pere-*:

3.4.2. *Pere-* 'over'

When the result phrase is formed, the prefix *pere-* introduces a relationship (of exceeding in (32)) between the event and the scale selected by it. When the prefix is absent, the undergoer is undergoing every small change along the scale (e.g. the soup in *solitj sup* 'salt soup' becomes more and more salty incrementally without necessarily becoming properly salted). When the prefix combines with the scale in the result projection, the event extends beyond the maximal point on the scale of change (of maximum acceptable saltiness value on the saltiness scale in (32)).

(32) povar pere-solil   sup
      cook   over-salted soup
      cook over-salted the soup.

There is a salting event, initiated by the cook, which leads to the salting process, of which soup is the undergoer, which leads to a result salting event, of which the soup is the resultee, and there is a contextual measure function (of how much salt a soup needs), which was exceeded by the soup in the result state .

(33)
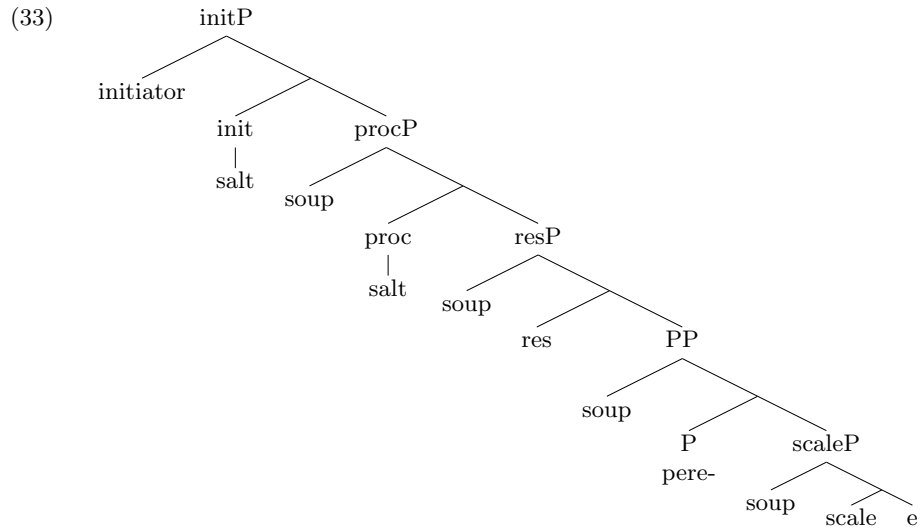
(34) 1.ScaleP: λ x,e.Scale(x) & bounded(x, f(soup)) & $R_{characterize}$(x,e)
      2.PP: $\lambda p, e \exists$x.Path(p) & figure(soup, p) &pere(p, x) & Scale(x) & bounded(x, f(soup)) & $R_{characterize}$(x,e)
      3.resP: $\lambda e \exists$p,x.result(e) & resultee(soup)(e) & R(e)(p) &Path(p) & figure(soup, p) &pere(p, x) & Scale(x) & bounded(x, f(soup)) & $R_{characterize}$(x,e)
      4.procP: $\lambda e' \exists e, p, x$.process(e') & undergoer(soup,e') & e' $\rightarrow$ e & result(e) & resultee(soup)(e) & R(e,p) & Path(p) & figure(soup, p) &pere(p, x) & Scale(x) & bounded(x, f(soup)) & $R_{characterize}$(x,e)
      5.initP: $\lambda e'' \exists e', e, p, x$.Init(e'') & initiator(the cook, e'') & e'' $\rightarrow$ e' .process(e') & undergoer(soup,e') & e' $\rightarrow$ e & result(e) & resultee(soup)(e) & R(e,p) & Path(p) & figure(soup, p) &pere(p, x) & Scale(x) & bounded(x, f(soup)) & $R_{characterize}$(x,e)

The specifier of the scaleP (34;1) is the soup and it coincides with the figure, the resultee and the undergoer. The specifier provides the intended temperature of the soup and thus creates the functional standard on the scale. In the PP (34;2) the scale combines with the prefix *pere-*, which creates a path p that 'exceeds' the functional standard on the scale x. The soup is also the

specifier of the PP, as it consecutively obtains the temperatures constituting the path. The PP is the complement of the *res*, so the result is mapped to the final point on the path. Since result is a state, it is mapped to the state at the end of the path, i.e. to a state beyond the intended temperature. The event variable in the complement of the scale is existentially closed at the *res*P, so it is result state of heating, thus the scale characterising it consists of possible results of heating, i.e. temperatures.

Thus, the result state of the soup is mapped to the end of the path over (i.e. exceeding) the functional standard.

3.4.3. *Pro-* 'through'

Pro-varitj seems to display properties of several groups of meanings, depending on context:

(35)   a.   Pro-varitj sirop 15 minut.
              pro-cook   syrup 15 minutes
              'Cook the syrup for 15 minutes' (from a recipe).
        b.   pro-varitj čečevicu do   gotovnosti
              pro-cook   lentils   until readiness
              "Cook the lentils until well done' (from a recipe).

Though it takes a temporal complement, like superlexical prefixes (discussed in detail in section 3.5), it behaves by all means like a lexical prefix. There is a direct object (syrup, lentils), a passive may be formed (pro-varennyj) and secondary imperfectivization is possible (pro-var-ivatj).

Having established that *pro-* in this use is a lexical prefix, we have to decide whether the direct object is figure or ground. The syrup is the undergoer and the resultee, as it is changing along the cookedness scale, and cannot be interpreted as a ground, the meaning is different from cooking through the syrup, the readiness is the criteria of the result, rather than the requirement that cooking happens to every subpart of the syrup. Furthermore, a goal (*do gotovnosti* 'until readiness') may be added. Hence, the syrup is clearly the external argument of *res*. However, unlike the directional verbs, there is no directional path PP required, because the internal scale may be the rheme.

Yet, *pro-* has a strong preference to refer to going through real objects rather than abstract states, so even with scalar verbs it occurs more frequently in the structure described in the previous section, where the object is the ground (through the wall) .

3.4.4. *Do-* 'up to'

Do- 'up to' is somewhat similar to *pro-*, as it also refers to doing something properly and thoroughly. In both cases we are looking at a scale of readiness, and refer to overcoming each subpart of it, until we get to the culmination point. For *pro-* the crucial part is thoroughness, the fact that the activity happens to every subpart of the object or scale, while for *do-* completeness, reaching the final culmination point, is crucial. Unlike *pro-*, *do-* does not

require that all subparts of the scale are overcome. It is possible to use a *do*-prefixed verb in the context where an activity starts from some middle point and is completed. E.g. (36) is compatible with Vasja starting and finishing the chapter on one occasion, or he could have taken an incomplete chapter (possible started by a co-author), and finished it.

(36)   Vasja do-pisal   glavu.
         V.   do-wrote chapter
         Vasja completed writing the chapter.

3.4.5. *Ot-* 'off'

As we saw in the discussion of directional motion verbs, *ot-* 'off' is the inverse of *za-* 'into' and refers to a plus to minus transition. With directional motion, the transition was from being at or near a certain location to being away from it. Now we are dealing with change of state verbs, so the undergoer changes states, rather than locations. So *ot-* will now refer to a transition from being in a certain state to getting out:

(37)   xozjajka ot-stirala   skatertj.
         hostess   ot-washed table-cloth.ACC
         The hostess washed (the dirt off) the tablecloth.
         (implication: table-cloth was dirty, #... though it was clean)

   The verb 'to wash' contains a scale of change, one end of which is completely dirty state, and the other one (culmination requirement) is completely clean. The starting point of this scale provides the previous state, from which the event happens. As opposed to the previously discussed prefixes, the prefix *ot-* refers to a punctual transition, a verb prefixed with ot- is incompatible with any time modfications ('in an hour' nor 'for an hour'), the internal substructure of the scale is not visible to it, the scale only provides its starting point as the initial state.

3.4.6. *Za-* 'into'

Za- is the opposite of *ot-* and refers to a minus to plus transition. For directional verbs, it meant entering a certain location. Now that we are out of the spatial domain, it refers to entering a new state. While *ot-* means a transition out of the state contained in the scale of change provided by the verb, *za-* means entering a completely new state, implied by the verb but not contained in the scale of change it lexicalizes. Hence its uses are very diverse, and not always predictable. E.g. *za-stiratj* 'za-wash(clothes)' never means entering a clean state, but rather fading of clothes from overly frequent washing.
   Very frequently the new state is wear and tear, extreme annoyance, or death:

(38)   fermer za-bil   svinju
         farmer za-beat pig
         The farmer slaughtered the pig.

However, the new state may be also more positive, e.g.

(39) za-varitj čaj
      za-boil tea
      'to brew tea'

One of the uses of *za-* is with locative alternation verbs (Sokolova, 2012), which display contrasts like 'load hay on the wagon' vs. 'load the wagon with hay'.

(40) a. Voditel' za-gruzil paket   v bagažnik.
          driver loaded   bag-ACC in trunk-ACC
          'The driver loaded the bag into trunk.'
      b. Krasnoarmejcy za-gruzili kuzov   jaščikami.
          soldiers   za-loaded truck.bed-ACC boxes-INSTR
          'The Red Army soldiers loaded the truck bed with boxes.' (Sokolova
          (2012): p. 75)

In (40a), the direct object, the bag, is the figure that is entering the new location in the trunk, so it is a regular directional motion configuration discussed in the first subsection. In (40b), the scale, optionally lexicalized by the verb, is the ground, that is the trunk changes along the scale of being fully loaded. The same alternation is available with *pere-*.

Most of the cases where the meaning of *za-* appears empty, or purely perfectivizing, also fall under this structure. The direct object enters a new state, determined by the lexical properties of the verb, which may often look like a pure perfective meaning.

3.5. Superlexical prefixes, temporal interpretation

This section is dedicated to a subset of prefixes known as 'superlexical', namely to temporal prefixes, which, in terms of their semantic and syntactic properties, form a relatively large and coherent class. I do not go into the detailed analysis of other superlexical prefixes, such as distributive and cumulative, as these are generally exemplified by one or two prefixes, and my central goal in this paper is to show how a syntactic position results into consistent properties across a large class of prefixes. It must be noted, however, that distributive and cumulative prefixes are located in a different position, higher than temporal and require a separate, pluralizing head.

When the verb lexical entry contains *init-proc*, and conflated material, such a verb may not lexicalize *res*. Thus, no *res*P may be added, and there is no position for a lexical prefix. However, the temporal trace of the verb, when monotonic and unbounded, may provide the scale, such that the prefix may map the definite (perfective) time variable to a specific point in the temporal trace. Thus, with unergative verbs, the prefixes head a PP which is a complement to the aspect head. For example, in (41) the contextual temporal function f is exceeded by the duration of the event:

(41)   ja pere-plavala v bassejne
        I over-swam   in swimming.pool
        'I swam too much in the swimming pool'

There is a swimming event, of which I am both initiator and undergoer, and
there is a scale x with a functional standard f, of how much swimming I can
endure, and the event time exceeds f.

(42) Asp_1P
        _____|_____
      Asp_1 PP
                    _____|_____
                   P   scaleP
                  pere   ___|___
                           I |
                         scale   AspP
                               _____|_____
                              I |
                            Asp   initP
                                    _____|_____
                                   I |
                                 pere   initP
                                         _____|_____
                                       init   procP
                                               _____|_____
                                              I |
                                            proc   Z-path
                                            swim
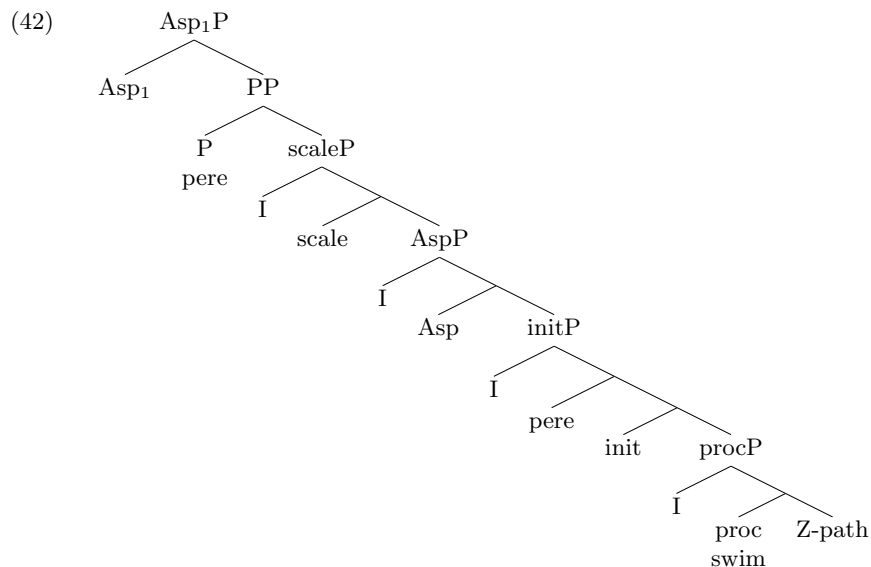
    The prefix *pro-* establish a one-to-one mapping correspondence between
the event and the temporal function of two hours, so that the event lasts
precisely for two hours:

(43)   Pro-xoditj   dva časa.
        PRO-walk^non-dir two hours
        'to walk for two hours.'

There is a walking event, and the definite time variable is mapped to the end
of the temporal trace of the event (which is two hours long)
    The prefix *do-* maps the time variable to the right edge of the temporal
trace of the event, thus deriving the completive meaning, where the event
extends up to the end.

(44)   Matros do-plaval   rejs
        sailer   DO-swam^non-dir trip-ACC
        'The sailor sailed till the end of the trip (and then quit)'.

There is a sailing event, and the time variable is mapped to the right edge of
the temporal trace of the event, which is exactly as long as the trip takes.

The prefix *ot-* refers to a plus to minus transition from flying to non-flying, thus deriving a completely different completive interpretation:

(45)   IL-76 svoe   ot-letal.
        IL-76 its-ACC OT-fly$^{\text{non-dir}}$
        '(The plane) IL-76 has done its flying (and will never fly again)'

The definite time variable is mapped to the plus to minus transition point on the scale (temporal trace of the event), i.e. the time corresponds to the transition from flying to never flying again, so that the right edge boundary of the flying event temporal trace is the reference time.

The prefix *za-* introduces a minus to plus transition, from not working into working, thus giving rise to inceptive interpretation:

(46)   Časy za-xodili.
        clock ZA-walked$^{\text{non-dir}}$
        'The clock started working'

The definite time variable is mapped to the minus to plus transition event (from not working to working), inception, so the left edge boundary of the activity is the reference time.

Thus, in the absence of a result scale, the event provides a temporal unbounded monotonic scale, which may be parsed with help of the superlexical prefixes. This temporal semantics goes hand in hand with superlexical syntactic properties: lack of secondary imperfectives, lack of passives, and ability to stack above lexical prefixes.

In the case of stacking, the secondary imperfective appears in the lower Asp head, and creates an unbound temporal trace of the process subpart (following Ramchand (2008a)) of the relevant event, which is, stripped of a salient transition point, a possible complement of a superlexical prefix.

4. Conclusion

The syntactic type of a verb and the type of rheme it takes, allows us to predict how the prefix may be interpreted. The prefix establishes the shape of the path to which the event variable in the adjacent head is mapped. For this to be accomplished the complement must contain a measurable scale. Thus, a prefix may be inserted in any configuration where it has an eventive head and a proper scale. However, the process of the prefix insertion is restricted by the internal structure of the verbal phrase, which makes it possible to interpret a prefixed verb in context.

For example, consider the situation where the prefix is combined with a directional motion verb. The verbs of motion generally have a trajectory, however, the verbs that are not normally considered to be motion verbs can be coerced to be interpreted as motion verbs. For example, the following range of meanings is offered for the English verb 'siren' in Borer (2005), which is also compatible with nominal syntactic structure.

(47)   a.   The fire stations sirened throughout the raid.

     b.   The factory sirened midday and everyone stopped for lunch.

     c.   The police sirened the Porsche to a stop.

     d.   The police car sirened up to the accident.

     e.   The police car sirened the daylights out of me.

A parallel example from Russian is brought up in Rakhilina (1998), where practically any imperfective verb denoting manner of motion or sound may substitute 'move':

(48)   a.   Diližans exal /plyl   /skoljzil /pilil /česal   čerez
            vehicle drove /floated /glided /sawed /brushed through
            derevnju.
            village
            'The vehicle drove /floated /glided /sawed /brushed through the
            village'

      b.   Diližans molotil   /uxal   /xljupal /uljuljukal čerez
            vehicle hammered /hooted /sloshed /screamed through
            derevnju.
            village
            'The vehicle hammered /hooted /sloshed /screamed through the
            village'

However, the 'making noise along the way' interpretation is not available with potentially addressed noise production that has its own lexicalized path, the direction of the communication.

(49)   a. *Maljčik pel /kričal   /uljuljukal čerez   derevnju.
            boy   sang /shouted /screamed /through village
            'The boy sang /shouted /screamed (while walking) through the
            village', but available interpretation: 'The boy sang /shouted
            /screamed (to smb.) across the village'.

So a non-motion verb can be forced into the directional configuration, but a directional verb cannot be forced into a non-directional configuration. If the lexical entry states that a verb obligatory selects path as a complement and the verb is a result verb, this is not easily overridden by context or world knowledge. When it does not, the missing path projection can be lexicalized by a separate lexeme, creating a directional structure with a non-directional verb. However, if the verb is unergative with conflated material, it does not fit into such a structure, as the conflated material occupies the rheme projection leaving no room for a directional path.

    Thus, in spite of a considerable degree of flexibility, the syntactic make up of the verbs, the features it lexicalizes and its selectional properties allow the speakers to predict into which syntactic configuration the prefix may be inserted, and, consequently, which of the wide range of meanings it must take in a given sentence.

5. Appendix

Verb	translation	Lexical			superlex.			obratno
		za-	ot-	pro-	za-	ot-	pro-	
pomnitj	remember	yes	no	no	no	no	no	no
videtj	see	yes	no	no	no	no	no	no
suditj	judge	yes	yes	no	no	no	no	no
chuvstvovatj	feel	no	no	yes	no	no	no	no
znatj	know	no	no	yes	no	no	no	no
dumatj	think	yes	no	yes	no	no	no	no
slyshatj	hear	yes	no	yes	no	no	no	no
veritj	believe	yes	no	yes	no	no	no	no
bitj	beat	yes	yes	yes	no	no	no	no
estj	eat	yes	yes	yes	no	no	no	no
pitj	drink	yes	yes	yes	no	no	no	no
paxnutj	smell	no	no	yes	yes	yes	no	no
visetj	hang	no	yes	no	no	yes	yes	no
zhaletj	pity	yes	no	no	no	no	yes	no
sluzhitj	serve	yes	yes	no	no	yes	yes	no
ljubitj	love	yes?	no	no	no	no	yes	no
terpetj	tolerate	yes?	no	no	no	yes	yes	no
begatj	run.non.dir	no	no	no	yes	yes	yes	no
bojatjsja	fear	no	no	no	yes	yes	yes	no
ezditj	drive.non.dir	no	no	no	yes	yes	yes	no
kivatj	nod	no	no	no	yes	yes	yes	no
maxatj	wave	no	no	no	yes	yes	yes	no
mechtatj	dream	no	no	no	yes	yes	yes	no
nadejatjsja	hope	no	no	no	yes	yes	yes	no
prygatj	jump	no	no	no	yes	yes	yes	no
smejatjsja	laugh	no	no	no	yes	yes	yes	no
speshitj	hurry	no	no	no	yes	yes	yes	no
stradatj	suffer	no	no	no	yes	yes	yes	no
suschestvovatj	exist	no	no	no	yes	yes	yes	no
torchatj	stick out, hang about	no	no	no	yes	yes	yes	no
ulybatjsja	smile	no	no	no	yes	yes	yes	no
volnovatjsya	worry	no	no	no	yes	yes	yes	no
zvuchatj	sound	no	no	no	yes	yes	yes	no
boletj	be sick	yes	no	no	yes	yes	yes	no
meshatj	mix	yes	yes?	yes	no	yes?	yes	no
gotovitj	cook	yes	no	yes	no	no	yes	no
kolotj	prick trans	yes	yes	yes	no	no	yes	no
varitj	boil	yes	yes	yes	no	no	yes	no
chitatj	read	yes	yes	yes	no	no	yes	no
derzhatj	hold	yes	yes	yes	no	yes	yes	no
gljadetj	look, gaze	yes	yes	yes	no	yes	yes	no
goretj	burn	yes	yes	yes	no	yes	yes	no
govoritj	talk	yes	yes	yes	no	yes	yes	no
lezhatj	lie	yes	yes	yes	no	yes	yes	no
sidetj	sit	yes	yes	yes	no	yes	yes	no
slushatj	listen	yes	yes	yes	no	yes	yes	no
smotretj	watch	yes	yes	yes	no	yes	yes	no
stretljatj	shoot	yes	yes	yes	no	yes	yes	no
spatj	sleep	yes	yes?	yes	no	yes	yes	no
igratj (game)	play	no	yes	yes	yes	yes	yes	no
krichatj	scream	no	yes	yes	yes	yes	yes	no
oratj	shout	no	yes	yes	yes	yes	yes	no
petj	sing	no	yes	yes	yes	yes	yes	no
plakatj	cry	no	yes	yes	yes	yes	yes	no
xoditj	walk.nondir	no	yes	yes	yes	yes	yes	no
igratj (music)	play	yes	yes	yes	yes	yes	yes	no
kuritj	smoke	yes	yes	yes	yes	yes	yes	no
molchatj	keep silent	yes	yes	yes	yes	yes	yes	no
zvonitj	call, ring	yes	yes	yes	yes	yes	yes	no
stuchatj	knock	yes?	yes	yes	yes	yes	yes	no
vratj	lie	yes	yes?	yes?	no	no	no	no
zhdatj	wait	no	no		no	yes	yes	no
bezhatj	run.dir	yes	yes	yes	no	no	no	yes
bratj	take	yes	yes	yes	no	no	no	yes
brositj	throw	yes	yes	yes	no	no	no	yes
daritj	give as present	yes	yes	yes	no	no	no	yes

datj	give.p	yes	yes	yes	no	no	no	yes
dvinutj	move.trans	yes	yes	yes	no	no	no	yes
exatj	drive	yes	yes	yes	no	no	no	yes
gnutj	bend	yes	yes	yes	no	no	no	yes
idti	walk	yes	yes	yes	no	no	no	yes
katitj	roll.trans	yes	yes	yes	no	no	no	yes
krytj	cover	yes	yes	yes	no	no	no	yes
kupitj	buy(p)	yes	yes	yes	no	no	no	yes
lech	lie down.p	yes	yes	yes	no	no	no	yes
letetj	fly	yes	yes	yes	no	no	no	yes
leztj	climb, get in	yes	yes	yes	no	no	no	yes
nesti	carry	yes	yes	yes	no	no	no	yes
pastj	fall	yes	yes	yes	no	no	no	yes
platitj	pay	yes	yes	yes	no	no	no	yes
plytj	swim	yes	yes	yes	no	no	no	yes
prositj	ask	yes	yes	yes	no	no	no	yes
pustitj	let in	yes	yes	yes	no	no	no	yes
rasti	grow	yes	yes	yes	no	no	no	yes
slatj	send	yes	yes	yes	no	no	no	yes
sledovatj	follow	yes	yes	yes	no	no	no	yes
stavitj	put	yes	yes	yes	no	no	no	yes
sunutj	shove	yes	yes	yes	no	no	no	yes
taschitj	drag	yes	yes	yes	no	no	no	yes
terjatj	lose	yes	yes	yes	no	no	no	yes
valitj	bring down	yes	yes	yes	no	no	no	yes
vernutjsja	return, turn with prefix	yes	yes	yes	no	no	no	yes
vesti	lead	yes	yes	yes	no	no	no	yes
iskatj	seek	yes?	yes	no	no	no	yes?	yes
tjanutj	stretch	yes	yes	yes	no	no	yes?	yes
zvatj	call	yes	yes	yes	no	no	yes?	yes
uchitj	teach	yes	yes	yes	no	no	yes?	yes?
iskatj	seek	yes?	yes	no	no	no	yes	yes?
delatj	do	yes	yes	yes	no	no	yes	yes?
lovitj	catch	yes	yes	yes	no	no	yes	yes?
stroitj	build	yes	yes	yes	no	no	yes	yes?
uchitj	teach	yes	yes	yes	no	no	yes	yes?

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