

Time and the event: The semantics of Russian prefixes

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Abstract

In this paper, I draw on data from prefixation in Russian to argue for a basic distinction between event structure and temporal structure. I present a linguistic semantics of verb and argument structure interpretation on the one hand, and a formal semantic implementation of 'telicity' on the other, which makes sense of the generalisations apparently common to both domains. I will claim that the temporal domain embeds the event structure domain, and that the latter constrains the former. At the same time, the different formal primitives that operate at the levels proposed form the basis for a principled linguistic distinction between the two tiers of composition: the event structure level encodes subevental relations and predicational relations within those subevents; the temporal structure level introduces a *t* variable explicitly and relates it to the structure built up by the event level. Whether the event structure is homogenous or not will have an impact on whether the temporal variable chosen will be 'definite' or 'indefinite.' This latter claim then forms the basis for a new conception of the difference between perfective and imperfective verb forms in Russian.

1. Introduction

Stems in Russian divide into two natural classes 'perfective' and 'imperfective' depending on their behaviour with respect to the tense system. The following are main diagnostics for perfective verbs in Russian (Schoorlemmer 1995, Filip 2000, Borik 2002, Romanova 2004b).

- They cannot get a simple ongoing interpretation in the present tense
- They cannot be used as the complements of phasal verbs such as 'begin/finish/continue'
- They cannot form present participles.

The vast majority of prefixed roots fall into the perfective class, although there are some perfectives that are not prefixed. Imperfective verb forms are

* Much of the data, insights and generalisations that this work is based on come from the readings and discussions of the Slavic Prefixes Reading Group in Tromsø, held in the Spring of 2003. I am especially indebted to Eugenia Romanova and Peter Svenonius for stimulating discussions.

either unprefixated altogether, or possess a suffixal marker of imperfectivity (generally called the ‘secondary’ imperfective). The analytical problem is this: despite this apparently uniform effect on the interpretation of the tense morphology in the language, there is evidence that the prefixes in Russian are a heterogeneous class from a semantic and even distributional point of view. The notions implicated in describing the semantic effect of prefixes have included ‘boundedness,’ ‘telicity,’ ‘result augmentation,’ ‘perfectivity’ in various different works on the subject. The problem is not just a terminological one, but reflects a genuine complexity in the different levels at which aspectual composition is calculated. At the same time, the richness of the overt exponents of aspect in a language like Russian make it an important empirical domain for understanding the temporal, aspectual and event structural ingredients of the clause. I will argue that a better understanding can be gained of these phenomena if certain semantic properties are sufficiently deconstructed.

In the literature, there is a long tradition of taking event-structural or aspectual notions as criterial of verbal class membership (Vendler 1967, Dowty 1979, Pustejovsky 1991, Krifka 1992, Verkuyl 1993, Borer to appear). At the same time, but at a different level, aspectual notions are crucial in articulating the formal semantics of auxiliaries, the contribution of adverbials and PPs, and are implicated in the descriptions of traditional inflectional categories such as ‘perfective’ and ‘imperfective’ (Kamp and Rohrer 1983, Parsons 1990, Higginbotham 2001, de Swart 1996). Within the semantics literature on aspect, a distinction is often drawn between ‘inner’ and ‘outer’ aspect (Verkuyl 1989), sometimes phrased as ‘telicity’ versus ‘perfectivity’ (Borik 2002) or ‘telicity’ versus ‘boundedness’ (Depraetere 1995). This distinction in turn is assumed to map onto lexically determined aspect (‘aktionsart’), versus phrasally or contextually determined aspect. In practice, the distinction is often difficult to draw, with the contribution of direct objects and certain inner complements requiring a compositional approach to the so-called ‘lexically’ determined aspect (Verkuyl 1993, Krifka 1992), and with inflectional categories like perfective versus imperfective in Slavic languages interacting with idiosyncratic lexical meanings (Romanova 2004b, Svenonius 2003c). Moreover, recent developments in phrase structural syntax and the lexicon are increasingly seeing previously monolithic lexical items as decomposable in a way that makes that level look more syntactically compositional, and less like a distinct and encapsulated level of representation (Borer to appear, Ritter and Rosen 1998, Hale and Keyser 1993, Kratzer 1996, Mateu 2002), thus further eroding the conceptual distinction between the domains.

This paper is an attempt to integrate the insights of both the syntactic and semantic traditions on aspect and event structure which makes sense of the levels of composition distinguishable within natural languages. In doing so, I will argue for both of the following ideas: [i] the so-called ‘lexical’ level is indeed decomposable into a systematic ‘first phase’ syn-

tax with regular syntactic and semantic rules of composition; [ii] this ‘first phase’ is nevertheless compositionally distinguishable from *both* telicity and boundedness (inner and outer aspect) in the semanticists’ sense. The factor distinguishing the two levels is that the ‘first phase’ is non-temporal in a crucial sense. In terms of syntactic composition, I will claim that the temporal domain embeds the event structure domain, and that the latter constrains the former in a way in which I will make precise. The goal is to present a formal linguistic semantics of verb and argument structure interpretation on the one hand, and a formal semantic implementation of ‘telicity’ on the other, which makes sense of the generalisations apparently common to both domains. At the same time, the different formal primitives that operate at the levels proposed will form the basis for a principled linguistic distinction between the two tiers of composition. With respect to aspectual temporal notions, I will be agreeing with the view that ‘inner’ and ‘outer’ aspect are composed of the same ingredients but at different levels of clause structure (cf. Verkuyl 1989). However, aspect as a whole embeds a phase that represents a qualitatively different stage of linguistic semantic composition—that of event structure. In making the empirical arguments, I will draw on data from Slavic languages (principally Russian) which show a grammatical imperfective/perfective contrast, and from English.

2. Event Structure

This paper makes use of a concrete implementation of event topology such as that found in Higginbotham (2001), Pustejovsky (1991) and Ramchand (2003), involving at least the existence of processual and resultant subevents in a maximal ‘accomplishment verb’ decomposition. I will assume a sequence of heads in the syntax of the ‘first phase’ which includes *v* (causation, cf. Hale and Keyser 1993), *V* (process) and *R* (result), obligatorily in that hierarchical order, and given an explicit semantics. A number of basic participant relations can be minimally defined on this structure: ‘subject of initiation’ (= INITIATOR); ‘subject of process’ (= UNDERGOER); ‘subject of result’ (= RESULTEE); ‘complement of process’ (= MEASURE/PATH). Many of the specifics of this proposal are not necessary for the distinctions I will argue for in the analysis of aspectual composition that follows (see Ramchand 2003 for a discussion of this system in the context of a generative constructional view of the lexicon and a particular view of lexical insertion/selection). I present it here for concreteness.

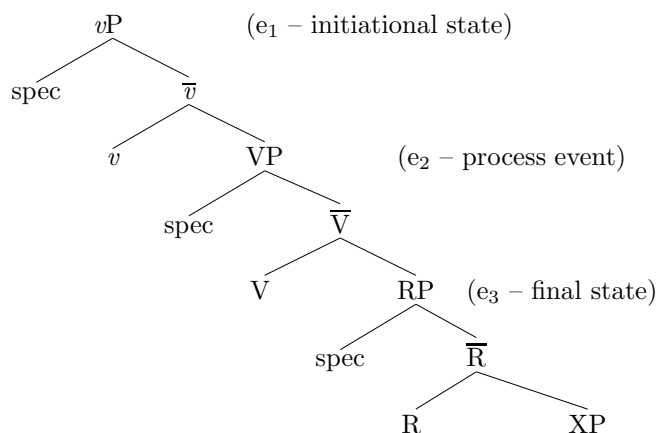
The purpose of any event structure decomposition is to establish a framework for predicting the different classes of verb meanings and argument relations that occur in natural languages. It is generally acknowledged that verbal flexibility is not unlimited, but restricted to the manipulation of a few semantic parameters and subject to certain abstract (universal) generalisations. An example of the large generalisations that have been uncovered in the literature are listed below, and are the general empirical

facts that any theory of event structure needs to be responsible for.

- (1) (i) For any verb in any language, if there is an AGENT-like argument and a PATIENT-like argument, it is never the case that the PATIENT ends up grammaticised as the subject with the AGENT as the object.
- (ii) Within and across languages, intransitive verbs with a single AGENT-like argument (unergatives) behave syntactically and morphologically distinctly from intransitive verbs with a single PATIENT-like argument (unaccusatives).
- (iii) Processes that affect the argument structure of a base verb exist in many if not most of the world's languages, the most common and uncontroversial of which are 'causativisation' (cf. Hale and Keyser 1993) and 'result' formation (Higginbotham 2001 Pustejovsky 1991, Levin and Rappaport 1998)

The event structure decomposition proposed here is intended to capture patterns at this level of generalisation and to account for the variabilities of verb meaning and the systematic processes of valence change and augmentation that are attested.

(2) **The Syntax/Semantics of the First Phase (FPSS)**



Within the FPSS itself, each head introduces its own (sub)-eventuality variable, in this conception, and the events e_1 , e_2 and e_3 are semantically combined by means of a single abstract composition relation, 'leads to' (cf. Hale and Keyser 1993)¹.

¹This particular decomposition utilises three heads instead of the two more commonly found in decompositions of this type (cf. Ritter and Rosen 1998, Borer to appear Hale and Keyser 1993) or even of the semantic decompositions postulated at the lexical level (Dowty 1979, Levin and Rappaport 1998). The system above isolates the dynamic verbal head as V and is always present in any dynamic predication, regardless of the

- (3) **Principle of Event Composition:** *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).*

The principle of sub-evental embedding is intended to capture productive ‘lexical’ processes such as causativisation in (4), and result augmentation (as in (5) and (6)). The examples also show that these event structure changes correspond to changes in the argument structure of the predicate involved.

- (4) a. The glass broke.
b. John broke the glass.
- (5) a. They marched quickly.
b. They marched the hangover off.
- (6) a. *They handed.
b. *They handed the results.
c. They handed the results in.

In the phrase structural decomposition outlined above, projections in specifier positions are systematically interpreted by the semantic compositional rules according to the projection that they are the ‘subject’ of.

- (7) **Interpreting DPs in Specifier Position:**
The DP merged in the specifier of any particular XP is interpreted as the ‘subject’ of the relation described by the head and its complement.
- (i) The ‘subject’ of the initiational subevent is interpreted as INITIATOR;
(ii) the ‘subject’ of the process subevent is interpreted as the UNDERGOER;
(iii) the ‘subject’ of the result state will be interpreted as RESULTEE (holder of result).

In all of these cases, there is a common semantics for the specifier position: the DP ‘subject’ is interpreted as the ‘theme’ or ‘figure’ of the predication constructed by the head and its ‘rhematic’ or ‘ground’ element. (Note that, following Hornstein 2001 and others, I am assuming that the Theta Criterion is not relevant to the grammar here, and that DPs can occupy more than one argument position via Move, provided that the semantics

nature of change involved. The V head in this system can represent either multivalent or bivalent change, and so is present in both traditional activity/accomplishment verbs or achievement verbs respectively. This decision accounts for some of the major differences between the system proposed here and others found in the literature, although this particular fact will not bear on the analysis that follows. The other two subevental heads, v and R are stative eventualities that provide the initiational and result state respectively and are not necessary for a well formed representation.

of the different positions are unifiable.) A further word needs to be said about these ‘rhematic’ elements which by definition are distinguished from ‘themes’ in being merged in complement position. The ways in which these XPs are interpreted vary with the nature of the XP (DP, AP, PP and CP being all possible), and in the encyclopædic semantics imposed by the lexical content of the head they are sister to. However, they are all similar in that in each case they act as ‘ground’ modifiers or further descriptors of the event introduced by the head.

(8) **Interpreting XPs in Complement Position:**

- (i) An event-denoting projection in complement position introduces its own subevent which is integrated semantically by the rule of event composition in (3) above.
- (ii) DPs in complement position, and non-event-denoting projections like APs, stative PPs, and CPs are interpreted as the RHEMATIC or ‘ground’ elements of the eventuality description determined by the head—these can be MEASURES, MANNERS, INSTRUMENTS or PATHS, depending on the encyclopædic content of the head.

Rhematic positions are in general omissible in the context of an encyclopædically rich lexical head. They are also the position from which incorporation is possible, and the source of material that creates the so-called ‘conflation’ verbs of Hale and Keyser (1993). Given the different FPSS configurations possible, and taking into account the unification via Move of ‘theme’ (specifier) positions, a number of different possible verb types emerges. A brief list is given below (but see Ramchand 2003 for more detailed exposition and tree structures for the various types).²

(9) **Dynamic Intransitives: V**

- a. Initiator (+Rheme) *sing/dance/sneeze*
- b. Initiator-Undergoer (+Rheme) *run/march/eat*
- c. Undergoer (+Rheme) *melt/rise/widen*
- d. Undergoer-Resultee (+Rheme) *break*
- e. Initiator-Undergoer-Resultee (+Rheme) *arrive, enter*

Dynamic Transitives: v, V and v, V, R

- a. Initiator Undergoer (+Rheme) *push, melt*
- b. Initiator Undergoer-Resultee (+Rheme) *break, give, put*
- c. Initiator-Undergoer Resultee (+Rheme) *run ragged*
- d. ?Undergoer Resultee (+Rheme)

Otherwise, we have the statives, which can only be Theme-Rheme.

²In the following list, round brackets indicate general ‘rheme’ optionality, and a hyphen between role types indicates unification within a single DP argument.

Stative IntransitiveTheme (incorporated, or non-DP Rheme) *sucks***Stative Transitive**Theme Rheme *fear, love, be, have*

In general, we have a number of diagnostics available for the positions proposed in the structures above.

- Diagnostic for presence of Initiator: verb in English cannot freely transitive/cause.
- Diagnostic for presence of Undergoer: must be specific/individuated; allows causativisation; some property associated with the undergoer varies over time.
- Diagnostic for presence of Resultee: must be specific/individuated; verb default telic regardless of nature of DP; is the holder of the final property state.
- Diagnostic for Rhemes: can be non-DP, can be non-specific; when DP rheme is conceptually a path quantizedness affects telicity entailments.

It is important to realise in this system that the traditional notion of MEASURE is distinct from the notion of ‘affected argument.’ The former is a subclass of rheme which describes the path that the ‘theme’ (figure) undergoes; latter is the ‘theme’ (figure) of the process itself—the argument that undergoes a change (undergoer).

These primitives seem to be independently necessary in order to represent verb class information and flexibility, but the important idea is that they do not seem to be equivalent either to telicity (temporal boundedness of the event) or quantizedness (temporal boundedness of the direct object)—contra claims by Verkuyl (1993) van Hout (1996), and Borer (to appear). In particular, the existence of an RP, or resultant state, is not equivalent to telicity itself, nor does it require a quantized direct object. In (10) below, the verb phrase is ‘telic’ even in the presence of a mass term object.

(10) The miners found gold (in only three hours).

The very fact of an RP in the First Phase Syntax seems to provide a natural telos regardless of the nature of the object. On the other hand, further aspectual modification can remove the entailment of a temporal bound, for example in the presence of a progressive auxiliary or iterative interpretation.

Conversely, telicity can be present, even when no explicit resultant state is expressed in the event topology. We find this most clearly with creation/consumption verbs, where the object is a measure of process (in

complement position to V). Given the interpretation of the object as a measure of the path, if that object is bounded in material extent (11a), a natural temporal bound emerges as an entailment of the compositional calculation (as in Krifka 1992), while a mass term object does not give rise to telicity (11b). With path of motion verbs if a bounded path is in object position (12a), we get the same effect, and with a gradable change of state verb, the existence of a contextual absolute value of that scale can give rise to telicity as well (12b). Note that the measure of the process in the latter case is the scale given by the adjective, and the quantizedness of the undergoer object is irrelevant (see Hay et al. 1999 for detailed discussion of gradable adjective verbs).

- (11) a. John read the (whole) book in two hours.
 b. John read poetry in his room for hours.
- (12) a. John ran to the store in two hours.
 b. (It was so hot outside), clothing dried in only ten minutes.

Thus, we find that the event structure notions described above, do not correlate in a simple one-to-one way with actual telicity. In fact, there seem to be a number of different ways to compose an event that will end up being telic: [i] the existence of an RP [ii] the existence of a VP that has a bounded path. The latter case itself breaks up into a number of subcases. With creation/consumption verbs a quantized DP rheme gives rise to a temporal bound; with a motion verb a bounded path which can be introduced by a preposition of the right type gives rise to a temporal bound; with a change of state verb the existence of an absolute end of the scale for the associated adjective allows a telic interpretation as well. So the event structure notions do not map onto telicity directly, if by telicity we mean the temporal boundedness determined at the *vP* level itself. This is even before we consider the independent further aspectual modifications such as iterativity, habituality or progressive operators which are the domain of outer aspect.

3. Temporal Structure

In representing the temporal semantics of a clause, I make use of recent work on the linguistic semantics of tense which explicitly represents temporal variables in the semantic representation, and which in fact contains two such variables corresponding to an event time t_e and a reference time t_r (Reichenbach 1947, Giorgi and Pianesi 1997, Demirdache and Uribe-Etxebarria 2000, Klein 1994).

Time variables are explicitly present in the representation language. This allows temporal expressions to refer directly to temporal entities in the representation. In other words, the temporal entities are actually in the object language, not just in the meta-language. Arguments for a ref-

ential approach to temporal anaphora have been made by Partee (1984) and Kamp and Reyle (1993). Evidence from the anaphoric properties of tenses argues that we need a representation that is able to store, access and manipulate time points for later reference. Once context and discourse are taken into account, it becomes even more necessary to allow direct reference to time variables, rather than simply invoke them indirectly through the meta-language.

In the tense logic proposed here, therefore, both temporal entities (time variables) and situational entities (event variables) are found in the ontology. Many of the complex aspectual issues that arise with the interpretation of tense forms and their relation to lexical and morphological aspect seem to require a notion of event variable for their description. I will assume that both variables are indeed necessary, and that there are two distinct relations that need to be expressed for a predication to be coherent: one relation between the event and the reference time, and another relation between the reference time and the speech time. These two relations require us to separate the variable representing the event (which is the argument of various event-structure properties) from the variable which locates that event temporally.

Giorgi and Pianesi (1997) hypothesise that various tenses are the result of a composition of a relation of the first type with a relation of the second type (table repeated from Giorgi and Pianesi 1997).

(13)	Relation 1	Relation 2
	S_R future	E_R perfect
	R_S past	R_E prospective
	(S,R) present	(E,R) neutral

I follow this partition into two types of relation, but claim further that Relation 2 is associated with an aspectual phrase structure node, and specifies the relation between the event variable *e* and the reference time variable *t*. The tense node specifies Relation 1, which anchors the reference time to the speech time. The main difference between my view and that of Giorgi and Pianesi (1997) is that I will be assuming a slightly more complicated/articulated set of relations as a part of Relation 2 shown above. In addition, within the temporal semantics literature, it is generally assumed that E, R and S all represent temporal variables. In my implementation, E is an event variable and Relation 2 establishes a temporal variable that is related in a particular way to the event topology of the phase it embeds. Only Relation 1 is actually a relation between two tense variables specifically.

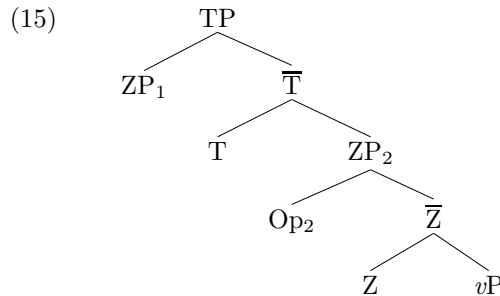
Demirdache and Uribe-Etxebarria (2000) propose a similar system in which an event time (EV-T) is ordered with respect to an assertion time

(AST-T), and then the latter is ordered with respect to an utterance time (UT-T) (after Klein 1994). The former is the analogue of Giorgi and Pianesi's Relation 2 (relating E to R) and the latter of their Relation 1 (relating S to R).

- (14) (Adapted from Demirdache and Uribe-Etxebarria 2000)
- a. [+*Central Coincidence*]: (FIGURE within GROUND)
 Present Tense: UT-T within AST-T
 Progressive Aspect: AST-T within EV-T
 - b. [−*Central*, +*Centripetal Coincidence*]: (FIGURE before/towards GROUND)
 Future Tense: UT-T before AST-T
 Prospective Aspect: AST-T before EV-T
 - c. [−*Central*, +*Centrifugal Coincidence*]: (FIGURE after/from GROUND)
 Past Tense: UT-T after AST-T
 Perfective Aspect: AST-T after EV-T

Demirdache and Uribe-Etxebarria (2000) (henceforth D&U) are clearly working with intervals as opposed to time instants in this model, and they claim that there is an analogy between tense and aspect relations in terms of the topological configurations they determine. It is a seductively elegant system, but has some analytical flaws when it comes to accounting for the Slavic data. Most importantly, the system outlined above does not straightforwardly predict incompatibility between the present tense and the perfective verb forms that we find in Russian, or the fact that that same morphological form gets a future interpretation with perfectives. Like Giorgi and Pianesi (1997), D&U assume that the event gives a particular time directly, whereas I am going to assume that the existence of a time variable is provided by the Asp head (Assertion time head) itself. Related to this point is the idea I will pursue that the assertion time in D&U's terms cannot be specified as preceding or following the run time of the event, but must somehow be linked integrally to that run time, the complication being that the events in our first phase composition are actually internally complex.

A somewhat different implementation of the intuitive separation I am pursuing can be found in Stowell (1996). Here, a phrase structural node, ZP (Zeit Phrase) is embedded under the T projection to give two temporal variables that are related by the Tense head.



What Stowell (1996) calls ZP here is equivalent to my AspP. For him, this is the projection that denotes the event time; it is one of the arguments of the tense head T (whose other argument—the speech time in matrix clauses—is the other ZP in the specifier of T). Stowell’s active concern is with sequence of tense and temporal binding in the discourse; he does not decompose the projection immediately dominated by ZP (which I have represented as *vP* here, somewhat anachronistically), although he does have an operator position in the specifier position of ZP that directly binds the temporal variable. In particular, since he is not concerned with different aspectual interpretations, he does not talk about the potentially different ways in which the event structure gives rise to a particular time moment. My argument will be that different heads in Z (my Asp) determine a different event tense embedding in each case (Relation 2). Having said this, the general structure assumed by Stowell is congruent with the outer levels of the clause that I also will be assuming.

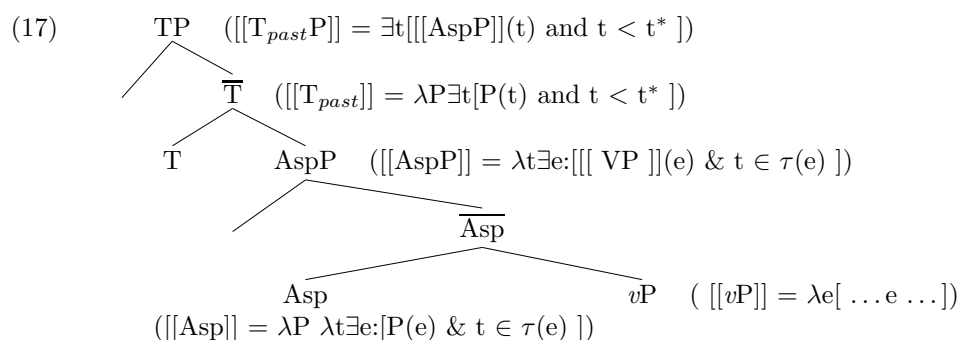
The crucial phase boundary between *vP* and the temporal phrase structural domain requires the establishment of a relation between the extended event topology which makes no direct reference to times, and the actual time variable which is only introduced at Asp (= ZeitP). In general we can assume that *t* and *e* are related formally by a temporal trace function $\tau(e)$ (as found in Krifka 1992) which maps an event to the ‘time line’ that it occupies. In any actual predication, the time variable introduced by Asp will be related in a particular way to the time trace of the event that it embeds. In formal terms, we can represent this restriction as:

$$(16) \quad t \text{ in } \tau(e) \text{ (the reference time of the predication is one of the time moments in the temporal trace function of } e)^3$$

Assuming that *vP* denotes some predicate over events, the aspectual head combines with it to bind the event variable, introduce *t*, and to specify the relationship between the two. The actual relationship specified will depend on the particular Asp head. The general property of the Asp head,

³In this implementation, I am treating the reference time introduced in Asp as a linguistic instant, as is the speech time, although the temporal trace function of the event clearly represents an interval. This is not a necessary choice, but will become relevant for the particular interpretation of the Russian forms to be given.

therefore, is to bind the event variable, and create a predicate over times that are somehow related to that event. The particular content of the Asp head will vary, ranging from very specific conditions on the relation between the time variable and the event, to a very simple minimal condition, as shown in (16) above. Further up the clause, in a completely parallel way, the tense head combines with a predicate over times to bind that time variable and relate it (anchor it) to the speech time in a particular way. The general compositional schema is shown in the annotated tree below (17). For concreteness in the illustration I have chosen a default inclusive Asp head and the T_{past} form.



This system can be used to model the ‘perfective’/‘imperfective’ contrast. To anticipate, the analysis will claim that perfectivity (more particularly, the perfectivity diagnostics) are sensitive to the existence of a *definite* event time in Asp, as opposed to an *indefinite* event time in Asp.⁴

Borik (2002), building on proposals by Reinhart, also gives an interpretation of the perfective/imperfective contrast in Russian using a Reichenbachian decomposition into event time E, reference time R and speech time S. This system is completely different from the one I am assuming here, but for completeness this should be clarified, given that Borik (2002) constitutes the most recent formal semantic treatment of the contrast in the literature. First of all, like Giorgi and Pianesi (1997) and Demirdache and Uribe-Etxebarria (2000), all three Reichenbachian positions are taken to refer to times. Secondly, Borik (2002) identifies the perfective versus imperfective contrast with the different relations that she stipulates for the S versus R association (Relation 1—the one reserved in the other systems for tense). However, in doing so, she moves away from a simple compositional system so that now the two relations do not map straightforwardly onto the hierarchical order within the phrase structure. The following table, taken from Borik (2002), summarises the proposal found in that work.

⁴Once again, the comparison with the system advanced in Stowell (1996) is apt: Stowell sees his ZeitP as an analogue of the DP within the nominal domain.

	IMPERFECTIVE $S \cap R \neq \emptyset$	PERFECTIVE $S \cap R = \emptyset$
past $E < R$	číta-l <i>read</i> -M.SG $[_R E < S]$	pro-číta-l PERF- <i>read</i> -M.SG $[_R E] < S$
actual present $S \cap E \neq \emptyset$	číta-jet <i>read</i> -3SG $[_R S \cap E \neq \emptyset]$	
future $S < E$	but-et čítatj <i>be</i> -3SG <i>read</i> -INF $[_R S < E]$	pro-číta-jet PERF- <i>read</i> -3SG $S < [_R E]$

According to Borik (2002), perfectives are distinguished by the fact that they impose a non-overlapping relation between the speech time interval and the reference interval, whereas imperfectives state that there is such an overlap. Tense relations in this system are orderings between the speech time and the event time directly. It should be clear that this is a rather different architecture from the ones assumed by the previous authors working in the Reichenbachian system (and the one which I follow) whereby the reference time is the intermediary between the event and the anchoring to speech time. In fact, in Borik's system there is no consistent interpretation for what the reference time actually corresponds to in the semantic composition: in the imperfectives it spans the whole interval that includes both event time and speech time regardless of how they are ordered; in perfectives, it simply encloses the event time and has no interaction with the speech time at all. It functions in effect as a diacritic enforcing the incompatibility of the perfective with the present tense. In addition, no analysis is offered in this system for the function of the prefixes as 'perfectivity' markers themselves.

To recapitulate, then, the basic system I will be using to implement the temporal domain will involve a hierarchically ordered set of projections with specific effects. The first head embedding the *vP* event structure domain is an Aspectual head, *Asp*, which introduces the time variable and specifies its relation to the internal constituency of the event. The final head in the temporal domain (TP) expresses a relation between that constructed reference time and the speech time. The system leaves open the number of intermediate aspectual auxiliary heads (contributing to outer aspect) that can modify the *t* introduced by *Asp* (the inner aspectual head) in particular ways, before final anchoring to tense.

4. Russian Prefixes: Arguments and Event Structure

It has been long acknowledged in the Slavic linguistic tradition that prefixes are not all the same, but fall into a number of distinct classes. The broad classes that I will be concerned with here bear most resemblance to those of Isačenko (1960), as discussed and modified by Forsyth (1970). First I will discuss the properties of the 'lexical' prefixes in terms of event structure,

and secondly a class of procedurals of ‘superlexical’ prefixes.⁵

4.1. Lexical Prefixes

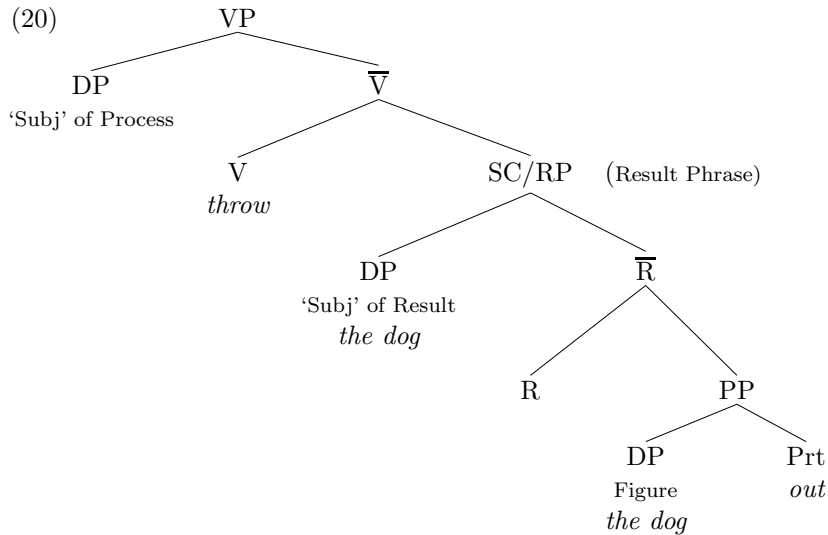
I start with this category of prefix usage because it is in this class that the prefixes bear closest resemblance to their non-prefixal (prepositional) meanings. Most prefixes in Russian have a corresponding homophonous prepositional form, but, like particles in Germanic, they seem to double as small clause predicates in close conjunction with a verbal meaning (cf. Kayne 1985, Guéron 1987, Hoekstra 1988, Svenonius 1994, den Dikken 1995). In other words, in many cases, the contribution of the prefix can be compositionally understood as bearing a predicational relation to the DP in object position.

- (18) v-bit’ ‘knock in’
 vy-tyanut’ ‘pull out’
 do-yti ‘go as far as’
 za-vernut’ ‘roll up’
 s-letet’ ‘fly down’
 u-brat’ ‘tidy away’

- (19) Boris vy-brosil sobaku.
Boris out-threw dog
 ‘Boris threw out the dog’

A small clause analysis of constructions of this type sees ‘the dog’ in (19) above as undergoing the throwing event, as well as being the subject or the ‘figure’ (cf. Talmy 1985, Svenonius 1994) of the small clause headed by the predicate ‘out.’ In other words, ‘the dog’ undergoes a ‘throwing’ and as a result becomes ‘out.’ Implementing this general idea within the first phase syntax decomposition proposed above (as in Ramchand and Svenonius 2002 for the Germanic particle construction) gives the following phrase structural representation.

⁵There is also a third class often identified in the traditional literature—the purely perfectivising prefixes. The semantic contribution of these prefixes is much vaguer, but they will be taken up in section 6, once the most important analytic distinctions have been made.



In other words, within an event structure decomposition, the small clause predication is actually integrated within the first phase syntax as the complement of the Result subeventual head. The analysis in terms of first phase syntax decomposition makes sense of many of the distinct and often paradoxical properties of the particle construction. It represents the sense in which the direct object is simultaneously the ‘subject’ of the small clause as well as the object of the main verb (since the DP moves and unifies both the RESULTEE and UNDERGOER roles). It also allows for ‘unselected’ objects since the RESULTEE position can be added to verbs that otherwise take no DP complement, or which seem to have a different semantics associated with a DP complement when used on their own (see Ramchand and Svenonius 2002 for more detailed argumentation).

It is pervasively true of the lexical prefixes that they induce argument structure changes on the verb that they attach to. In (21) we see a case where an object is added with the addition of the prefix, and in (22), the semantic participancy of the object is radically changed by the addition of the prefix (the data here is taken from Romanova 2004b and Romanova 2004a; see the Introduction to this volume for abbreviations).

- (21)
- | | | |
|----|---|--|
| a. | v-rezat' zamok
<i>into-cut^P lock.ACC in door.ACC</i>
‘insert a lock into a door’ | (*rezat' zamok)
<i>cut^I lock.ACC</i> |
| b. | vy-bit' glaz
<i>out-beat^P eye.ACC</i>
‘hit an eye out’ | (*bit' glaz)
<i>beat^I eye.ACC</i> |
| c. | pro-gryzt' dyru
<i>through-gnaw^P hole.ACC</i>
‘gnaw a hole in something’ | (*gryzt' dyru)
<i>gnaw^I hole.ACC</i> |

- (22) a. Oni stroili garaži na detskoj
they.NOM built.PL^I garages.ACC on children's.LOC
 ploščadke.
ground.LOC
 'They built garages on the the children's playground.'
- b. Oni zastroili detskuyu ploščadku (garažami)
they ZA.built children's playground.ACC (garages.INSTR)
 'They built the children's playground up (with garages)'

There are a variety of particular properties of lexical prefixes which mirror the behaviour of the particles in Germanic. These are laid out clearly in Svenonius (2003b) and Svenonius (2004), from which I repeat much of the following data. First of all, like Germanic more generally, the DP in a lexical prefix construction can actually be the GROUND, as opposed to the FIGURE of the spatial relation.⁶

- (23) Samoljot pere-letajet granicu.
plane across-flies border
 'The plane is flying across the border.'

Secondly, the verb plus prefix combination can function with a more abstract (less overtly spatial) interpretation of the P element to give a more abstract result, while still retaining the same predicational structure.

- (24) a. vy-sušit' — *out-dry* ('to dry up')
 b. do-nesti — *up-carry* ('to report')

These particle combinations are systematically subject to idiosyncratic interpretations and co-occurrence restrictions, as are verb-particle combinations in Germanic.

- (25) a. vo-plotit' — *in-flesh* ('to realize (a plan)')
 b. vy-dumat' — *out-think* ('to invent')
 c. raz-jest' — *around-eat* ('to corrode')

Under the assumption that the lexical syntactic level (in my terms, the first phase) is a phase for the assignment of idiosyncratic encyclopædic information (cf. Marantz 1997), these facts are congruent with an account that places the prefix in a low position. The argument structure changing potential of these prefixes, the clear event structural decomposition possible for them, and the potential for idiomatisation, mark them out as elements of the first phase.

Consistent with the existence of a result phrase which makes the whole event non-homogeneous, these forms are always incompatible with 'for an hour' adverbials.

⁶This possibility seems to be somewhat restricted in English, but it is found clearly in German and Dutch (see Svenonius 2003a).

- (26) Samoljot pere-letel granicu (*čas).
plane across-flew border hour
 ‘The plane flew across the border.’
- (27) Ona iz-lila mne dušu (*čas).
She out.of-poured me soul hour
 ‘She poured out her soul to me.’ (Svenonius 2003b)

They also go well with ‘in an hour’ adverbials, where the time frame adverbial indicates the time elapsed before the result state comes into being.

- (28) Samoljot pere-letel granicu za čas.
plane across-flew border in hour
 ‘The plane flew across the border in an hour.’
- (29) Oni zastroili detskuyu ploščadku (garažami) za
they ZA.built children’s playground.ACC (garages.INSTR) in
mesyats.
month
 ‘They built the children’s playground up (with garages) in a month’

Wide scope readings of these objects is always possible (see (30a) and (30b)), and they can scramble (in context) for most speakers. In addition, extraction from within such objects is degraded, if not completely ungrammatical, as in (31a) and (31b) (see Romanova and Diakonova 2003 for details).

- (30) a. Každij student vybrosil stat’ju.
every student out.throw.PST.SG article.ACC
 Can mean: ‘There is a specific article that every student threw out’
- b. Každij immigrant pereletel granicu.
Every immigrant across.flew.PST.SG border.ACC
 Can mean: ‘There is a particular border that every immigrant crossed.’
- (31) a. ??O chem John vybrosil stat’ji?
about what.LOC John out.threw.PST.SG articles.ACC
 ‘About what did John throw out articles?’
- b. *S kakoj stranoj John pereletel
With what.INST country.INST John across.flew.PST.SG
granicu?
border.ACC
 *‘With what country did John cross a border?’

While these phenomena are not clearly understood, I will assume that the behaviour of objects of lexical prefix verbs is consistent with their being true individuated arguments in the specifier position of some first phase predicational event. Being intermediate ‘subjects,’ they will resist extrac-

tion from within although they themselves will be easily extractable for scope. I assume that individuation of the argument as somehow specific correlates also with specifier position, contrasting with partitive or incorporated or rhematic objects (in the sense of de Hoop 1992, van Geenhoven 1998). In a sense, this is as we would expect, especially considering recent claims in the literature that quantizeness or specificity of objects is directly checked against a clausal telicity feature (Borer to appear, van Hout 2000). However, the diagnostic will become more relevant below when we see that perfectivity does not *always* correlate with the specificity or definiteness of the direct object in the case of the superlexicals.

4.2. Superlexical Prefixes

The second class of prefixes that I will examine are the ‘superlexicals.’ The prefixes in this category are a subset of the ones that show lexical behaviour, as above, but have different semantic and distributional properties. These prefixes do not seem to change the meaning of the lexical root, but add an identifiable extra bit of information relating to how the event progresses. For example, the process can be said to go on for a certain amount of time, to use up all or part of the object, to distribute over the object, or even be inceptive or terminative. Some examples of the most common ones are shown below.

- (32) po-pit’ ‘drink a little’ (attenuative)
 za-plakat’ ‘burst into tears’ (inceptive)
 do-čitat’ ‘finish reading’ (terminative)
 na-brat’ ‘gather (lots of) something’

The first thing to emphasise is that these prefixes never introduce extra predicational structure. They never add an argument to the root verb, and they never change the participant relations of an original object. Therefore, there is no sense in representing them as the complements of a result projection. Moreover, there seem to be no purely idiosyncratic combinations with idiomatic meanings, as we found with the lexical class. Rather, they add a predictable, adverbial-like or modificatory meaning to the event (Romanova 2004b, Gehrke 2004).

- (33) po-iskat’ ‘look *for a while*’
 Petja po-iskal knigu.
 Peter PO-looked book
 ‘Peter looked for a book for a little while.’
- (34) pro-sidet’ ‘sit *for a certain time*’
 Petja pro-sidel v tjur’me.
 Peter PRO-sat in prison
 ‘Peter sat in prison for a certain time.’ (Borik 2002)

- (35) za-rabat' 'start working'
 Kompjuter za-rabotal.
computer ZA-worked
 'The computer started to work.'
- (36) na-brat' 'pick a lot of'
 Olja na-brala gribov.
Olga NA-picked mushrooms
 'Olga picked a lot of mushrooms.'

While the superlexical prefixes do not change the argument structure of the root they attach to, they can in fact impose selectional restrictions on the DP denotations of their direct objects. For example, *na-* prefixes and distributive prefixes (such as *pere-*) require mass term or plural objects to be felicitous.

Once we come to apply the traditional tests for 'telicity,' a much muddier picture emerges with the superlexicals. In the case of inceptive *za-*, 'for an hour' is ungrammatical as expected and 'in an hour' is good. However, 'in an hour' does not measure the extent of the event, but only the time up to when the event started.

- (37) Kompjuter za-rabotal za čas/*čas.
computer ZA-worked in hour/hour
 'It took one hour for the computer to work' (Borik 2002)

In the case of *po-* and *pro-*, for example, we find a reversed pattern from the lexical prefixes: 'in an hour' is bad, while 'for an hour' is good.

- (38) Petja po-iskal knigu polčasa/*za polčasa.
Peter PO-looked book half.hour/in half.hour
 'Peter looked for a book for half an hour.'
- (39) Petja pro-sidel v tyur'me pyat' let.
Peter PRO-sat in prison five years
 'Peter was in prison for five years.' (Borik 2002)

As if this wasn't bad enough, performing the tests on *na* verbs gives grammaticality for 'in an hour' if the object is in the accusative case, but ungrammaticality for both 'in an hour' and 'for an hour' if the object is genitive.

- (40) Olja na-brala gribov ?za čas/*čas.
Olga NA-picked mushrooms.GEN in hour/hour
 'Olga picked a lot of mushrooms ?in/*for an hour.'
- (41) Olja na-brala korzinu gribov za čas/*čas.
Olga NA-picked basket.ACC mushrooms.GEN in hour/hour
 'Olga picked a lot of mushrooms in an hour' (Romanova 2004b)

Despite these variable results on the traditional telicity tests, Romanova (2004b) shows that all of these prefixed verbs pass the diagnostics for perfectivity, as laid out at the beginning of this paper. Borik (2002) uses these tests as well as a variety of others to argue that telicity (as diagnosed by these particular tests) cannot in fact be the distinction that underlies perfectivity. Moreover, as Borik also points out, on certain readings of the past tense in Russian, imperfective verbs also seem to be felicitous with ‘in an hour.’

- (42) Petja uže peresekal etot kanal za polčasa/*polčasa.
Peter already crossed^I this channel.ACC in half.hour/half.hour
 ‘Peter has already crossed this channel in half an hour.’ (Borik 2002)

Thus, the problem goes both ways. The superlexically prefixed verbs do not uniformly give ‘measure to endpoint’ readings for ‘in an hour’; at first blush, this might seem consistent with the ‘in an hour’ test being sensitive to something more ‘lexical’ (recall that the lexically prefixed verbs all accepted the ‘in an hour’ adverbial). But this doesn’t work because imperfective verbs under certain contextual circumstances *do* allow the time frame adverbial, and they certainly do not involve any kind of lexical ‘telicity.’ It becomes difficult to know what ‘in an hour’ is actually diagnostic *for* in Russian. What seems clear, though, is that it cannot be a straightforward test for result phrase in the first phase syntax (because some superlexicals and imperfectives pass the ‘in an hour’ test), nor can it be a test for perfectivity (because all superlexicals are perfective and some resist ‘in an hour’). Despite these tests not giving us an actual diagnostic for either Result Phrase or Perfectivity, they do drive a wedge between the lexicals and the superlexicals: the lexically prefixed verbs give clear and unambiguous behaviour in the expected direction, showing that the fact of possessing an RP gives rise to a determinate behaviour with respect to the traditional telicity tests; superlexicals vary, showing that in the absence of RP, the telicity tests are influenced by other factors. I will attempt to make sense of these diagnostics for the two classes of prefix in the next section.

In addition to the ‘for/in an hour’ tests, traditional entailment tests for quantizedness also give equivocal results for the superlexically prefixed verbs. For example, all the subevents of ‘looking for a book for a little while’ seem also to be events of ‘looking for a book for a little while,’ so the event comes out as non-quantized (See Filip 2000 for the first discussion of these facts for *na-* and *po-* superlexicals in Czech and Russian.)

A similar muddy picture emerges if one examines the claim often made that specific or quantized objects are associated with telic predicates. Romanova and Diakonova (2003) show that unlike lexically prefixed verbs, the tests for object specificity do not work for many superlexicals.

Taking the case of *po-* prefixed verbs once again, the following sentence can give rise to either a definite *or* an indefinite reading of the object (the

following data is all taken from Romanova and Diakonova 2003).

- (43) Každyj student po-čital statji.
every student PO-read articles
 ‘Every student read (the) articles for a while’

In addition, if the scope possibilities of this object are assessed with respect to the universal quantifier ‘every,’ both the (a) and (b) scope interpretations are possible.

- (44) a. $\exists y$ [y are articles] [$\forall x$ [x a student] [x has read y]]
 b. $\forall x$ [x a student] [$\exists y$ [y are articles] [x has read y]]

Consistent with the indefinite/non-specific reading, extraction is possible from within the object of a superlexical *po-* prefixed verb.

- (45) O chem deti po-čitali skazki?
About what children PO-read tales.ACC
 What did children read books about?

Na- prefixed verbs seem to be an extreme case once again, with Romanova and Diakonova reporting that objects of those verbs are obligatorily non-specific, do not scramble and do not allow wide scope readings. This is not to say that superlexical prefixed verbs can never get specific readings on their objects. The difference is that the lexicals *always* do, but the superlexicals seem to be much more varied (as we saw with the traditional telicity tests above).

5. Temporal Properties of Perfective and Imperfective

So far, I have tried to present the arguments for differences between two major classes of prefix in Russian, drawing on work by Romanova (2004b), Romanova and Diakonova (2003) and Svenonius (2004). This distinction between internal and external prefixes has also been argued for independently by Di Sciullo and Slabakova (to appear), and Gehrke (2004), claiming that the lexical prefixes are internal to the superlexical ones on the basis of the argument structure effects, lexical idiosyncrasy, and the order of stacking (the latter point being one which will be taken up later in this paper).

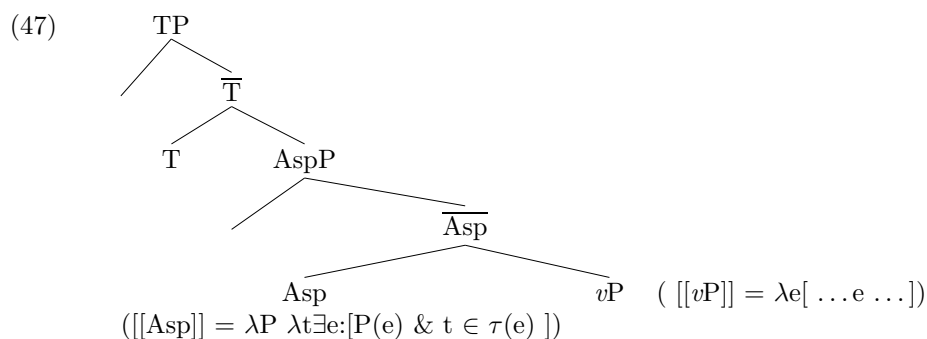
The event structure properties of the verb phrases created by Russian prefixation are clearly different from each other, but they nevertheless uniformly pass the diagnostics for perfectivity, and therefore contrast linguistically with the imperfective forms in Russian. I repeat the Russian diagnostics here again as (46), to which I add a further, more general property of perfectives versus imperfectives as (iv).

- (46) (i) They cannot get a simple ongoing interpretation in the present tense

- (ii) They cannot be used as the complements of phasal verbs such as ‘begin/finish/continue.’
- (iii) They cannot form present participles.
- (iv) In discourse, they combine to form non-overlapping events in the narrative

The latter property of perfectives is well known from the traditional literature—see Kamp and Rohrer (1983) for a modern discussion—and also holds for the Russian perfective. I will take it to be further indication of how perfective verbal forms interact with the tense system.

Consider again the aspectual/temporal architecture of the clause introduced in section 3.



The Asp head combines with an event-denoting projection to create a predicate of time instants. So far, in the default case, I have been assuming that some time moment within the temporal trace of the event provides that link between the event structure and temporal ordering. The fact about all the perfectives, whether lexical or superlexically prefixed, is that they all have the same interaction with the tense predicates and properties with respect to narratives. On the other hand, I have shown that the *vP* internal properties/event and argument structure properties of these forms are quite different from each other. Under this architecture, it must be some characteristic of the Asp head denotation that is common to all these forms, while preserving the heterogeneity of the event structure level.

Traditional linguists and native speaker intuitions about the difference between perfective and imperfective forms have often concentrated on the metaphor of ‘ways of viewing the event.’ Classically, the perfective forms are said to view the event from the ‘outside’ as a ‘completed whole,’ while imperfective forms reflect a more ‘internal’ perspective on the event (Isačenko 1960, Comrie 1976), or as emphasising the endpoint of an event (perfective) versus its visible or ‘ongoing’ portion (Smith 1991). It is rather more difficult to parley this kind of intuition into a more formal compositional treatment. The approaches in the formal literature make reference to closed and open time intervals, or to specifications of how those time intervals

must interact with the speech time. For example, we saw in the description of Demirdache and Uribe-Etxebarria (2000) above, that progressive aspect was characterised by having the assertion time interval properly contained within the event time interval, while the perfective (and prospective) were characterised by non-overlap between assertion time and event time. A rather different approach was taken by Borik (2002) where the imperfective aspect was characterised by the overlap between the speech time and the reference time interval, with perfective aspect enforcing strict non-overlap. The open-interval nature of the imperfective and the point-like behaviour of the perfective are important intuitions that I do not propose to discard. However, the analysis I will offer will package the system in a somewhat different way, drawing on syntactic and morphological facts, and exploiting the parallelism between DP and CP structure.

The approach I will take here at first might seem to be a radical and unwarranted departure from these previous accounts and intuitions: firstly, I will represent the assertion time/reference time that is introduced in Asp as a simple time instant rather than an interval, and I will be insisting that the extended event structure topology of the *vP* does not linguistically denote an interval either, but its temporal trace function is one of the inputs to possible denotations of the assertion time. The proposal is then that perfective events correspond to a *definite* assertion time/reference time in Asp, whereas imperfective events correspond to an *indefinite* assertion time.

Consider the ‘default’ denotation of the Asp head as given below, where *t* is simply picked as being some arbitrary moment within the time trace of the event. This essentially reduces to an ‘indefinite’ assertion of some time moment once the *t* becomes existentially quantified (48). But if there is some salient presupposed time moment in $\tau(e)$, then this information could provide a restriction on the quantification over times that ends up referentially linking *t* to a single unique moment. I will represent this presuppositional information as part of the restriction of the time variable here, to produce what is now essentially a partial function over time moments, and represents a definite assertion time (49).⁷

$$(48) \quad [[\text{Asp}]] = \lambda P \lambda t \exists e: [P(e) \ \& \ t \in \tau(e)]$$

Indefinite assertion time = *Imperfective Asp*

$$(49) \quad [[\text{Asp}]] = \lambda P \lambda t [\text{there is a single unique moment } t_{def} \text{ in the event that is salient}] \exists e: [P(e) \ \& \ t = t_{def} \in \tau(e)]$$

Definite assertion time = *Perfective Asp*

By making this claim, I am basically saying that AspP as the locus of the introduction of the *t* variable, has the same potential for definiteness/indefiniteness (presuppositional properties) as we find with individual

⁷Representing definiteness presuppositions as a partial function is a strategy that I carry over from Heim and Kratzer (1998).

variables in the DP.

This way of representing the difference between perfective and imperfective is still able to recoup the intuitions of the interval-based or viewpoint-based semantic traditions. First of all, the behaviour of these elements in narrative discourse falls out immediately: an imperfective Asp head will choose a time moment arbitrarily within the event projection in its complement and thus will end up entailing overlap between the imperfective event and the previous discourse reference time (the set of all possible choices of *t* is the analytic equivalent of the ‘open interval’ exploited in many treatments of imperfective semantics). A perfective Asp on the other hand will anchor only a specific moment to the previous narrative discourse time, giving the impression of sequentiality, or at least of discrete temporal relationships.

Consider next the interpretation of these forms in the past tense. It is incorrect to represent the imperfective past tense in Russian as somehow always being equivalent to a past habitual or to a past progressive interpretation. In fact, the data seem to be that the imperfective forms are probably the most varied and neutral in their possibilities. So, in addition to the progressive past, habitual past and generic past, but there are at least two other possibilities:

- (50) *General Factual/Present Perfect (PP)*
 Ya ne poydu v kafe. Ya uže yela
I not go.FUT.1SG^P in cafe. I already eat.PST.F.SG^I
 ‘I am not going to a cafe. I already ate.’

- (51) *Annulled Result*
 Kto zalezal na čerdak
Who climb.PST.M.SG^I on attic.ACC
 ‘Who climbed to the attic? (assumption is that they are not there any more)’

Basically, all of these readings can be understood if we analyse the [+past] feature in T as simply stating that the *t* introduced by Asp precedes the utterance time (UT-T). Given that the imperfective Asp head is indefinite, it is free to choose any time moment within the run time of the event to be the argument of this tense predicate. Thus, it could be an in-progress moment (past progressive) or a moment near the end (general factual/present perfect) that is said to precede the utterance time.

In addition, I will assume that there are higher ‘outer’ aspectual heads that can construct a number of derived event types based on the one constructed by the first phase. These include: a cumulative/habitual derived event and a generic situation/property. A time moment in one of these derived events is claimed to precede the UT-T to give the past habitual and past generic readings. I assume following Moens and Steedman (1988) that a culmination state (cf. similar also to the resultant state of Parsons 1990) and a preparatory state are also available under coercion, the cul-

mination state possibly being the source for the present perfect (resultant state) interpretations of imperfectives in the past.

The perfective past on the other hand, is much more definite about which time moment in the event is said to precede the event time. In the case of an event structure which contains R, the moment chosen is going to be that transition moment from the change taking place into the result state. It is this moment that must of necessity precede UT-T, giving the impression of the event's internal structure being inaccessible. However, if we consider (52) which is a minimal pair with (51), we can see that the interpretation contains an interesting inference.

- (52) *Result Reading*
- Kto zalez na čerdak
 Who climb.PST.M.SG^P on attic.ACC
 'Who climbed to the attic? (assumption is that they are still there)'

It is crucial here that it is not the event *as a whole* that is asserted to be before the utterance time, as most representations of the perfective would have it. Rather, it is the transition to the result subevent that has occurred in the past. The inference that the result subevent is still in existence is very strong for immediate past events, probably because of the salient difference with the imperfective past which carries no such implicature. An analysis of the perfective Asp head as asserting the R transition time as the anchor to tense, straightforwardly captures this difference in interpretational possibilities between the perfective and the imperfective which does not follow from other accounts.

The behaviour with respect to the present tense can also be understood in these terms. Let us assume that the present tense feature in T states that the t introduced by Asp is identical to the utterance time (UT). Given that imperfective Asp chooses any t it likes from within $\tau(e)$, an in progress interpretation is obviously possible. In addition, the present tense on imperfectives can also be used to give immediate (planning the future) interpretations and vivid past narrative interpretations, much like in English (E. Romanova, p.c.).

- (53) a. I fly to London tomorrow.
 b. He delivers the first ball of the over. The batsman defends cautiously.

These meanings are not special or unusual from the point of view of the analysis adopted here, but arise from the event being anchored by a moment in its initiational state or final moment of process respectively, as allowed by the imperfective aspectual setting for choosing t.⁸

⁸Habitual and generic interpretations are also possible in the present tense, and I assume these involve a higher functional head in the outer aspectual domain which

When we turn to the perfective forms in the present tense, however, we find that no in-progress reading is possible at all. It seems plausible that a definite transition moment cannot be asserted to be taking place at the utterance time, although equally it seems as if it would never be true (!). While tantalisingly similar effects seem to be found with English eventive verbs in the present tense, they are absent with Romance accomplishments in the present (i.e. they *can* get an ongoing reading). Given the availability of crosslinguistic variation here, I will analyse the situation as arising from a semantic/selectional property of the particular present tense morpheme/feature in Russian itself which obligatorily selects for an *indefinite* *t*. Notice that this kind of indefiniteness selection is already attested in the literature, albeit in a slightly different domain. The *there* construction in English requires a novel or non-presuppositional associate (54). The claim is that present tense in Russian, the utterance time UT-T requires a novel or non-presuppositional associate (55).

- (54) a. There is a man in the garden.
 b. *There is the man in the garden.
- (55) a. $T_{pres} \dots Asp_{[-def]} [vP]$
 b. * $T_{pres} \dots Asp_{[+def]} [vP]$

What of the interpretation that these forms do get? Given that the perfective head gives rise to a definite assertion time, the only way to embed it under a present tense head is to perform some sort of coercion that will create a derived but related event, which is free of the presuppositions that beset the definite one. The idea of coercion is present in de Swart (1996) and in Moens and Steedman (1988), possibly mediated by an outer aspectual head. The coerced related states that have the required indefiniteness property would be a ‘preparatory state’ (a la Moens and Steedman) or a ‘resultant state’ (culmination state in Moens and Steedman’s terms). I would argue that the future reading of these forms results from an indefinite time moment within the preparatory state being linked to the utterance. There is also a habitual past reading that is possible with perfective forms in the present tense, indicating perhaps the link to a subjectively oriented resultant state being the coerced form⁹. Note that the preparatory (giving rise to future for the event itself) and resultant state coercions give rise to subtly different readings from the ones available with the imperfective. In the imperfective, the futurate readings require explicit planning and indicate a much more immediate future, just as the vivid narrative past readings require some illusion of immediacy of the past as well. I take these readings to arise from the possibility of variable anchoring within the subevents al-

create a cumulative derived event based on the initial *vP* (these heads we saw were also possible in a past tense embedding).

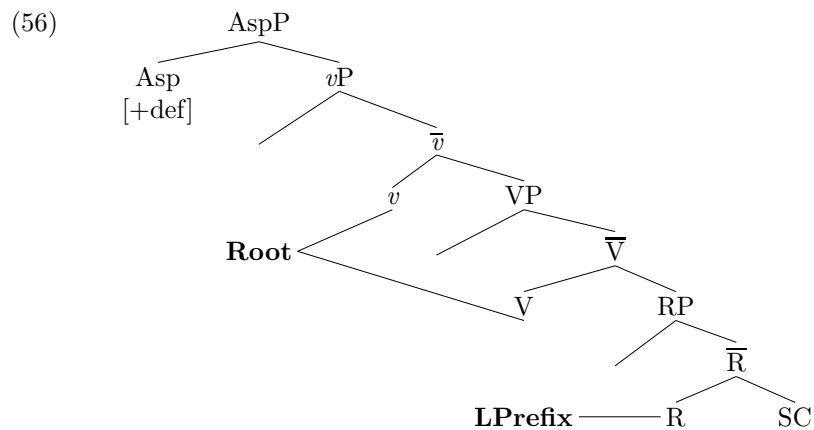
⁹For discussions concerning the possible readings of these forms, I am indebted to E. Romanova.

ready present in the first phase syntax. In the perfective no such inferences are present, the coerced indefinite events have to be derived second hand via contextual information and are not necessarily temporally integrated with the first phase event. A more formal analysis of the truth conditions of these forms is beyond the scope of the present paper, but it is sufficient for our purposes to note that the existence of a definite versus indefinite time moment in Asp gives us two natural classes of interpretation type, and that this distinction is independent of the internal details of the first phase syntax (as will become increasingly clear in the following sections).

A word needs to be said now about the other tests—the ability to form participials and to be the complement of phasal verbs. While I do not presently have a formally worked out analysis of the interaction, it seems clear that the distinction proposed above can be used to make sense of these facts as well. Briefly, I would argue that phasal verbs, being themselves verbal forms that impose a specific temporal transition time, also select for complements with a non-presuppositional time structure (indefinite/imperfective AspP). The possibility of present participial formation could be given the same analysis, under the assumption that the present tense meaning (which has this property) is a necessary component of it, and that participial word formation is too local to allow for the existence of coercive outer aspectual heads.

5.1. The Lexicals

The lexical prefixes appear low down in the predicational structure to allow the lexical specification of a subordinate Result Phrase in the first phase syntax. However, in doing so, they have a particular effect on the temporal properties of the subsequent structure. I will assume that the existence of this lexically specified transition, introduces presuppositional structure to the aspectual head, to the effect that it creates a definite rather than an indefinite time moment in Asp.



- (57) $[[\text{Asp}]] = \lambda P \lambda t[\text{there is a unique moment } t_{def} \text{ in the event that occurs at the onset of the R-state's run time}] \exists e: [P(e) \ \& \ t = t_{def} \in \tau(e)]$

As we have seen, the equivalent of inner aspect or telicity under this view is the existence of a definite time moment in Asp. In the case of the lexical prefixes, we have a structure that has both a first phase syntax RP and also a definite assertion time which is related to it in a fairly direct way. Cases like these, which are not uncommon, are potential sources of confusion, however. Consider the ‘in an hour’ test which is commonly used as a test for ‘telicity.’ Based on the Russian evidence, I would like to argue that ‘in an hour’ actually measures the temporal distance between subevents in a predicational structure, and that subevental transitions are crucial to its operation not the mere existence of a definite time moment. The ‘eventive’ analysis of ‘in an hour’ has been independently argued for by Pustejovsky (1991). I repeat the successful ‘in an hour’ test for the lexical prefix as (58) here.

- (58) Samoljot pere-letel granicu za čas.
plane across-flew border in hour
 ‘The plane flew across the border in an hour.’

It is not clear from the success of the test whether definite temporal bound, quantizedness, or measure to a subevental transition is the crucial point, since they all coexist for structures like this. Correspondingly, the ‘for an hour’ test is bad, indicating either a dislike for definite temporal moment (lack of homogeneity) or a dislike of the existence of a result subevent.

We will see that as we consider the more complicated Russian prefixes and other inflectional forms, these notions are logically separable, so we need to look at those cases to establish what is really going on.

5.2. The Superlexicals

The idea behind the unified perfectivising impact of all of the prefixes despite their different event structure properties is that there are potentially many different ways of imposing a definite t in Asp. We have seen how it is done with presuppositions induced by the event structure as is the case with lexical prefixes. But the idea here is that the prefixes can over time become grammaticalised to assert a definite Asp time directly, and occur directly in Asp, or possibly some higher functional projection.

Choosing a definite time moment leaves a lot of options, limited only by the lexically specific kinds of information carried by each relevant prefix. A time moment can be chosen to specifically pick out the initial transition of a complex event structure (inceptive *za*), it can pick out a final transition of a complex event structure that already has an R (but which doesn’t have any presuppositional lexical content associated with it), or it can choose some

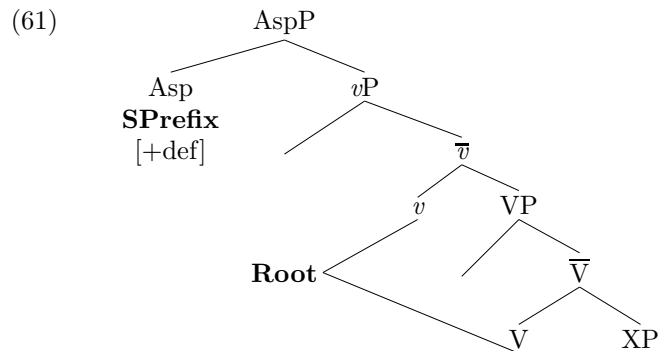
arbitrary moment within the run-time, as picked out by a certain kind of measure (delimitatives, and measure prefixes).

Taking inceptive *za-* and delimitative *po-* as examples, it seems as if they have a productive and regular semantics along the following lines, adding information about the constraints on the reference time variable, singling out a specific point with specific properties. In the case of *za* the time moment t_V is picked out, the one which corresponds to the transition from the initial state to the dynamic event.

$$(59) \quad [[za]] = \lambda P \lambda t[\text{there is a unique moment } t_{def} \text{ in the event that occurs at the onset of the V-process run time}] \exists e:[P(e) \ \& \ t = t_{def} \in \tau(e)]$$

In the case of *po-*, a temporal bound is asserted to exist after a short run time for the event.

$$(60) \quad [[po]] = \lambda P \lambda t[\text{there is a unique moment } t_{def} \text{ in the event that occurs at the end of the V-process run time, and that run-time is pretty short}] \exists e:[P(e) \ \& \ t = t_{def} \in \tau(e)]$$



It is important for this analysis that the superlexical/procedural prefixes actually *impose* a specific reference time on the relation between event and temporal anchoring: the information they impose is not given or implied by the inherent semantics of the root, nor is it dependent on any result state being present.

It is also important for the purposes of these examples to see that the temporal point imposed by the aspectual heads does not require a result phrase in the first phase syntax, so that no event transition is actually going to be asserted. Similarly, the case of *za* shows us that the definite temporal moment chosen can actually be an inceptive one, not a telic one at all. These two prefixes therefore allow us to tease apart the event notions from the temporal notions in a way that was not possible with the lexical prefixes. Let us consider the ‘in an hour’ test again for these predicates.

- (62) *Kompjuter za-rabotal za čas/*čas.*
computer za-worked in hour/hour
 ‘It took one hour for the computer to work’ (Borik 2002)
- (63) *Petja po-iskal knigu polčasa/*za polčasa.*
Peter po-looked book half.hour/in half.hour
 ‘Peter looked for a book for half an hour.’

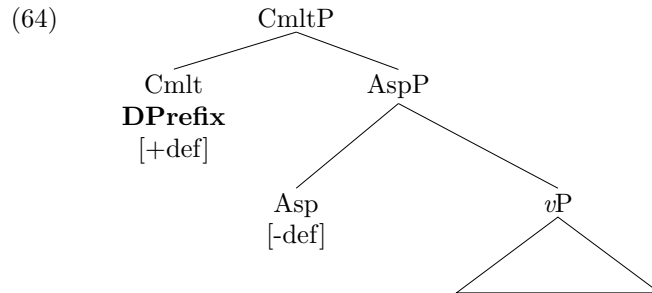
The test works after a fashion with *za-* inceptives, but rather than measuring the run time of the event, it measures the time between the onset of the initiational subevent to the onset of the V process. For the *po-* verbs, there is no subevental structure, the event is internally homogenous according to the first phase syntax and the ‘in an hour’ PP is ungrammatical, despite the existence of a definite time moment at the end of the event, as diagnosed by the perfectivity diagnostics. To make a connection to terminology already present in the literature, the result subevental transition might be considered a ‘set terminal point’ because it is determined by the information within the first phase, but the definite time moment introduced by *po-* is only a ‘terminal point’ in the sense of Krifka (1989).

A related point can be made with regard to the interpretation of the objects in superlexical constructions. Since there is no predictable event structure configuration that they always co-occur with (each superlexical being possibly slightly different), the issue of whether or not the direct object is specific and/or individuated as being the ‘subject’ of a predicational structure, is not affected by their existence. Thus we find that there is no uniformity in the behaviour of objects with respect to specificity in the superlexical class, whereas there is with the lexical class.¹⁰

There is one further class of superlexical prefix that should be briefly considered here. These are the prefixes of the explicitly distributive type, such as *pere-* and distributive *po-*. Analogous to definiteness of *t* as located in Asp, there is some evidence for a cumulative operator over verbal projections which creates distributive and iterative and possibly also habitual readings. This head, analogous to a kind of outer plural within the DP (cf. Kratzer 2004) is hierarchically superior to the inner aspectual Asp head. The superlexical prefixes that require distributivity are those that exist in this higher head, creating a derived complex cumulative event via the plural object, and imposing a definite assertion time on *that*. I assume that in such cases, the superlexical can attach directly to the imperfective root (or even a derived imperfective— see the next section) and that the cumulation

¹⁰This is not to say that interpretational effects on the object position cannot be found, as entailments following from the prefixal semantics. When a prefix imposes a time boundary on an event that has an undergoer or a path, the nominal in that position will be interpreted as used up to the degree imposed by the lexical semantics of the aspectual modifier. The superlexical prefix bounds the event directly, and only indirectly seems to have a quantificational effect on the object. Whether the object suffers quantificational effects or not will depend on whether it is in path position, or if it is an undergoer of the creation/consumption type.

head is projected to check the distributive features on a plural object.



While the semantics of distributivity is beyond the scope of this paper, I give a schematic representation of its denotation here. The important points are that it introduce a derived event which is in some sense a cumulation of the original one, and that it impose a definite temporal bound at the end of the run time of *that* event.

(65) $[[\text{pere}]] = \lambda P \lambda t [\text{there is a unique moment } t_{def} \text{ in the event that occurs at the end of the V-process run time}] \exists e' [\text{Cmlt}(e', \hat{P}(e)) \ \& \ t = t_{def} \in \tau(e')]$

The external positioning of the superlexical prefixes is what distinguishes them from the lexical one. I assume that the regular semantics that can be associated in a productive way with these prefixes is due to their position outside of the ‘first phase,’ and that they will not have as many of the purely idiosyncratic and selectional restrictions we see between root and prefix in the lexical prefixes category.¹¹

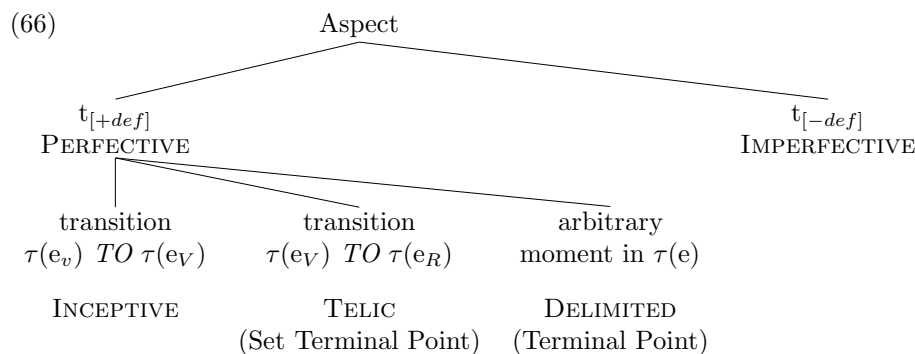
¹¹There is a third class of verb forms which does not seem to fall straightforwardly into the two different groups discussed above, at least in the traditional classifications. These are the purely perfectivising prefixes. They are distinguished by the fact that they do not affect the argument structure, but neither do they seem to add anything obviously identifiable to the verb phrase meaning other than pure terminativity. Some examples are given below.

- (i) pit'/vy-pit' drink^I/drink^P
 stroit'/po-stroit' build^I/build^P
 čitat'/pro-čitat' read^I/read^P

I will assume that these are also, in most cases, a subspecies of the superlexical class, and that they are generated in the inner aspectual head position outside the first phase, and that they simply impose a final temporal bound to the event, similar to *po-* given above, but with no necessary implication of a short run time, and with more of a sense of a contextually natural end to the event. The semantics of this perfective head in Asp is thus fairly bleached and abstract. The reasons for not assimilating this class to the lexical prefixes are that they do not change the argument structure properties or add secondary predication to the root, and also that they resist the morphology of secondary imperfectivisation, which is never true of the lexical prefixes but true for many superlexicals.

Forsyth (1970) points out that the verbs that form perfectives that seem to be ‘purely

To summarise, lexical prefixes have been distinguished from the superlexicals in that they create extra predicational structure in the first phase syntax. Because of this, they are sensitive to certain event structure level diagnostics and properties. They also end up inducing the semantics of definiteness on the aspectual head that introduces the time variable in the inner aspectual position just outside the first phase. The superlexicals are like the lexicals in that they give rise to definiteness of the reference time, but they do so by directly sitting in the inner aspectual position and imposing a temporal bound according to their lexical semantics. Thus, they will behave like lexically prefixed verbs with respect to perfectivity diagnostics that are sensitive to reference time definiteness, but they will behave differently from lexical prefixes if the diagnostic requires subevental complexity.



6. Morphosyntax: Secondary Imperfective and Hierarchical Order and Scope

One thing that has not yet been touched on in this paper is the secondary imperfective, which has an important set of cooccurrence restrictions with the prefixes of various types. In order to make sense of this, I first need to make a proposal about the semantics of this suffixal form and its position in the tree.

As is well known, the secondary imperfective is not as restricted in its interpretation as the English progressive, but can give rise to a wide variety of meanings in addition to ongoing action e.g. habitual and iterative interpretations. It is also clear that the imperfective itself does not modify the meaning of the lexical root or change its participant relations. It must therefore be situated in a position outside of the first phase *vP*.

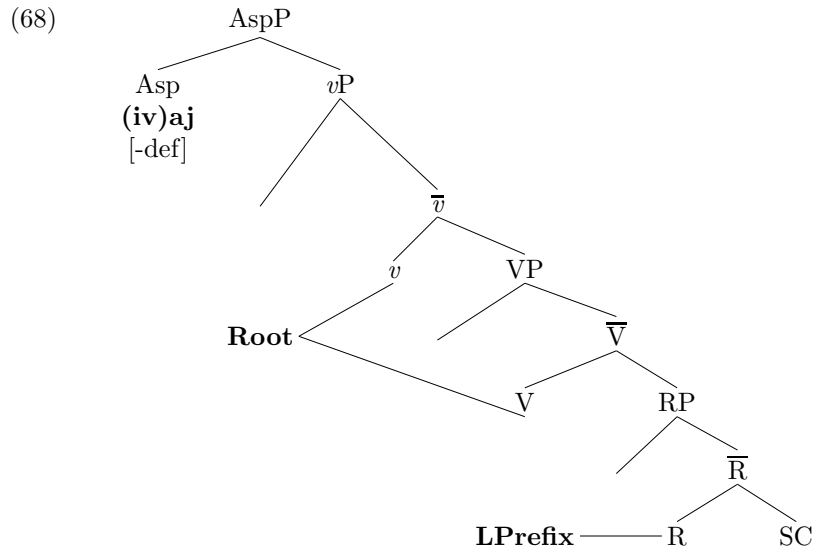
perfectivising' in this way are either incremental activities ('eat,' 'burn,' 'turn red,' 'grow') or states of mind and emotional attitudes ('express,' 'doubt,' 'engage in,' 'fear,' 'believe') (pp. 51-52). Neither of these classes of verb have the possibility of locational result states, and the latter class probably doesn't even have a dynamic portion at all. It seems reasonable that in these cases, the prefix in question is not an R head introducing an extra participant dimension, but an Asp head outside the first phase *vP* stipulating a definite terminus.

I will therefore take the most conservative position and assume that the secondary imperfective is actually a specific instantiation of the Asp head that we have seen already, which implements the connection between the event and the reference time. However, it does so in a way that is much more complex than the default indefinite Asp head we have seen before that gives rise to imperfectivity. The secondary imperfective actually combines with a *v*P which already contains lexical prefixes which by hypothesis trigger the definite assertion time. Therefore, the secondary imperfective will have to take an event with presupposed time moments and somehow magic them away, or at least prevent them from being chosen as the reference time. Informally, it does this by introducing an ancillary event *e'* which is related in some salient way to the event described by the *v*P it combines with. This ancillary event now has a time trace which is free of the presuppositions associated with $\tau(e)$ and the *t* variable is indefinite once more.

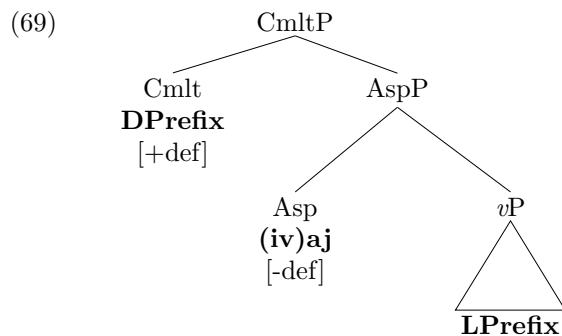
$$(67) \quad [[(iv)_{aj}]] = \lambda P \lambda t \exists e' [\text{Char}(e', \hat{P}(e)) \ \& \ t \in \tau(e')]$$

The predicate ‘Char’ is shorthand for ‘is characterised by.’ The formula says that the new event *e'* is characterised by the properties associated with being an event of the *P* variety. This way, *e* is not necessarily instantiated (it has been intensionalised), but the related event *e'* is, and it is the latter’s time trace that will be anchored to tense. The relation ‘Char’ is kept deliberately vague because depending on context and the nature of the *v*P, either an in-progress state (in the sense of Parsons 1990), an iterated event, or a superevent consisting of habitual repetitions of *e*, can be chosen as the *e'*. It may in fact be that there are different possible levels for generating the secondary imperfective, with the habitual and generic interpretations located higher up in the head of *CmltP*.

With this interpretation in place, we can make sense of some of the cooccurrence restrictions we find with prefixes. This subject has been treated in detail from a morphosyntactic point of view in Svenonius (2004) and related presentations, and can be reported here. Svenonius also assumes different base positions for the lexical and superlexical prefixes with the former being low and the latter higher up in the structure. The lexical prefixes uniformly allow secondary imperfective suffixal morphology to create a derived imperfective. This is unproblematic under the view argued for here as well: any prefix generated in *R* (or moved there) will have no problem combining with the secondary imperfective—the one is part of the construction of a result phrase, the higher imperfective head nullifies that by creating a secondary event *e'* which does not necessarily have a result, and so it induces an indefinite assertion time.



However, an important distributional difference emerges with the superlexicals. The facts seem to be that many superlexical prefixes resist secondary imperfectivisation, although it is not clear how exceptionless this is, and seems to depend on the precise superlexical meaning involved (cf. Romanova 2004b). The system I have been developing so far makes some predictions with respect to cooccurrence restrictions which at least go in the right direction. First of all, any superlexical that actually sits in Asp is going to be incompatible with the secondary imperfective, since they are definite and indefinite versions of the same head, competing for the same slot. On the other hand, if the superlexical in question is one of the high D-prefixes which actually is generated in a more external cumulative head, then we would expect such a prefix to be compatible with the secondary imperfective sitting in Asp. Under these circumstances, we predict that the scopal order of the affixes would be as shown below, with DPrefix > Secondary Imperfective > LPrefix, and the resulting form being perfective.



The prediction is borne out: when a lexical prefix and a superlexical cooccur with the secondary imperfective suffix, the resulting word behaves like a perfective, i.e. the scoping is as in (70) (from Svenonius 2003b).

$$(70) \quad [\text{superlexical}-[[\text{lexical}-[\text{V}-v]^I]^P \text{-imperfective }]^I]^P$$

If the speculations in this section prove to be on the right track, and if the secondary imperfective has a high attachment site just like the superlexicals do in CmltP, then we would predict the possibility of an inner aspect superlexical like inceptive *za-* or delimitative *po-* to cooccur with a high secondary imperfective suffix to give an imperfective form (we would further predict the imperfective form to be non-progressive, but only habitual/iterative or generic). I am aware that forms can be found with inceptive *za-* and delimitative *po-* which occur with the secondary imperfective to create a derived imperfective form, so in that sense the prediction seems to be wellfounded, but must wait further investigation.

Thus, the phase difference argued to underlie the lexical versus superlexical distinction is corroborated by morphosyntactic evidence as well: while lexical prefixes are compatible with the ‘outer aspect’ secondary imperfective suffix, the superlexicals are not; in cases of prefix doubling, the superlexical is morphologically more peripheral and takes scope over the lexical.

Note that these arguments are fundamentally semantic, scopal and syntactic in nature. I have made no claims about the way that the morphology of prefixation and suffixation combine in the linearisation of a tree of this complexity (but see Svenonius 2004 for a view on the matter). Reassuringly, though, when two prefixes stack in Russian, the superlexical variety is always more peripheral to the root than the lexical, in addition to taking wider scope.

7. Conclusion

On this evidence, the aspectual composition of a natural language sentence proceeds in phases, where the formal variables at each level are different. What is usually understood as aspectual composition actually involves both event structure notions as well as temporal notions in a hierarchical (embedding) relationship.

I have argued that the first phase syntax where subevents are built up topologically into more complex ones via causational relations is distinct from the second phase where temporal variables are introduced. The case of Russian prefixation has been instructive: the different levels of structure at which the prefixes attach have different semantic effects and therefore perform differently with respect to the traditional diagnostics. While both classes of prefix can be said to induce perfectivity (here analysed as a definite assertion/event time) only one class of prefix (the lexicals) actually creates a result subevent. The notion of ‘telicity’ turns out to be a *subcase*

of the inner aspectual definite Asp head—the subcase where the definite moment asserted corresponds to a result transition.

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