Information structure and aspectual competition

Atle Grønn
University of Oslo

The imperfective aspect in Russian competes with the perfective in referring to events whose existence is entailed by the input context. In the first, major part of the paper (sections 1-5) I take a global view on aspectual competition, which is analyzed in light of various pragmatic constraints. It is shown in a bidirectional optimization how the default/unmarked imperfective in the appropriate context gets a presuppositional interpretation. Then, in the second part of the paper, I turn to the issue of how this presuppositional reading can be accounted for locally (compositionally) at the syntax-semantics interface, without assuming a proliferation of imperfective operators.

1 Aspectual Competition

One of the main puzzles of the aspectual system in Russian is the fact that the unmarked imperfective aspect (Ipf) is compatible with complete event interpretations – known in Slavic linguistics as the 'factual Ipf' (Grønn 2004) – despite the strong competition from the perfective (Pf), which represents a grammaticalization of this aspectual configuration.

A standard, compositional DRT-analysis of aspectual operators gives us the following semantics for both the Pf and the factual Ipf:

- Pf (and the factual Ipf) $\Rightarrow \lambda P \lambda t[e \,|\, P(e), e \subseteq t]$

Aspects convert predicates of events into predicates of times, and here they convey the information that the event e described by the VP is included in the assertion time t.[1] An example is given below:

(1)   A: Krasivo **ukrasili**^{pf} elku.
       B: Kto **ukrašal**^{ipf}?

       A: They **decorated** the Christmas tree beautifully.
       B: Who **decorated** it?

But why does speaker A choose the Pf, while speaker B prefers the Ipf in referring to the same complete event of decorating the Christmas tree? The aspectual pattern in discourse (1) appears to display synonymy (from the hearer's interpretation perspective) and optionality (from the speaker's production perspective) – not a very attractive situation from the linguist's perspective. In order to appreciate the problem and locate it in the global picture of Russian aspect, I propose to have a look at Blutner's bidirectional optimality theory (BOT), which has shed light and formal precision on various phenomena at the semantics-pragmatics interface.

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[1] The value of the Reichenbachian assertion time t is provided by the 'tense branch' above aspect, which contains tenses and temporal adverbials.

2 Blocking of the factual Ipf in BOT

What are the relevant form-meaning pairs? We need only consider two forms, F = {Pf, Ipf}, and I assume the following inventory of M, a set of partial state descriptions which for convenience are represented as the familiar aspectual configurations: $\{e \subseteq t, t \subseteq e\}$. This is to say that the interpretation of the aspects is reduced to two opposite inclusion relations – a complete event interpretation $e \subseteq t$ and the incomplete/processual/progressive event interpretation $t \subseteq e$. According to the standard view on Russian aspect, the Pf grammatically encodes the complete event configuration, while the meaning of the Ipf is underspecified and compatible with both inclusion relations above. This gives us the following set of form-meaning pairs, generated by the OT-function GEN:

- GEN = F × M – {<Pf, $t \subseteq e$ >}

Another crucial feature of OT is the use of ranked and violable constraints. In the bidirectional version adopted in this paper focus is on Economy – the mother of all pragmatic constraints – which will be interpreted in terms of *conditional informativity* (Blutner 1998).[2] This allows for a formally precise implementation of the Gricean idea that the best form-meaning pairs are the ones which minimize both the speaker's and hearer's effort (whose interests are, in a sense, conflicting). The competition perspective tells us that a pair $< f, m >$ wins the contest if it is less costly '<', i.e. more economic, than the alternative candidates. When the probability of meaning m given the form f is 1, the 'surprise' value of $< f, m >$ equals zero – and this pair is most economic. At the opposite end of the scale, if the probability of m given f is zero, then the surprise that $< f, m >$ holds is infinitely high, and the pair is ruled out.

The more interesting cases are the ones in between these two extremities. Being semantically underspecified, the form Ipf participates in such pairs. Accordingly, a straightforward application of (strong) bidirectionality can show us why the processual/progressive reading is considered the Hauptbedeutung of the Ipf, cf. tableau [0.1].[3]

inf(m/f)	Pf	Ipf
$e \subseteq t$	$\Rightarrow 0$	1
$t \subseteq e$	∞	$\Rightarrow 1$

Table 0.1: A bidirectional OT-tableau for Russian aspect

The underspecified semantics of the Ipf is equally compatible with both inclusion relations, but the complete event interpretation is blocked by the strongly optimal pair <Pf, $e \subseteq t$ >. It is difficult to see how the pair <Ipf, $e \subseteq t$ > can survive in this system. And, indeed, I will claim that the following theorem comes out in (strong/weak) BOT:

[2] See also Sæbø's contribution to this volume.

[3] The OT-tableau is based on the assumption that complete and incomplete event interpretations are equally probable for Ipf. The numbers in the tableau then follow from the function *inf*, which is inversely related to probability: $inf(\text{m/f}) = \frac{1}{\text{Prob(m/f)}} - 1$. In OT-pragmatics, for instance in the original paper (Blutner 1998) and several recent papers by Sæbø, the authors make use of a similar graph obtained from a logarithmic function which exhibits certain additional mathematical properties. For the purposes of formalization of natural language pragmatics, the simpler function above appears to be good enough.

- **Theorem 1**

  A complete event interpretation $e \subseteq t$ is not available for the Ipf whenever a progressive/processual interpretation $t \subseteq e$ is possible.

3   An illustration of blocking

The generalization stated in theorem 1 explains a puzzle raised by examples like the following:

(2)   Kogda pozvonil^{pf} Boris Georgievič, my s Iroj **gotovili**^{ipf} dokumenty.

Ira and I **were preparing** (*not available reading:* had prepared) the documents.

   Given a standard analysis of the temporal system in Russian (Grønn to appear), temporal 'kogda/when'-clauses are expected to be compatible with two interpretations of an imperfective past in the main clause: a simple past or a relative past. In our case, the simple past would correspond to a progressive interpretation of the event e of preparing the documents – 'the past time interval of B.G.'s calling $\subseteq e$' – while a relative past would produce the following interpretation of the utterance: '$e \subseteq$ the whole past of B.G.'s calling'. Thus, the value of the assertion time t provided by the 'kogda/when'-clause is underspecified, which in turn creates an ambiguity in the aspectual relation. However, the OT-argument correctly predicts that the progressive interpretation is the only one available, $<$Ipf, $t \subseteq e >$ being the winner. Hence, in order to express a relative past reading with a complete event interpretation in constructions like (2), the Pf must be used. Previous accounts, notably (Paslawska & von Stechow 2003), got the description of the facts right, but failed to explain the restrictions on the use of the Ipf in this environment.

4   The return of the factual Ipf

In light of the considerations above, one still wonders why the factual Ipf is acceptable in (1) – and also in (3) and (4) below.

(3)   Vanja **čital**^{ipf} 'Vojnu i mir'.

   Vanja **has read** 'War and Peace'.

(4)   V ėtoj porternoj ja **napisal**^{pf} pervoe ljubovnoe pis'mo. **Pisal**^{ipf} [karandašom]$_F$.

   In this tavern, I **wrote** my first love letter. I **wrote** it [in pencil]$_F$.

   The reason why tableau [0.1] in section 2 fails to capture aspectual competition and the emergence of the factual Ipf is the lack of context sensitivity. I propose to repair this by incorporating the speaker and hearer's common ground (CG) into the OT-reasoning, thereby adding a third dimension to the two-dimensional BOT-architecture.

   In this paper, I will only consider the kind of aspectual competition which is illustrated in (1) and (4) – the most simple case from the point of view of modeling CG. In previous work, I referred to this usage of the factual Ipf as the "presuppositional Ipf". It is characterized by a deaccentuated verb, representing given/backgrounded material, while focus is on some other constituent, as indicated through the F(ocus)-marking in (4). Following the DRT-treatment of presuppositions as anaphora (van der Sandt 1992), presuppositional Ipf can (and should) be analyzed as an instance of event anaphora.

Obviously, the two viewpoint operators are equally informative in the input context for the second utterance in (4). In order to decide between the two competitors, an additional parameter is needed. In OT, a distinction is often drawn between informational and structural markedness. The latter is incorporated into the definition of conditional informativity in (Blutner 1998) through a function called "complexity of form". However, if this structural constraint merely amounts to counting the number of syllables, it cannot be used to separate the Ipf from the Pf. In Russian, imperfective verbs come in two variants: simplex verbs (e.g. 'pisal' in (4)) and derived, secondary imperfectives (e.g. 'ukrašal' in (1)), with the following ranking in terms of complexity: Simplex Ipf < Pf < Secondary Ipf. Despite these structural differences, secondary imperfectives are perceived of as just as "unmarked" as the simplex verbs, being used in exactly the same environments.

In this respect, one should bear in mind the fact that every verb in Russian is obligatorily marked for aspect, even when the issue of aspectual competition or opposition is not on the speaker's agenda (e.g. with statives, in present tense etc.). Importantly, the Ipf is used as the *default form* in these cases. Accordingly, I propose to include in the definition of conditional informativity a "tie-break" function *defaultness*, which penalizes the Pf for being a non-default by mapping the Pf to 0.1 and the Ipf to 0. Thus, everything else being equal, the Ipf is the winner, minimizing the speaker's effort.

- **Conditional informativity:**
  $inf(\mathrm{m/f}) =^{def} \mathrm{defaultness}(\mathrm{f}) + (\frac{1}{\mathrm{Prob(m/f)}} - 1)$

The preference for the Ipf in examples such as (1) and (4) is thereby based on the BOT-tableau [0.2], where CG entails the complete event in question.[4]

$inf(\mathrm{m/f})$; CG $\models e \subseteq t$	Pf	Ipf
$e \subseteq t$	0.1	$\Rightarrow 0$
$t \subseteq e$	∞	∞

Table 0.2: A context-sensitive OT-tableau for Russian aspect with the 'presuppositional Ipf' as the winner

5 Division of labor: presuppositional Ipf vs. assertoric Pf

Indeed, intuitively, there is no reason for marking the event as completed through the Pf when this feature is inferable from the context. But in what sense is the Ipf a true "presupposition trigger"? My claim is that the presuppositional status accorded to the Ipf follows from two independent principles: the defaultness of the Ipf and a soft OT-constraint such as DOAP ("Don't Overlook Anaphoric Possibilities.").[5] Hence, although there is nothing inherently "presuppositional" about the Ipf, it acquires – in the right context – this additional reading.

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[4] The constraint on consistency with the input context could also be treated as part of GEN itself (Blutner & Zeevat 2004), in which case GEN equals {<Pf, $e \subseteq t$ >, <Ipf, $e \subseteq t$ >}. Consistency cannot be outranked by Economy in the same way as Gricean quality maxims are a prerequisite for the quantity maxims.

[5] Due to the close relationship between presuppositions and anaphora (van der Sandt 1992), the relevant constraint could presumably also be formulated as "Maximize presuppositions".

Due to a general tendency of polarization, the division of pragmatic labor ensures that the Pf is associated with assertoric content. In actual language use, speakers are often redundant, and we should not be too surprised to find the Pf in contexts where an eventive presupposition is licensed. Russian-speaking informants will often accept to substitute the Pf for the presuppositional Ipf, e.g. the alternative 'ukrasil^{pf}' is not completely excluded in speaker B's utterance in discourse (1). But by choosing the Pf in this environment, the speaker ignores DOAP and should be penalized by a 'bad rating', i.e. a high number in terms of conditional informativity. In the current framework, the "softness" of DOAP is translated into a numerical value: It is expected with a probability of, say, 0.75 that the speaker seizes opportunities to anaphorize or, equivalently, marks information entailed by CG as a presupposition, while a less likely strategy (probability of 0.25) would be to reassert the same information.

The division of labor between the two aspects can now be derived in a principled way in *weak* BOT, cf. tableau [0.3].

$inf(\text{m/f})$; CG $\models e \subseteq t$	Ipf	Pf
$e \subseteq t$ (in presupposition)	$\Rightarrow \frac{1}{0.75} - 1 = 0.33$	$0.1 + (\frac{1}{0.75} - 1) = 0.43$
$e \subseteq t$ (in assertion)	$\frac{1}{0.25} - 1 = 3$	$\Rightarrow 0.1 + (\frac{1}{0.25} - 1) = 3.1$

Table 0.3: A weak bidirectional OT-tableau (consistency with CG; probability distribution according to DOAP)

A strong version of BOT would block the pair <Pf, $e \subseteq t$ (in assertion)> in contexts like (1) and (4) since it loses the competition both from the production perspective ($3 < 3.1$) and interpretation perspective ($0.43 < 3.1$). Importantly, however, in *weak* bidirectional optimization the two dimensions of optimization are mutually related. This means that the last two form-meaning pairs are removed from competition by the pair <Ipf, $e \subseteq t$ (in presupposition)>, since $0.33 < 3$ and $0.33 < 0.43$, and are therefore not able to block the Pf from appearing with an assertoric meaning. This result can also be obtained in weak BOT by a more traditional treatment of markedness and economy constraints (including "DOAP").

To conclude this section: Neither of the two aspects starts out as "presuppositional" or "assertoric", but weak BOT accounts for the emerging polarization whereby the factual Ipf gets its presuppositional reading. Furthermore, the division of labor allows for the speaker to reintroduce the event at the assertoric level through a perfective verb, even if the conditions hold which would allow a presupposition to be satisfied.

6 From the viewpoint of compositional semantics

A global explanation has been given for why the factual Ipf can be used in (1) and (4) – and, to a certain extent, be interchangeable with the Pf. Unlike the Pf, the factual Ipf shows signs of being a "presupposition trigger" of the anaphoric kind, whose "primary function is to collect old and given material from the context in order to say new things about it" (Zeevat 1999: 70). For instance, in (4), the speaker adds the new information that the given writing event was performed with a pencil.

In the words of Blutner (1998: 32), "economy principles are crucially involved in determining how non-representational parameters control the selection and suppression of representations", but so far we have by and large ignored the question of how the Ipf should be represented at the syntax-semantics interface.

In light of examples such as (1) and (4), it is tempting to propose the following revised semantics for the factual Ipf, where the subscript notation encodes the presuppositional part of a complex DRS:

- Factual Ipf (preliminary version) $\Rightarrow \lambda P \lambda t[\,|\,P(e)]_{[e\,|\,e\,\subseteq\,t]}$

The above representation invites a proliferation of imperfective operators. It covers examples like (1) and (4), but does not extend to cases like (3). The point is that complete event interpretations of the Ipf in *absence* of an appropriate eventive discourse referent in the input context cannot be saved by accommodation. The factual Ipf is not accommodatable, due to the following theorem by Blutner and Zeevat.[6]

- **Theorem 2:**
  If a trigger context has simple non-triggering expression alternatives with the same meaning, it does not accommodate.

The "presupposition" of the factual Ipf is never accommodated, since the simple non-presuppositional/assertoric Pf is always an available alternative expression. "The simplicity of the alternative expressions guarantees that they are considered in the optimality contest [...] If the context lacks a suitable antecedent and non-presupposing means of expression are available, the principle forces us to choose those means of expression rather than the presupposing ones, which would force an accommodation" (Zeevat 1999: 77). The reason for avoiding accommodation (cf. the OT-constraint "Do Not Accommodate!") again involves considerations of efficiency/economy: Using a simple assertoric alternative is always a more efficient strategy than relegating the same content to presupposition accommodation, cf. (Zeevat 1999: 74).

So, after all, the factual Ipf is not a pure presupposition trigger. Below, I will propose a unified semantics for the factual Ipf, which incorporates the empirical observation that the factual Ipf is compatible with both event anaphora and event assertion. In this paper, I will not discuss the issue of what a unified (and underspecified) semantics for the Ipf *tout court* should look like (Sonnenhauser 2005). The treatment of the factual Ipf proposed here suggests that this operator is distinct from a progressive/processual operator (and an habitual-iterative operator).[7]

7 A function defined over different cases

The factual Ipf locates a complete event into the assertion time either by linking it anaphorically to a given event or by introducing the event.[8] Which of the two options actually obtains is derived from the focus-background structure of the underlying VP according to a special principle introduced below. The idea is to ensure that the Ipf operates on the background if the latter is non-empty. Otherwise it operates on the focus.

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[6] Theorem 2 is referred to as 'Blutner's theorem' in (Zeevat 1999) and as 'Zeevat's theorem' in (Blutner 2000).

[7] But see (Grønn 2004) for an alternative implementation of the ideas presented below. In my previous work, I accorded a vague semantics of temporal overlap – $e \bigcirc t$ – to the imperfective operator, the idea being that this most general topological relation is subject to pragmatic strengthening such that in a particular context the interpretation turns into one of the more specific inclusion relations.

[8] I thank Kjell Johan Sæbø for his valuable comments on earlier versions of the analysis presented in this section. See (Grønn 2005) for a more detailed exposition.

Thus, the information structure of the input determines whether the factual Ipf has a presuppositional or an assertive interpretation.

I represent the VP being input to an aspectual operator as an ordered pair $<$B(ackground), F(ocus)$>$ along the lines of the structured meaning approach. In accordance with neo-Davidsonian event semantics, the main event is decomposed into several event predicates:

- $< \lambda e[\,|\,\mathrm{write}(e)], \lambda e[x\,|\,\mathrm{Instrument}(e,x), \mathrm{pencil}(x)] >$ [cf. example (4)]

The background part is considered to contain presupposed material, and the $<$B,F$>$-partition is therefore transformed into a complex DRS as follows, where the subscript DRS represents the presupposed/given material:

- $\lambda e[x\,|\,\mathrm{Instrument}(e,x), \mathrm{pencil}(x)]_{[\,|\,\mathrm{write}(e)]}$

This complex DRS is input to the Ipf-operator in (4). Since a $<$B,F$>$ structure is formed already at the VP-level, we can maintain a uniformed treatment of different aspectual operators, which all have the same logical type and convert predicates of events into predicates of times.

The factual Ipf is now treated as a function defined over different cases:

- $\mathrm{Ipf}_{factual}$ (final version) $\Rightarrow \lambda P \lambda t[\mathbf{e}\,|\,P(e), \mathbf{e} \subseteq \mathbf{t}]$

Note the use of *bold face* discourse referents and conditions, which only occur in the translation of the operator and disappear at the next stage of the derivation, according to the following principle:

- **The bold face convention**
  Bold face discourse referents $\mathbf{x} \in \mathrm{U}_{Fun}$ and conditions $\mathbf{Con} \in \mathrm{Con}_{Fun}$ occurring in the translation of an operator $Fun_{<\mathrm{a,b}>}$, are 'rewritten' in the process of applying Fun to an argument $Arg_{<\mathrm{a}>}$. In the resulting DRS $K_{<\mathrm{b}>}$,
  (i) if K's presupposition part P is empty, $\mathbf{x}$ and $\mathbf{Con}$ are rewritten as $x \in \mathrm{U}_K$ and $Con \in \mathrm{Con}_K$, respectively.
  (ii) if K's presupposition part P is non-empty, $\mathbf{x}$ and $\mathbf{Con}$ are rewritten as $x \in \mathrm{U}_P$ and $Con \in \mathrm{Con}_P$, respectively.

The point is that the bold face discourse referent '$\mathbf{e}$' and the bold face aspectual configuration '$\mathbf{e} \subseteq \mathbf{t}$' in the translation of the aspectual operator will be drawn to the presuppositional DRS if and only if the latter is non-empty. In the case of a presuppositional Ipf reading, the 'bold face convention' thereby ensures that the eventive discourse referent and aspectual configuration are eventually declared in the presupposition part.

By applying the factual Ipf to its argument in (4), we end up with the following complex DRS:

- [AspectP]: $\lambda t[x\,|\,\mathrm{Instrument}(e,x), \mathrm{pencil}(x)]_{[e\,|\,\mathrm{write}(e), e \subseteq t]}$

8 Reconciling a global and a local perspective

The goal of this paper was twofold: (i) to show how the presuppositional Ipf emerges from a competition with the Pf, and (ii) to implement this information structure component into a compositional analysis of the aspectual operator. The first part of the paper is an illustration of how the Gricean mechanism of pragmatic strengthening fills out the underspecified meaning of the Ipf, thereby contributing to truth-conditional content (Blutner & Zeevat 2004). The second part of the paper applies these results locally, in a compositional set-up.

In recent work, Blutner (2006: 11) discusses global vs. local pragmatic theories: "A global theory describes the principal forces that direct communication – it has a diachronic dimension and allows a rational foundation of conversational implicatures; a local theory describes the actual, synchronic dimension – it explains how online, incremental interpretation [...] is possible". Importantly, he argues that the two approaches can coexist, since they are connected by the assumption "that the results of global optimization fossilize into a local mechanism of utterance processing".

In other words, pragmatic inferences can grammaticalize and turn into semantic, conventionalized content through a process of "fossilization". Blutner's ideas on fossilization – although rudimentary at the present stage – can hopefully develop into an attractive linking theory between the semantics-pragmatics and diachrony-synchrony interfaces. The aspectual system of Russian provides many more examples of fossilized/conventionalized interpretations than the ones considered here, and it will be interesting to see how these data can be dealt with within this new branch of OT-based semantics and pragmatics.

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