

Horn strategies and optimization in Russian aspect

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Outline

- Partial blocking in Bidirectional OT (and GT)
- A diachronic view on Russian aspect
- A "diachronic" explanation of aspectual competition and implicatures in the synchronic system

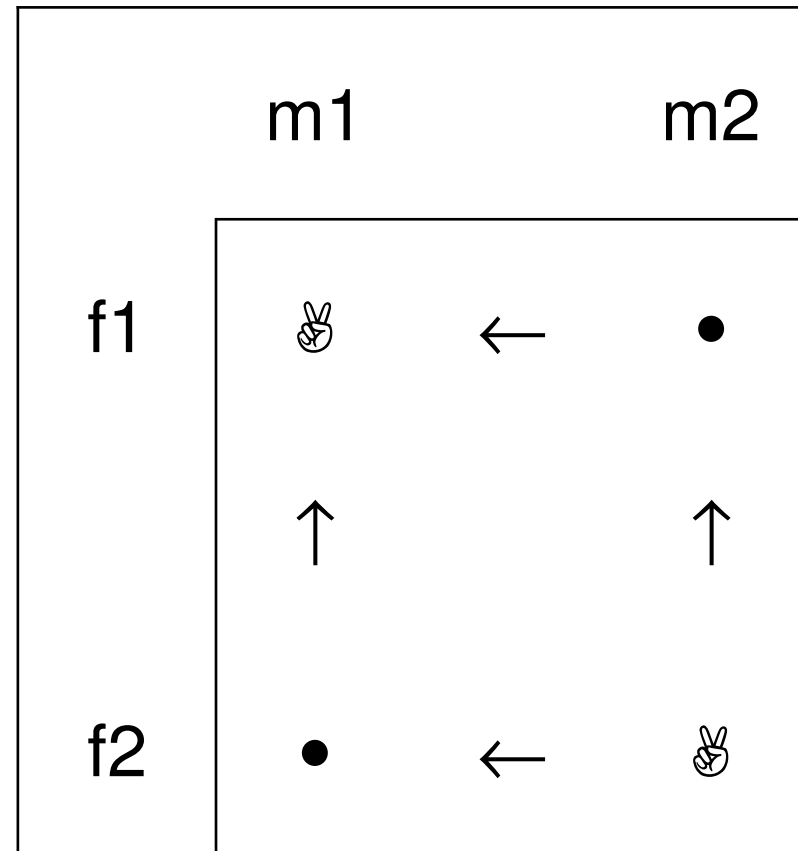
Partial blocking in the lexicon

- "kill" (f1) > "cause to die" (f2)
- direct killing (m1) > indirect killing (m2)

(1) Black Bart caused the sheriff to die.

Partial blocking (Horn strategies)

- Graphical representation (Dekker & van Rooy)
- $\langle f1, m1 \rangle$ is (weakly) optimal
- $\langle f2, m2 \rangle$ is weakly optimal



Definition 1

Bidirectional Optimality

A form-meaning pair $\langle F, M \rangle$ is weakly optimal iff

- 1. $\langle F, M \rangle$ is a member of GEN.
- 2. there is no pair $\langle F', M \rangle$ in GEN such that
 - (2.1) $\langle F', M \rangle \succ \langle F, M \rangle$ and
 - (2.2) $\langle F', M \rangle$ is weakly optimal.
- 3. there is no pair $\langle F, M' \rangle$ in GEN such that
 - (3.1) $\langle F, M' \rangle \succ \langle F, M \rangle$ and
 - (3.2) $\langle F, M' \rangle$ is weakly optimal.

Russian aspect

Every Russian verb form is

- Perfective (Pf) or
- Imperfective (Ipf)

Key notions in Slavic aspectology

- markedness
- competition
- underspecification
- context sensitivity
- pragmatic implicatures

Claim

- Truth-conditional approaches to Russian aspect fail because they don't consider *alternative* forms which the speaker could have used.
- The competition perspective suggests an OT/GT analysis.

Aspects as temporal inclusion relations

- The perfective ("complete event interpretation"): $e \subset t$

$$[[P_f]] = \lambda P \lambda t \exists e [P(e) \wedge e \subset t]$$

- The progressive imperfective ("incomplete event interpretation"): $t \subset e$

$$[[I_{pf_prog}]] = \lambda P \lambda t \exists e [P(e) \wedge t \subset e]$$

The imperfective aspect (progressive reading)

(2) *Kogda my vstretilis',*
when we met_PAST.PF
on chital "Vojnu i Mir".
he read_PAST.IPF "War and Peace"

“When we met, he was reading “W&P”.”

- i.e. *the time of our meeting is temporally included in an event of him reading W&P*

Aspectual competition

- (3) *Ja chital "Vojnu i Mir" v šestom klasse,*
I read_PAST.IPF "W&P" in sixth grade
prochital polnost'ju za 6 dnej. (internet)
read_PAST.PF completely in 6 days

"I read "W&P" in the 6th grade, read it through in 6 days."

Aspectual competition (cont.)

- The perfective *prochital* in (3):
the event of reading W&P is temporally included in an interval of 6 days: e C t
- The imperfective in (3):
the event of reading W&P is temporally included in an interval of 1 year: e C t

The emergence of aspect

- Many synchronic semantic and syntactic facts can be analyzed from an evolutionary perspective as *frozen pragmatics* (Blutner 2006).

Towards a 1-1 mapping (Church Slavonic/Old Russian)

- atelic activities ↔ chitat' (to read)
- progressive accomplishments (incomplete events) ↔ chitat' pis'mo (to read the letter)
- non-progressive accomplishments (complete events) ↔ prochatat' pis'mo (to "through-read" the letter)

Partial blocking in BiOT requires underspecification



Was *prochitat' pis'mo* ("through-read" the letter) originally compatible with an incomplete event interpretation?

- (4) Als ich den Brief durchlas, den meine Freundin Katja für ihre Tochter Anna schrieb, musste ich weinen. (google)
"As I was reading the letter (lit.: `the letter through-read'), which my friend Katja had written to her daughter, I had to cry"

The pre-aspectual Russian system as a 2x2 game

- $f1 = (\text{in})\text{transitive simplex } V$
- $f2 = \text{prep} + V$
- $m1 = \text{incomplete events}$
- $m2 = \text{complete events}$
- $\text{GEN} = M \times F$
- Rankings: $f1 > f2$ (complexity);
 $m1 > m2$ (stereotypical)

Partial blocking in the pre-aspectual system of Russian

	Incomplete event (m1)		Complete event (m2)
Simplex V (f1)		←	●
	↑		↑
Prep + V (f2)	●	←	

Jäger's BiOT algorithm

- Given a situation corresponding to m_1 , the preferred form of S will be f_1 , hence the alternative $\langle f_2, m_1 \rangle$ is *blocked*.
- Given the input form f_1 , H will choose the interpretation m_1 , hence the alternative $\langle f_1, m_2 \rangle$ is also blocked.
- The pair $\langle l_{pf}, m_1 \rangle$ is considered optimal from both perspectives.
- Remove the pairs which are blocked.
- The only remaining pair $\langle f_2, m_2 \rangle$, itself not being blocked, is *weakly* optimal.

Explaining partial blocking in terms of associative learning (Benz 2006)

- At stage 1, the 1-1 mapping between intransitive simplex verbs and atelic activities is the external factor which triggers f_1 to be associated with incomplete events (progressivity, the subinterval property etc.).
- Through associative learning, the pair $\langle f_1, m_1 \rangle$ gets strengthened at stage 2.

Associative learning (cont.)

- If the speaker then, at stage 3, wants to emphasize the complete event interpretation, he should choose the marked form f2.
- At stage 4, this invites a strengthening of the pair <f2,m2>.
- Finally, at stage 5, prefixation develops into perfectivization, giving rise to a new aspectual system.

Grammaticalization of Pf ...

- Pragmatics → frozen pragmatics → semantics
- GEN = M X F – {<Pf, tCe>}
- Secondary imperfectivization (16th century): chitat'_IPF (f1) > prochitat'_PF (f2) > prochityvat'_IPF (f3)
- Complexity of form does not produce a linear ranking of Pf and lpf!

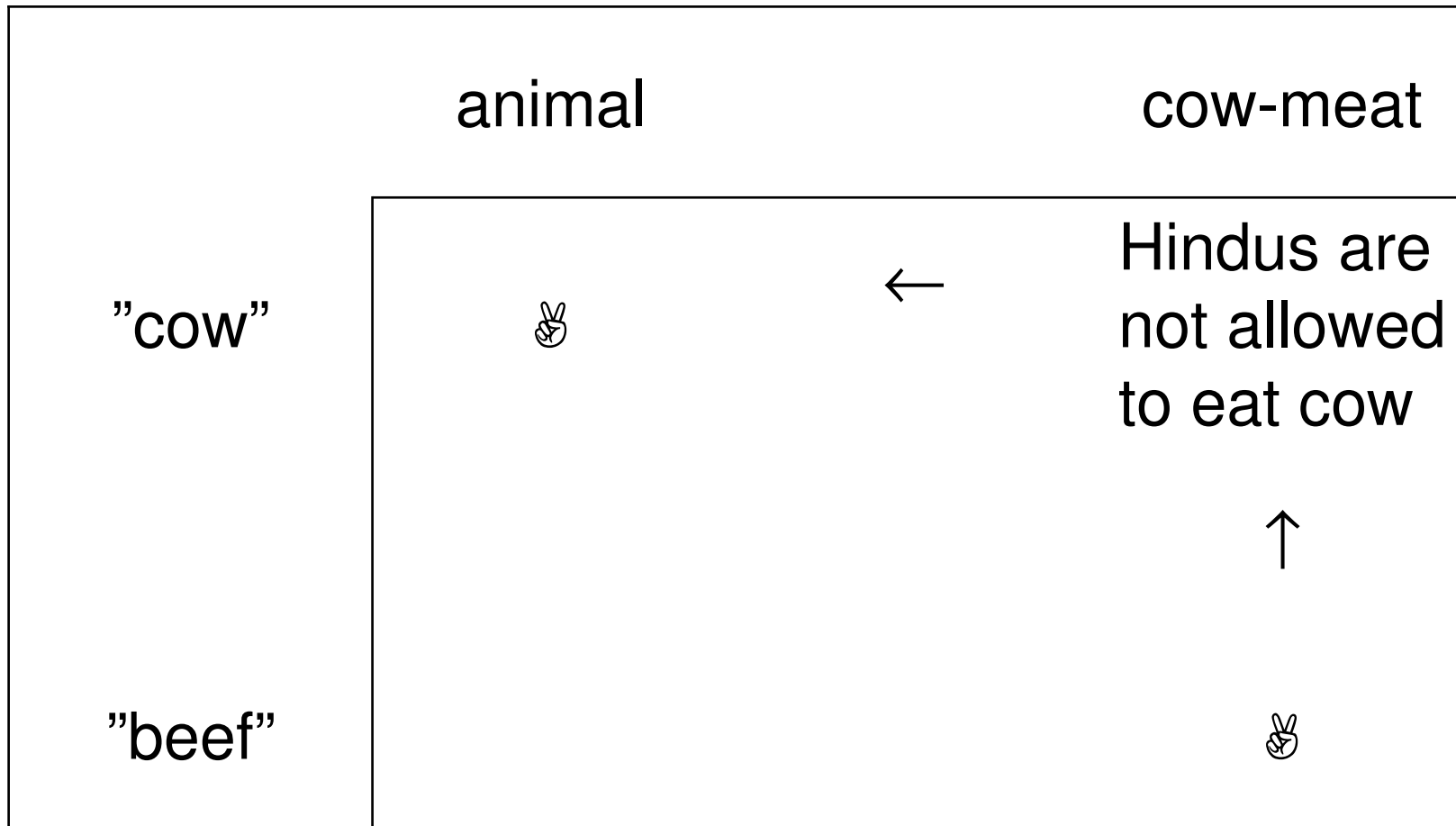
Deblocking in modern Russian

- Not obvious that the new system can be modeled as a game
- A 2x2 game with three solutions, preserving ambiguity, cannot be modeled in terms of bidirectional optimization (two-solutions games)...

Modern Russian (cont.)

- What are the rankings in modern Russian?
- How and when does the complete event reading of Ipf survive?

An excursus: Deblocking and Conceptual grinding



Three classes of contexts

Basic idea:

- Aspect is a temporal phenomenon
- Global reasoning – without compositionality

- Class 1: Small reference time
- Class 2: Big reference time
- Class 3: No reference time

Class 1: small reference time

Example:

f1 = lpf+past+punctual_temporal_adverbial

f2 = Pf+past+punctual_temporal_adverbial

m1 = tCe \wedge Tadv(t)

m2 = eCt \wedge t = the interval preceding Tadv

Class 1: Progressive vs. "past perfect" interpretation

(2') *Kogda my vstretilis',*
when we met_PAST.PF
on ?? "Vojnu i Mir".
he ?? "War and Peace"

- *chital_IPF* ("was reading/had read") *or*
- *prochital_Pf* ("had read")?

Ranking in class 1

- Ranking on F (harmony, frequency, salience...):



$$f1 > f2$$

- Ranking on M (stereotypical interpretation):

$$m1 > m2$$

Class 1: Generalization

A complete event interpretation is not available for *lpf* whenever a progressive interpretation is possible.

	tCe (m1)		eCt (m2)
<i>lpf</i> ... (f1)		←	●
<i>Pf</i> ... (f2)			↑ 

Weakly optimal pairs in class 1

(2'') ... *on uže pročital "Vojnu i Mir"*.

... he already read_PAST.PF "W&P"

"(when we met), he had already read "W&P""

- <lpf_when_clause, "the time of meeting C e >
- <Pf_when_clause, e C "the whole past preceding the time of our meeting">

Class 2: big reference time

Example:

- $f1 = Ipf+past$
- $f2 = Pf+past$

- $m1 = eCt \wedge t = \text{the whole interval preceding the utterance time.}$
- $m2 = ??$

Ranking in class 2

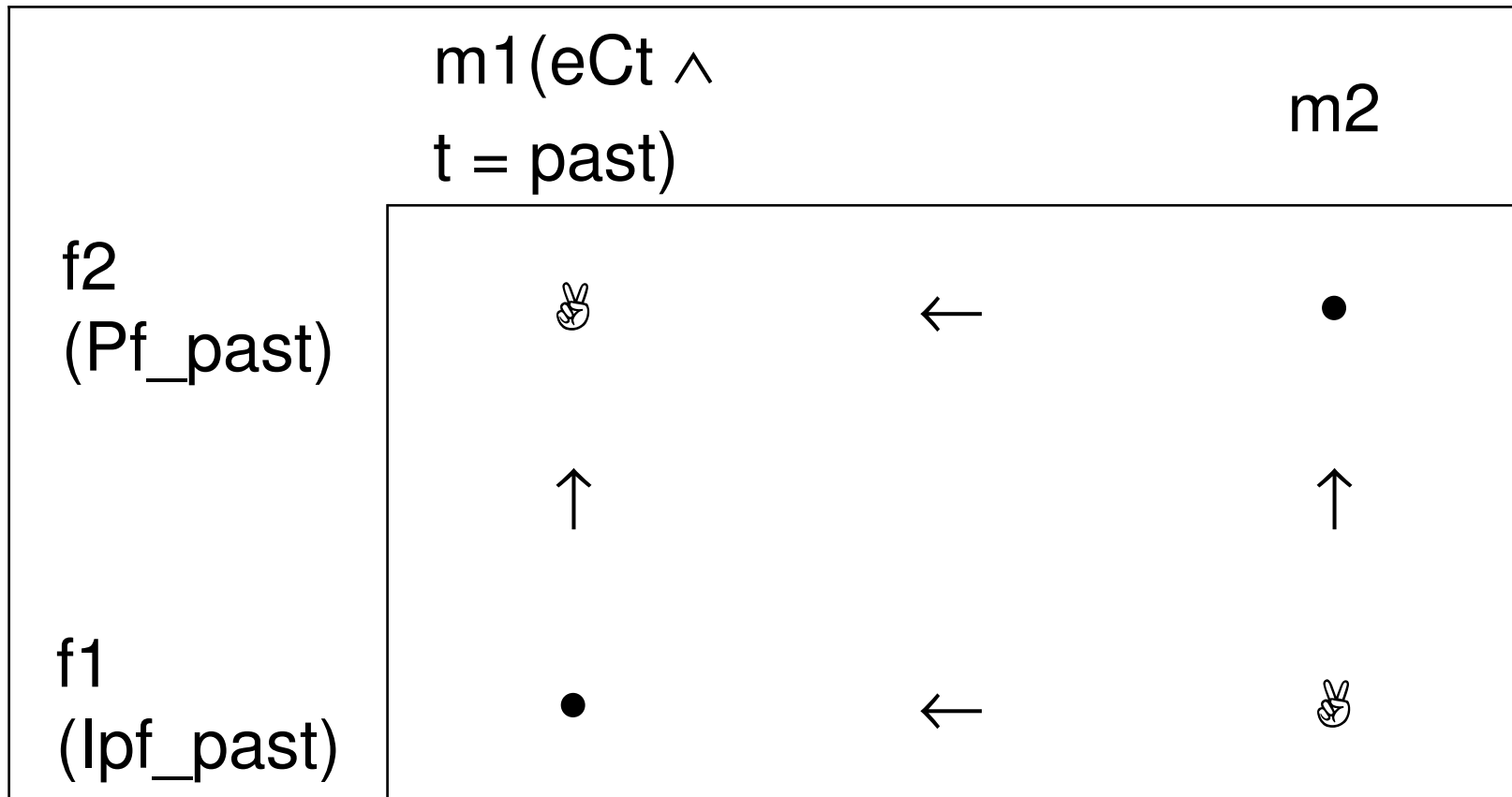
- Ranking on F (harmony, frequency, salience...):

$$f2 > f1$$

- Ranking on M (stereotypical interpretation):

$$m1 > m2$$

Class 2: Partial blocking



Strengthening of Pf in class 2

By associative learning (Benz 2006) it is expected that the interpretation of Pf gets strengthened to include an implicature of the *current relevance of the result state*.

Strengthening of Pf in class 2 (cont.)

(5) *Kto otkryl okno?*
who open_PAST.PF window.

“Who has opened the window?”
(the window is currently open)

From deblocking to partial blocking

- What about m2?
- “The unemployed form may soon find a new job, generally expressing something closely related to but subtly different from the canonical interpretation that one might have expected” (Beaver & Lee, 2003:140).

Ipf and the convention of annulled result

(5') *Kto otkryval okno?*

who open_PAST.IPF window.

“Who had the window open?”

(the window is currently closed)

Strategies in game theory

	open	closed
S1	Pf	lpf
S2	lpf	Pf
S3	Pf	Pf
S4	lpf	lpf

	Pf	lpf
H1	open	closed
H2	closed	open
H3	open	open
H4	closed	closed

P. Parikh's GT-model (discussed in van Rooy 2004)

- Determine expected utility for each profile (S, H) given the hearer's probability function:

$$EU(S, H) = \sum_m P(m) \times U(m, S, H)$$

- Utility function of successful communication:

$$U(m, S, H) = 1, \text{ if } H(S(m)) = m \\ = 0 \text{ otherwise}$$

P. Parikh's GT-model (example cont.)

Assumptions (part of the common ground):

- Probability of window being open at the utterance time: 0.6
- Probability of window being closed at the utterance time: 0.4

Combining strategies (without complexity of form)

Partial	H1	H2	H3	H4
S1	1	0	0.6	0.4
S2	0	1	0.6	0.4
S3	0.6	0.4	0.6	0.4
S4	0.4	0.6	0.6	0.4

P. Parikh's GT-model (cont.)

- $U(m, S, H) = 1/\text{Complexity}(S(m))$,
if $H(S(m)) = m$
= 0 otherwise

Assumptions (part of the common ground):

- Complexity of "Pf+past": 1
- Complexity of "lpf+past": 2

Combining strategies (with complexity of form)

Partial	H1	H2	H3	H4
S1	0.8	0	0.6	0.2
S2	0	0.7	0.6	0.2
S3	0.6	0.2	0.6	0.2
S4	0.2	0.6	0.6	0.2

Blutner vs. P. Parikh

- $\langle S1, H1 \rangle$ (Horn) and $\langle S2, H2 \rangle$ (anti-Horn) are strict Nash equilibria.
- $\langle S1, H1 \rangle$ is Pareto optimal (highest expected utility) – Parikh's unique solution.
- Blutner's BiOT and Parikh's GT model both account for partial blocking in these simple cases.

Class 3: no reference time

Example: imperatives under negation

- $f1 = \text{Ipf_neg_imperative}$
- $f2 = \text{Pf_neg_imperative}$

- $m1 = S \text{ wants } H \text{ not to perform action } a$
- $m2 = S \text{ warns } H \text{ against accidentally performing action } a$

Ranking in class 3

- Ranking on F (harmony, frequency, salience...):

$$f1 > f2$$

- Ranking on M (stereotypical interpretation):

$$m1 > m2$$

Class 3

(unmarked form/meaning)

(6) *Ty, požalujsta, ne opazdyvaj.*
you please not be_late|MP.IPF

“Please don’t be late.” (internet)

Class 3

(marked form/meaning)

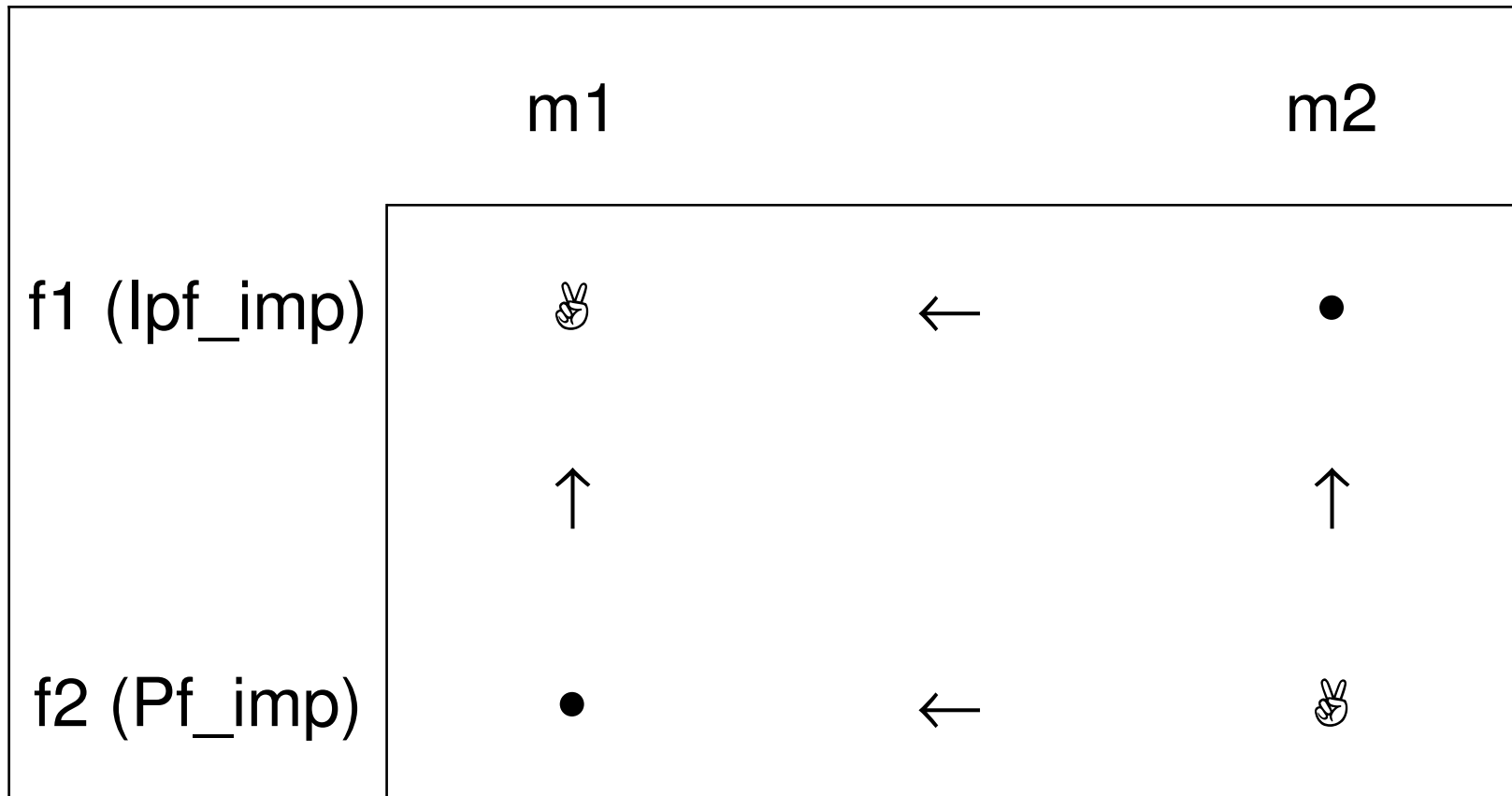
(6') [*Čerez 10 minut budet uže pozdno.*]

Smotri, ne opazdaj!

lookIMP.IPF not become_late IMP.PF

“In 10 minutes it’ll already be too late.
Be careful not to be late.” (internet)

Partial blocking in class 3



Conclusion

- GT and BiOT approaches can provide new insights into aspectual competition in Russian
- A principled explanation for various implicatures associated with Ipf and Pf
- The temporal dimension of aspect plays a crucial role in the rankings of F and M.
- GT, BiOT or associative learning?

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