The Russian perfective and maximality of causal influences

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1 Introduction

As has been extensively discussed in the linguistic literature, Slavic perfective predicates, in contrast to their imperfective counterparts, convey that an event is bounded, temporally delimited, or maximalized (e.g. Forsyth (1970), Smith (1991), Krifka (1992), Filip (2000), (2008), Timberlake (2004), Filip and Rothstein (2006)). For instance, Filip (2008) argues that perfective verbs contribute a (covert) maximalization operator on events MAX_E, which "picks out the unique largest event at a given situation" (p. 217). In the prototypical case, this will be an event that reaches its inherent natural endpoint, but this could also be an activity that is maximal with respect to some ordering criterion.

However, certain Russian data demonstrate that such concepts as telicity or temporal delimitation are necessary but insufficient for the purposes of capturing the distribution of past perfective predicates. Typically such examples evoke additional causal influences that are accommodated. Here we extend the idea of maximality to such cases. We propose that the **affirmative past perfective entails maximality of causal influences on the event,** as a result of an interaction between its presuppositions and assertion**.** Because the assertion is involved in this interaction, the **negative past perfective entails non-maximality of causal influences on the event.** To argue for this, we consider data discussed by Dickey (2000) on temporal definiteness in East Slavic, as well as Russian data recently introduced by Kagan (2020), and use a causal model where multiple causal influences can be represented.

2 Data

2.1 Event Specificity

There exists a strong intuition that sentences with past perfective verbs report events that are in some sense specific. This characteristic becomes particularly salient in non-veridical environments or when we compare a perfective sentence and it imperfective counterpart under the Statement of Fact meaning (one that asserts that a certain kind of event has been instantiated; cf. e.g. Smith 1991).

(1) a. Ivan vstrečal Lenu. b. Ivan vstretil Lenu
Ivan met.IMP Lena Ivan met.PERF Lena
'Ivan has met with Lena (at least once)'. 'Ivan met Lena (under particular circumstances)'

Intuitively, (1a) under the relevant reading asserts that the event kind *Ivan meet Lena* was instantiated at least once. It is made true by any event of Ivan meeting Lena. In turn, (1b) relates to a particular eventuality (e.g. one of meeting at a particular time or place, or meeting with the purpose to discuss particular issues). Analogously, Ivan ne pozvonil (Ivan didn't call.PERF) suggests that Ivan didn't call in a particular situation, e.g. when he was expected to call. The specificity view is supported by the fact that past perfective verbs strongly tend to be incompatible with such temporal adjuncts as nikogda 'never' (but see the special construction in 4 below), kogda-libo 'ever' and kogda-nibud' 'some time', 'any time':

(2) *Dima nikogda ne vstretil Mašu.
Dima never NEG met$_{PERF}$ Masha
'Dima has never met Masha.'

Here, inherently non-specific time does not allow for a specific event reading. Indeed, according to Dickey (2000), perfective aspect in East Slavic languages expresses temporal definiteness. Perfective event predicates have a specific flavor because they are mapped to definite / specific temporal intervals. While such a correlation is indeed observed in many instances, we can also find statements about specific events that lack a specific (or even fixed) temporal location. According to (3), a particular calling event which was expected or maybe even promised or scheduled, never took place, i.e., did not take place at *any* time. It is thus possible to conceive of a (potential) specific event without linking it to a particular time.

(3) On tak nikogda ej i ne pozvonil. (possible unlike the default variant in (3))
he so never her and NEG called.PERF
'He never called her in the end.'

2.2 Feasibility

Additional striking restrictions on the use of the past perfective are exhibited in non-veridical environments, with negative contexts providing especially salient examples. Consider, for example, the contrast in (4), originally described by Kagan (2020). Suppose that Ivan is found murdered and Anna gets accused of the crime. She denies the guilt and says "I didn't kill Ivan". For this purpose, only imperfective aspect is appropriate (4a). Even though a single, bounded, specific event is under discussion, the perfective is a bad choice, because in essence, the perfective sentence (4b) sounds like a confession. The sentence informs the addressee that although the killing of Ivan by Anna did not successfully take place, it was reasonable to expect such a murder. For instance, it is possible that Anna tried to kill Ivan but failed as he was stronger. Alternatively, she may have planned the murder but ultimately decided not to perform it (because that would be too risky). Or at least, she seriously considered the possibility of committing the murder but then, again, decided to backtrack.

(4) a. Ja ne ubivala Ivana
I NEG killed.IMP Ivan
'I didn't kill Ivan.'
b. Ja ne ubila Ivana.
I NEG killed.PERF Ivan

Anyway, in order for the perfective to be used, telicity and even event specificity is insufficient. Intuitively, the choice of this aspect means that *something happened in the world that made an instantiation of the negated event plausible, expected, or feasible*. Sometimes, this results from the fact that the event in question was actually taking place, although it did not reach completion, e.g. Dima ne napisal pis'mo (Dima didn't write.PERF the letter) may be uttered if Dima wrote a part of the letter but didn't complete the action (although in this context the use of the verb dopisal 'finished writing' may be preferable). But it is also possible to use negative perfectives when the event did not even begin, but some other event or situation in the actual world made the occurrence of this event expected or, in some sense, realistic.

3 Analysis

3.1 Formal framework

We use a structural equation / causal model approach (Nadathur & Lauer 2020, Copley 2020, Baglini & Bar-Asher Siegal 2020, Nadathur & Filip 2021) where multiple causal conditions can influence an eventuality. In a causal model $\mathcal{M}$, causal conditions are represented with nodes in a directed acyclic graph. The possible values of the nodes correspond to the truth values of propositions. The edges (arrows) represent the direction of the causal relations and correspond to equations that relate the truth values to each other, and especially, show how some values depend on other values asymmetrically.

Nodes: A node's "existing" in $\mathcal{M}$ does not mean that the situation it describes actually exists in the world. The nodes in the causal model correspond to *functions* of type ⟨s,t⟩ that return truth values (contra e.g. Pearl 2000, Halpern & Pearl 2005, where nodes are *variables* that themselves have values). The nodes need to be functions of situations so that nodes can "line up" with a sequence of situations *s, s′, s″* something like a timeline, such that $s \prec s' \prec s''$. So for instance, if Ⓐ → Ⓑ is in the model, in our denotation we will be talking about Ⓐ(*s*) and Ⓑ(*s′*), for some *s, s′* such that $s \prec s'$. Because we are talking about past perfective sentences, it will also be the case that $s \prec s' \prec s'' \prec s_{\text{utterance}}$, the situation of utterance.

Arrows: We can think of an arrow from Ⓐ to Ⓑ in $\mathcal{M}$ as representing that for pairs of *s, s′* such that $s \prec s'$, the value of Ⓐ(*s*) influences the value of Ⓑ(*s′*). In our proposal, the arrows are associated with a *ceteris paribus* / **defeasible efficacy /** localized closed-world assumption **(**see van Lambalgen & Hamm 2007, Copley & Harley 2015). That is, if Ⓐ → Ⓑ is in the model, we assume background conditions such that Ⓐ(*s*) = 1 is in principle sufficient to cause Ⓑ(*s′*) = 1, for $s \prec s'$, provided that we erase any other arrows in our model that might inhibit Ⓑ. (From here on out we mark "stimulatory" arrows, where the value of Ⓐ(*s*) positively correlates with the value of Ⓑ(*s′*), with a "+" and "inhibitory" arrows, where the value of Ⓐ(*s*) negatively correlates with the value of Ⓑ(*s′*), with a "-" (Lewis 1973). Since we are using truth values as the values of our node functions, this means that there is a single stimulatory arrow function, namely the one that has [Ⓐ(*s*) = 1 and Ⓑ(*s′*) = 1] and [Ⓐ(*s*) = 0 and Ⓑ(*s′*) = 0] and a single inhibitory arrow function, namely the one that has [Ⓐ(*s*) = 1 and Ⓑ(*s*) = 0] and [Ⓐ(*s*) = 0 and Ⓑ(*s′*) = 1].)

If we have Ⓐ → Ⓑ *and* one or more inhibitory influences on Ⓑ, then in that case and in that case alone, it is possible to get Ⓐ(*s*) = 1 and, nonetheless, Ⓑ(*s′*) = 0, even though Ⓐ $\rightarrow^{+}$ Ⓑ is part of the model. Effectively, the two defeasibly efficacious arrows (Ⓐ $\rightarrow^{+}$ Ⓑ and Ⓒ $\rightarrow^{-}$ Ⓑ compete, and in this case it would be Ⓒ $\rightarrow^{-}$ that "wins". So, for example, a "partial event" of killing that does not result in a dying would be represented exactly by this case where Ⓐ(*s*) = 1 and Ⓑ(*s′*) = 0, and there would need to be another, "winning" inhibitory influence: a node Ⓒ such that Ⓒ $\rightarrow^{-}$ Ⓑ. This is how we model defeasibility (Martin & Schäfer 2017). Note as well that the presence of Ⓐ $\rightarrow^{+}$ Ⓑ in the model does not guarantee that Ⓑ(*s′*) = 1 is likely or even plausible given that Ⓐ(*s*), because an efficacious inhibitory influence may be part of the most plausible scenario.

Events and results: We consider telic verb phrases to introduce the nodes corresponding to the occurrence in the world of a (perhaps partial) event or process (Ⓔ), which influences whether a result occurs (Ⓡ). (We do not present an example of an atelic verb phrase here (and see verbs with the attenuative prefix po-), but we note that a recognition of the existence of entrainment causation, where the cause occurs at the same time as the effect (Talmy 2000, Copley & Harley 2015), is an underused possibility that would be helpful here. If we understand atelic dynamic predicates such as *dance* as cases of entrainment, they would contribute the

same Ⓔ $\rightarrow^{+}$ Ⓡ structure as telic verbs, where Ⓔ corresponds to the occurrence of the energetic process (e.g. the energy the dancer puts into dancing) and Ⓡ corresponds to the cotemporal existence of the abstract object that is created by the energetic process (e.g. the dancing motion). Note that the result need not be a state. If this possibility is realized, the situation sequence will not exactly correspond to a timeline, as the causal ordering will give us only a partial temporal ordering. Ultimately it is the verb phrase that tells us whether the event is *temporally* prior ($\prec$) (to the result, even though the event is always *causally* prior ($\rightarrow$) to the result.)

Intentions and circumstances: Leaving aside background circumstances, an event may be influenced by the subject's intention, which makes (5) a representation for intentional action ((5a)); or by ad-hoc circumstance(s), which makes (5) a representation for mere (accidental) actions and non-agentive events ((5b); see Martin 2020 for an argument for treating the latter two similarly). This influence (Ⓧ $\rightarrow^{+}$) will be contributed as a presupposition by perfective aspect.

(5) Ⓧ $\rightarrow^{+}$ Ⓔ $\rightarrow^{+}$ Ⓡ
a. Ⓧ is Ⓘ, where Ⓘ is subject's intention
b. Ⓧ is Ⓒ, where Ⓒ is a circumstance; accidental (unintentional) or non-agentive event

3.2 Example

To see how this works, we give a negative past perfective in (6) and its analysis in (7) and (8):

(6) Anna ne ubila Ivana.
Anna NEG killed.PERF Ivan
'Anna didn't kill Ivan.'

(7): Causal model $\mathcal{M}$ provided by (6)
for $s \prec s' \prec s'' \prec s_{\text{utterance}}$
Ⓧ $\rightarrow^{+}$ Ⓔ $\rightarrow^{+}$ Ⓡ
Ⓧ(s) = 1 iff e is defeasibly efficacious for Anna-kill-Ivan (contributed by perfective)
Ⓔ(s') = 1 iff Anna-kill-Ivan(s') (i.e., iff s' is defeasibly efficacious for Ivan-dead)
Ⓡ(s'') = 1 iff Ivan-dead(s'')

(8) Presupposition and assertion of (6)
a. Presupposition: The causal model in (8), and $\exists s$: Ⓧ(s) = 1
b. Assertion: $\lambda s'$. ~[Ⓔ(s') = 1 & Ⓡ(s'') = 1]
c. Minimal models speaker might have in mind: Ⓧ $\rightarrow^{+}$ Ⓔ $\rightarrow^{+}$ Ⓡ or Ⓧ $\rightarrow^{+}$ Ⓔ $\rightarrow^{+}$ Ⓡ
(Ⓨ ↓⁻ "event collider"; Ⓨ ↓⁻ "result collider")

The two most minimal models for the speaker to be committed to are shown in (8c). The "event collider" option corresponds to the "failed-attempt" or "zero-change" case where the event does not even start (Martin 2020 and references therein). The case where Ⓧ $\rightarrow^{+}$ Ⓔ is part of the model and Ⓧ(s) = 1 but Ⓔ(s') = 0 can only happen if the modal has a event collider (Ⓧ $\rightarrow^{+}$ Ⓔ $^{-}\leftarrow$ Ⓨ) because we assume s is efficacious for s' in the absence of inhibitory influences, since their respective nodes (Ⓧ and Ⓔ) are connected by an arrow. So if Ⓧ(s) = 1, the only way that

Ⓔ(*s′*) = 0 is if there is an additional inhibitory influence on the value of Ⓔ(*s′*). Ⓨ affects *whether any (even "partial") event of the description occurs, i.e., whether* Ⓔ(*s′*) = 1.

The "result collider" option corresponds to the case where an event happens that would normally cause the result, but the result does not occur. Again, if Ⓔ $\rightarrow^{+}$ Ⓡ is a part of the model and Ⓔ = 1 but Ⓡ = 0, there must be a result collider Ⓔ $\rightarrow^{+}$ Ⓡ $^{-}\leftarrow$ Ⓨ. We assume *s* is efficacious for *s′* in the absence of inhibitory influences, since their respective nodes (Ⓔ and Ⓡ) are connected by an arrow. So if Ⓔ(*s′*) = 1, the only way that Ⓡ(*s″*) = 0 is if there is an additional inhibitory influence on the value of Ⓡ, namely Ⓨ. It doesn't affect the (quality of the) result state per se; it affects *whether a result state occurs, i.e., whether* Ⓡ(*s″*) = 1.

4 Discussion

Specificity: The “specificity” effect associated with perfective clauses (cf. (1b), (2) above) is due to the presence of Ⓧ in the presupposition: we deal not with *any* situation that Ⓔ holds of, but rather specifically with the situation *s′* that is caused by the specific intentional state or circumstance *s* such that Ⓧ is predicated of *s*. Such an intentional state or circumstance constitutes the identifying property which creates the specificity intuition. Specificity is maintained in (3), despite the absence of temporal definiteness: it is asserted that a phoning event caused specifically by the presupposed *e* of which Ⓧ is predicated did not take place at any temporal interval.

Feasibility: The “feasibility” intuition is due to the presupposition that Ⓧ $\rightarrow^{+}$ Ⓔ $\rightarrow^{+}$Ⓡ, where Ⓧ (s) = 1, and . Our interpretation of the arrows as conveying defeasible efficacy means that there is an influence that is defeasibly efficacious for an event that would be defeasibly efficacious for Ⓡ. This is the case independently of whether the sentence is affirmative or negative. In the negative, however, one of either Ⓔ(*s′*), Ⓡ(*s″*) must be equal to zero; the effect is that we retain the feasibility of Ⓧ to cause Ⓔ, even if one of Ⓔ(*s′*) and Ⓡ(*s″*) is equal to zero.

Maximality: Maximality of causal influences on the event and/or the result falls out as an epiphenomenon from the combination of the properties of the causal model, and the presupposition and the assertion of the Russian perfective. While we take our inspiration from the notion of "maximality" of an *event* (Filip & Rothstein (2006) and Filip (2008)), here we are dealing with the maximality of the set of arrows that are pointing to Ⓔ and Ⓡ. Informally, a causal model $\mathcal{M}$ is *causally maximal* iff it picks out the unique largest set of (non-background) causal influences that the speaker is committed to. For the Russian perfective, since the assertion is involved in this maximality entailment, affirmative sentences entail that the model provided by the sentence is causally maximal, but for negative sentences, the model is entailed to be causally non-maximal. This is because in the case of the negative perfective, the speaker ends up committing themselves to having at least one more node in their causal model than what is provided by the sentence. That this node is an *additional* influence on either Ⓔ or Ⓡ is something that can only be represented using a model which allows the reification of multiple influences; our causal model does this.

References

Copley, B., & Harley, H. (2015). A force-theoretic framework for event structure. *Linguistics and Philosophy* 38(2). 103-158.

Dickey, S. M. 2000. *Parameters of Slavic Aspect: A Cognitive Approach*. Stanford: CSLI Publications.

Dowty, David R. 1979. *Word meaning and Montague grammar*. Dordrecht: D. Reidel.

Filip, Hana. 2000. The quantization puzzle. In Carol L. Tenny and James Pustejovsky (eds.), *Events as grammatical objects*, 3-60. Stanford, CA: CSLI Publications.

Filip, Hana. 2008. Events and Maximalization. In S. Rothstein (ed.), *Theoretical and Crosslinguistic Approaches to the Semantics of Aspect*, 217-256. Amsterdam: John Benjamins.

Filip, Hana & Rothstein, Susan. 2006. Telicity as a Semantic Parameter. In J. Lavine, S. Franks, H. Filip et al. (eds.), *Formal Approaches to Slavic Linguistics (FASL 14). The Princeton University Meeting*, 139-156. MI: University of Michigan Slavic Publications.

Forsyth, J. 1970. *A Grammar of Aspect*. Cambridge: Cambridge University Press.

Kagan, Olga. 2020. A Force-Dynamic Approach to Perfectivity. In E.V. Golovko, E.V. Gorbova, P.A. Kocharov, V.S. Hrakovskij and O.U. Chujkova, (eds.), *Interrelation Between Aspect and Adjacent Categories*,149-155. Saint Petersburg: RGPU.

Krifka, M. 1992. Thematic Relations as Links between Nominal Reference and Temporal Constitution. In I. Sag and A. Szabolcsi (eds.), *Lexical Matters*, 29-53. Stanford: CSLI Publications.

van Lambalgen, M., & Hamm, F. 2008. *The proper treatment of events (Vol. 6)*. NY: John Wiley & Sons.

Lewis, D. 1974. Causation. *The Journal of Philosophy* 70(17). 556-567.

Martin, F. 2020. Aspectual differences between agentive and non-agentive uses of causative predicates. In Elitzur A. Bar-Asher Siegal and Nora Boneh (eds.), *Perspectives on causation*, 257-294. Cham: Springer.

Martin, F., & Schäfer, F. 2017. Sublexical modality in defeasible causative verbs. In A. Arregui, M. L. Rivero, & A. Salanova (eds.), *Modality across syntactic categories*, 87–108. Oxford: Oxford University Press.

Smith, C. 1991. *The Parameter of Aspect*. Dordrecht: Kluwer Academic Publishers.

Talmy, L. 2000. *Toward a Cognitive Semantics*. MA: MIT Press.

Timberlake A. 2004. *A Reference Grammar of Russian*. Cambridge: Cambridge University Press.