

Does viewpoint aspect make reference to time?

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Beyond Time @ University of Colorado, Boulder
April 9-10, 2017

What many of us believe...

What many of us believe...

...about verb phrases

- ▶ They are event descriptions

Making this idea formally precise

- ▶ The extension of a verb phrase is a function of type $\langle \epsilon, t \rangle$ from events to truth values:

$$[[\text{john run}]] = \lambda e. \text{AGT}(e) = \text{john} \wedge \text{running}(e)$$

What many of us believe...

...about tenses

- ▶ They are time descriptions

Making this idea formally precise

Two possibilities:

- ▶ The extension of tense is a prominent time of type $\langle i \rangle$
[[PST]_{*i*}]^{*t,g*} is defined only if $g(i) \prec t$.
If defined, then [[PST]_{*i*}]^{*t,g*} = $g(i)$

Making this idea formally precise

Two possibilities:

- ▶ The extension of tense is a prominent time of type $\langle i \rangle$
[[PST]_i]^{t,g} is defined only if $g(i) \prec t$.
If defined, then [[PST]_i]^{t,g} = $g(i)$
- ▶ The extension of tense is a function of type $\langle \langle i, t \rangle, t \rangle$
from a set of times to truth-values:
[[PST]_i]^{t,g} =
 $\lambda Q. \exists t'(t' \prec t \wedge t' \in g(i) \wedge Q(t'))$

What many believe...

...about compositional semantics

There must be an expression that is intermediary to verb phrases and tenses that relates events to times.

What most of us want to believe

Viewpoint aspect is that expression!

The neo-Kleinian revolution

- ▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$
portrays a situation from the inside (Comrie 1976)
- ▶ PERFECTIVE: $\lambda P \lambda t. \exists e (\tau(e) \subseteq t \wedge P(e))$
portrays a situation from the outside (Comrie 1976)
- ▶ PERFECT: $\lambda P \lambda t. \exists e (\tau(e) \prec t \wedge P(e))$
portrays the event being over by the topic time (Kratzer 1998)

A different approach: Bach 1986

Mereologically speaking, and in terms of event semantics, there is a part-whole relation between the meaning of 'John was drawing a circle' and 'John drew a circle':

- ▶ part of a situation of drawing \approx part of a circle
- ▶ whole situation of drawing \approx whole circle

Krifka 1992

Bach's (1986, p.12) suggestion, formalized by Krifka (1992, p.47):

- ▶ PART: $\lambda R \lambda x'. \exists x (x' \sqsubseteq x \wedge R(x))$ **nominal domain**
- ▶ PROG: $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge P(e))$ **eventuality domain**
- ▶ Viewpoint aspect is an eventuality description modifier, mapping a set of eventualities onto another set of eventualities.
- ▶ **Caveat: viewpoint aspect does not make reference to time!**

Interim Summary

Point of agreement between the two approaches:
Viewpoint aspect makes reference to events.

Interim Summary

- ▶ Klein: Viewpoint aspect encodes a relation between events and times (temporal logic with event semantics)
- ▶ Bach/Krifka: Viewpoint aspect encodes a part–whole relation of events (mereology and event semantics); nothing is said about what relates events and times

Interim Summary

- ▶ The two approaches are different but compatible!
 - ▶ It could be the case that viewpoint aspect relates event parts to the topic time
 - ▶ See Moens and Steedman 1988 and more recent approaches by, e.g. Altshuler [2010, 2012] and Michaelis [2011]
- ▶ Do we need both approaches or only one of them?

Roadmap

- ▶ Show some well known phenomena that seem problematic for the Kleinian approach
- ▶ Discuss what the solutions might be like
- ▶ Discuss whether the Bach/Krifka approach fairs any better

Composition problem with the perfect progressive

1. John has been building a house out of hay.

▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$

▶ PERFECT: $\lambda P \lambda t. \exists e (\tau(e) \prec t \wedge P(e))$

The neo-Kleinian approach revised

The perfect is not a viewpoint aspect!

It encodes a relation between times (it's a kind of tense!)

- ▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$
- ▶ PERFECTIVE: $\lambda P \lambda t. \exists e (\tau(e) \subseteq t \wedge P(e))$
- ▶ ~~PERFECT: $\lambda P \lambda t. \exists e (\tau(e) \prec t \wedge P(e))$~~
- ▶ See extended now/time span theories of the perfect (e.g. McCoard 1978, Fabricius-Hansen 1986, Iatridou et al. 2001, Portner 2003, Rathert 2004, Pancheva and von Stechow 2004)

Extending Bach/Krifka approach

2. Look at that! John has been building a house out of hay.

PROGRESSIVE: $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge P(e))$

PERFECT: $\lambda P \lambda s. \exists e' (s = \text{RESULT}(e') \wedge P(e'))$

- ▶ See e.g. Moens and Steedman 1988, Parsons 1990, Kamp and Reyle 1993, Higginbotham 2008, Michaelis 2011, Kamp et al. 2016 that adopt a version of this approach to the perfect.
- ▶ For ontological questions (what is a perfect state?), see, e.g. Portner 2003 and Nishiyama and Koenig 2010

Two problems with the progressive

The adverb problem

3. It was June 14, 1998. John was crossing my street. (Then a bus hit him).

▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$

If the adverb fixes the topic time as being June 14, 1998, then the truth-conditions are too strong.

The adverb problem

4. It was June 14, 1998. John was crossing my street. (Then a bus hit him).

▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$

▶ June 14, 1998: $\lambda Q \lambda t'. \exists t (t' \subseteq t \wedge \text{june.14.1998}(t) \wedge Q(t'))$

Solution: the adverb fixes the topic time to be a subinterval of June 14, 1998!

▶ see, e.g. von Stechow 2002, Borik 2006, Kamp 2017

The adverb problem

5. It was June 14, 1998. John was crossing my street. (Then a bus hit him).

▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$

▶ June 14, 1998: $\lambda Q \lambda t'. \exists t (t' \subseteq t \wedge \text{june.14.1998}(t) \wedge Q(t'))$

Solution: the adverb fixes topic time to be a subinterval of June 14, 1998!

- ▶ Caveat: instead of going partitive in the event domain, we go partitive in the time domain
- ▶ See Bennett and Partee 1972 for analysis of viewpoint aspect as being partitive in this way!

Bach/Krifka approach extended

6. It was June 14, 1998. John was crossing my street. (Then a bus hit him).
- ▶ PROGRESSIVE: $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge P(e))$
 - ▶ June 14, 1998: $\lambda P \lambda t. \exists e (t \circ \tau(e) \wedge \text{june.14.1998}(t) \wedge P(e))$
 - ▶ See Altshuler 2016: Chapter 6 for an approach along these lines

The problem of the imperfective paradox

7. It was June 14, 1998. John was crossing my street. (Then a bus hit him).
 - ▶ PROGRESSIVE: $\lambda P \lambda t. \exists e (t \subseteq \tau(e) \wedge P(e))$

- ▶ PROGRESSIVE:

$\lambda P \lambda t. \forall w' (\text{Intert}_t(w^*)(w') \rightarrow \exists e (t \subseteq_{\circ} \tau(e) \wedge P(w')(e)))$

- ▶ a progressive sentence is true iff in every inertia world w' of w^* at the topic time t there is an event e whose run time is a superinterval of t such that t is not a final part of this run time.

- ▶ PERFECTIVE:

$$\lambda P \lambda t. \forall w' (\text{Intert}_t(w^*)(w') \rightarrow \exists e(\tau(e) \subseteq t \wedge P(w')(e)))$$

- ▶ The runtime of the P-event is a subinterval of the topic time.
- ▶ This ensures that the universal quantification over inertia worlds is trivial

Problem with Hindi perfective (Singh 1991, 1998)

8. maayaa-ne biskuT-ko khaa-yaa
Maya-ERG cookie-ACC eat-PFV
'Maya ate the cookie
 9. par use puuraa nahiin khaa-yaa
but it-ACC finish not eat-PFV
'but did not finish it.
- ▶ See ongoing research on *non-culminating accomplishments* (Martin 2015, Demirdache and Martin 2015 and references therein; J.P. Koenig's talk in this workshop – on deck!)

Different from Russian perfective

10. *Ivan pročitai knigu.*
Ivan PFV.read book
'Ivan (has) read a/the book'
11. *#no ne do konca.*
but not until end
'But not until the end.'

Other languages

Sample of languages which arguably have a Hindi-kind perfective:
Japanese (Ikegami 1985), Karachay-Balkar (Tatevosov 2008),
Malagasy (Travis 2000), Mandarin (Teng 1972, Koenig and Chief
2008), Punjabi (Raja 2003), Stát'imcets and Skwxwúmesh (?),
Tagalog (Dell 1987), Tamil (Pederson 2007), Thai (Koenig and
Muansuwan 2000), among many others.

Key contrast

12. maayaa-ne biskuT-ko khaa-yaa
Maya-ERG cookie-ACC eat-PFV
 13. #aur use ab tak khaa rahii hai
and it still eat PROG be.PRS
'and is still eating it.'
- ▶ See Koenig and Muansuwan 2000 for parallel Thai data and discussion

Form	Is it ever used to describe an event that was instantiated in the past and continued to develop until the speech time?
a. English progressive	Yes
b. Russian perfective	No
c. Hindi perfective	No

Figure: Contrasting aspectual forms

Form	Does it ever lead to the imperfective paradox?
a. English progressive	Yes
b. Russian perfective	No
c. Hindi perfective	Yes

Figure: Contrasting aspectual forms

Defining viewpoint aspect

(Im)perfective operators:

14. An operator is perfective if it requires a maximal stage of an event in the extension of the VP that it combines with.
15. An operator is imperfective if it requires a stage of an event in the extension of the VP that it combines with, but this stage need not be maximal.

Extending Bach/Krifka

PROGRESSIVE (English): $\lambda P \lambda e'. \exists e (e' \sqsubset e \wedge P(e))$

IMPERFECTIVE (Russian): $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge P(e))$

PERFECTIVE (Hindi): $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge \text{MAX}(e', P) \wedge P(e))$

PERFECTIVE (Russian): $\lambda P \lambda e'. \exists e (e' = e \wedge \text{MAX}(e', P) \wedge P(e))$

- ▶ Altshuler [2014], building on Koenig and Muansuwan 2000, Filip 2001, 2008

Extending Bach/Krifka

PROGRESSIVE (English): $\lambda P \lambda e'. \exists e (e' \sqsubset e \wedge P(e))$

IMPERFECTIVE (Russian): $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge P(e))$

PERFECTIVE (Hindi): $\lambda P \lambda e'. \exists e (e' \sqsubseteq e \wedge \text{MAX}(e', P) \wedge P(e))$

PERFECTIVE (Russian): $\lambda P \lambda e'. \exists e (e' = e \wedge \text{MAX}(e', P) \wedge P(e))$

- ▶ Gyarmathy and Altshuler [forthcoming] treat the formulas above as *observations* in an abductive framework to derive culmination implications with the Hindi Perfective and the Russian Imperfective.
- ▶ See also Smith 1991, Bohnemeyer and Swift 2004, Bar-El et al. 2005, Arunachalam and Kothari 2010, 2011 for neo-Gricean approaches to deriving the culmination implicature; see Grønn 2003, 2007 for an optimality theoretic approaches to deriving the culmination implicature.

Question

Can we extend the Kleinian approach to account for the difference between, e.g. the English progressive and the Hindi perfective without going partitive in the event domain?

- ▶ see Bar-El et al. 2005, Tatevosov 2011

Further worry: Aspectual stacking in Russian

16. *Ivan čital knigu.*
Ivan IPF.read book
'Ivan was reading a book'.
17. *Ivan dočital knigu.*
Ivan PFV.IPF.read book
'Ivan finished a book'.
18. *Ivan dočityval knigu.*
Ivan IPF.PFV.IPF.read book
'Ivan was finishing a book'.

Russian imperfective a non-aspect?

'...there seems to be no structural functional category that could somehow be linked with an imperfective feature in AspP...there is no such thing as the meaning of the imperfective; this aspect' is really a non-aspect (Paslawska and von Stechow 2003, pp. 336).

Conclusion

- ▶ The Kleinian and Bach/Krifka approaches agree that viewpoint aspect makes reference to events
- ▶ The two approaches disagree in what viewpoint aspect relates the described event to
- ▶ Regardless of the approach taken, it seems that partitivity must sneak in somewhere, if not in the event domain, then in the time domain
- ▶ It's unclear how the Kleinian approach can account for the various flavors of perfectivity cross-linguistically and aspectual stacking in languages such as English and Russian

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