# On the asymmetry of space and time with verbs of predication

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# Goals of the Talk

To discuss the behavior of PPs used as *primary predicates*, across a range of copular verbs.

- The case of spatio-temporal predicates
  - *How are events introduced in predications involving space and time?*
  - *When can regular objects 'stand in' for events?*
- The case of verbs of change or retention:
  - *how do "become" or "end up" differ from "be"?*

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  - *When can regular objects 'stand in' for events?*
- The case of verbs of change or retention:
  - *how do "become" or "end up" differ from "be"?*

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# Merging Traditions: PPs as Primary Predicates

- Much research on copular predication has analyzed the role of adjectival and nominal predicates:

  (1) Bob is {a linguist / tall / drunk}

- A lot of the research on PPs has looked at their role as *modifiers*, typically rendered using event(ualitie)s:

  (2) a. Claire kissed Bob (in the kitchen) (at 7).
  b. $\exists$e[kissing(Claire, Bob, e) $\wedge$ in(e, kitchen) $\wedge$ at(e, 7)]

# PPs as predicates

Copular clauses can include some PPs (3)

(3)
a. Bob is {in Rome / under water / at home} *locative*
b. Bob is from NY. *origin (apparently: movement-from)*
c. The car is {for him / for sale} *benefactive / destination*
d. The matter is of great importance. *of*

# PPs as predicates

Copular clauses can include some PPs (3) , but not others (4):

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(4) a. *Bob is {at 5 / during the morning / for 80 years} *temporal*
b. *Bob is to NY. *to-place*

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**Relevant contrasts:**

- movement *from/to* ((3b) vs. (4b)): put aside here.
- locative-temporal ((3a) vs. (4a))

# Be + Locatives: Time vs. Space

*Non-eventive* subjects:

(5) a. Bob was in Rome ({in 1995 / when it was 1995 / during the 90ies})
b. *Bob was in 1995.
c. *Bob was in 1995 {here / when he was in Rome / as in Rome}

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(6) a. With [Claire in town (at 8)], we must celebrate.
b. From the station, she saw [Bob on the road].

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- Non-events may be predicated with places, and optionally times (5a). Overt *be* is not necessary (6).
- Non-events **cannot be predicated with a time alone** (5b), even when a place is provided via an adjunct (5c).

# Be + Locatives: Time vs. Space II

*Eventive* subjects:

(7) a. The party was at 9pm (in the garden)
b. The party was in the garden (at 9pm)

- Eventive subjects can provide an anchor for time.

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**The problem**

- Locatives must be able to anchor times (see *be on the road at 7pm*) and so must main verbs (see *kiss at 7*)
- but main verbs must also be able to host locative modifiers (see *John works [in the garden]*)

# **Caveat:** Non-event Subjects with Event Proxies

With non-event subjects, relevant events can be derived from the context, making time predicates available (with *at* or *between*)

(8) Our appointments are an hour apart: Frank is **at** 2, I'm **at** 3 o'clock, you are **at** 4. I am **between** you and Frank.

Italian: *in* vs. *tra* (conflated in English *in*)

(9) (doctor appointment scenario)

a. Io sono {tra / ??in} un ora, tu tra / ??in} 2.
I am {in / in} an hour, you {in / in} 2

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Default event is lifetime (if the temporal modifier spans it)

(10) Caesar was {in the 1st century BC / *in the morning}

# Non-event Subjects with Event Proxies II

- The derived event disallows *for* predicates (11), or *during* (12).
- No classic eventive verbs (*take place/happen*)

(11) (Doctor visit context):
*I will be for 30 minutes.

(12) Our races with start at noon, and some will overlap. I will be at 3.

a. ... Your race will {be / take place / happen} **during** mine.
b. ... You will {??be / *take place / *happen} **during** my race.
c. ... Your race will {*be / *take place / happen} **during** me.
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## Hypothesis

The derived event is punctual, and possibly defective.

# Locatives: some assumptions

**Proposal**

Locatives have 3 open arguments (an **eventuality**, a **participant** and a **time**)

- One argument is saturated by the external argument, the other two by Existential Closure (EC).
- The main predicate inside a locative, $\text{IN}_{space}$, applies to the eventuality itself, not to its participant.
- The eventuality can come:
  - From the subject: *The conference was in Udine*
  - From the verb: *Bob slept in Udine*
  - From the locative itself: *With Claire in Udine ...*

# Locatives: a semantic proposal

(13) in [*place*] = $\lambda T_{<vt>} \lambda x \lambda e_v$[PARTICIP(x,e) $\wedge$ IN(e,*place*) $\wedge$ T(e)] ≪vt><e<vt≫

(14) at [*time*] = $\lambda e_v$[AT(e) = *time*)] <vt>: *event property*

- In (13) the time modifier T expresses the idea that locatives are *always* stage-level (Maienborn 2001). T may be existentially closed (the event happens 'with some time modifier or other'), or take an overt temporal modifier like (14).
- The external argument binds either x (non-event entity) or e (event). The other argument is also existentially closed.
- In (14), on the other hand, *at* [*time*] only takes events as external arguments.
- Secondary clauses (e.g. *when he was here*) establish a relation with the event in the main clause, but do not introduce a new event.

# Locatives: example

(15) in [*place*] = $\lambda T_{<vt>} \lambda x \lambda e_v [\textsc{participip}(x,e) \wedge \textsc{in}(e,\textit{place}) \wedge T(e)]$ $\ll$vt$>$$<$e$<$vt$\gg$

(16) at [*time*] = $\lambda e_v [\textsc{at}(e) = \textit{time})]$ $<$vt$>$: *event property*

The price to pay: predicates that can accommodate time/space modifiers must now come with open arguments for both modifiers, to be closed with EC when they are missing.

(17) kissed = $\lambda S \lambda T \lambda y \exists e' [\textsc{kiss}(e') \wedge \textsc{agent}(y,e') \wedge T(e') \wedge S(T)(y)(e')]]$

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(17) kissed = $\lambda S \lambda T \lambda y \exists e'$[KISS(e′) $\wedge$ AGENT(y,e′) $\wedge$ T(e′) $\wedge$ S(T)(y)(e′)]]

(18) a. kissed in Udine = $\lambda S' \lambda T' \lambda y \exists e'$[KISS(e′) $\wedge$ AGENT(y,e′) $\wedge$ T′(e′) $\wedge$ S′(T′)(y)(e′)](λTλxλe$_v$[PARTICIP(x,e) $\wedge$ IN(e,*Udine*) $\wedge$ T(e)]) =
*after reduction / existential closure*
$\exists T' \lambda y \exists e'$[KISS(e′) $\wedge$ AGENT(y,e′) $\wedge$ [PARTICIP(y,e′) $\wedge$ IN(e′,*Udine*) $\wedge$ T(e′)]]

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$\exists T' \lambda y \exists e'$[KISS(e′) ∧ AGENT(y,e′) ∧ [PARTICIP(y,e′) ∧ IN(e′,*Udine*) ∧ T(e′)]]

b. kissed in Udine at 7 = $\lambda S' \lambda T' \lambda y \exists e'$[KISS(e′) ∧ AGENT(y,e) ∧ T′(e′) ∧ S′(T′)(y)(e′)]
(λTλxλe$_v$[PARTICIP(x,e′) ∧ IN(e,*Udine*) ∧ T(e)]) *space argument*
(λe$_v$[AT(e) = 7pm)]) *time argument*
*after reduction:*
λy∃e′[KISS(e′) ∧ AGENT(y,e′) ∧ [PARTICIP(y,e′) ∧ IN(e′,*Udine*)] ∧ AT(e′) = 7pm]

# Beyond *be*: verbs of change or persistence

A lot of research on predication just looks at *be*. But there other verbs that *prima facie* have similar meanings and a tight relation with the copula:

(19) becoming, remaining, ending up, staying ...

Plausible decompositions:

(20) a. X became Y $=_{def}$ X changed from not being Y to being Y
b. X remained Y $=_{def}$ X did not change from being Y to being not Y

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However, these verbs show partially divergent patterns:

(21) a. The pet {was / *became / remained / stayed } {here / in the garden / with her}
b. The party {was / *became / remained / *stayed} at 9pm.
c. The issue {became / remains / *stays} of the utmost importance.

# Becoming

(22) a. Bob {is / became} a doctor / Superman
b. Bob {is / became} tired / tall.
c. Bob {is / became} interested

(23) a. Bob {is / *became} in Rome/in a bad mood
b. Bob {is / *became} under the bed/under the weather.

But some *of* PPs are still acceptable:

(24) a. That matter now becomes of great importance.
b. These events became of some significance.

(25) Gianni è diventato di cattivo umore.
Gianni is become of bad mood.
vs. '*Gianni became in a bad mood.'

# Becoming (II)

When a nominal or adjectival predicate is provided (26), *become* allows the same range of PPs as any verb, now functioning as modifiers.

(26) Bob became a father/rich {in Italy / at 40 / with ease / without any problem}

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**Proposal:**

- *become* requires the change of state to apply *to its external argument*.
  The problem of **Bob became in the garden* is that the change (from not being to being in the garden) concerns the *event* that has Bob as a participant, not Bob himself.
- the *of*-PPs in *become of some importance* differ from temporal/locative PPs in that these PPs apply to the individual bound to the external argument (be they events or objects)

# "Becoming" vs. "ending up"

- The restriction on *become* are inverted in *ending up* (an achievement in the Dowty-Vendler classification, unlike *become*).
- *End up* dislikes changes that directly apply to the participant (27a) but has no problem with locatives (27b).

(27) a. ?Growing up, Bob ended up {scary / dull / furry}
b. Bob ended up in the garden. *a change of location*

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- When *end up* applies to gerund clauses, it opens up new meanings (a change *in the speaker's state-of-knowledge* in (28), (29))

(28) The Manaslu peak ended up *(being) in Nepal. *a discovery*

(29) *The film ended up *(being) boring. $\neq$*became boring at the end*

# Remaining

*Remain* behaves like *be*, but with interesting twists.

(30) You can buy kilts made in Italy now, but

a. the best ones are still from Scotland.

b. ?*the best ones {remain / became} from Scotland.

c. the best ones {remain / became} the ones from Scotland.

Assumptions:

- *remain* says that a property has not changed, *become* that it has.
- These statements become vacuous (with *remain*) or contradictory (with *become*) if applied to properties that *cannot* change.
- One such properties is 'originating-from X' (once you do, you do).
- (30c) is specificational: its meaning is similar to (31):

(31) The ones from Scotland remain the best ones.

# Loose ends

- *Become*'s constraints (change must be applied to the external argument) predict that (32) should be acceptable, but it is not (ok, with *became crowded*)

  (32) ??With daylight saving time setting in, the party became at 8pm.

- Difference between *stay* vs. *remain* (an activity vs. state contrast?)

  (33) Five people took rooms in the hotel. Two left, three {stayed / are staying / remain / *are remaining}.

# Take Home Lessons

- Temporal and locative PPs used as predicates have diverging behaviors: locatives provide an event, while times require it.
- In appropriate contexts, a proxy event may be generated for non eventive subjects, to satisfy time predicates that are content with a punctual event.
- *Becoming* and *ending up* are verbs of change, but they put different restrictions on which ingredients get changed: the participant or the event.

# Thanks!

Happy San Valentine!

Service message

I am looking for a graduate student for next year (4 year PhD at the Center for Mind/Brain Science, University of Trento).

Please spread the word!

# References I

Farkas, D. F. and Y. Sugioka (1983).
Restrictive if/when clauses.
*Linguistics and Philosophy 6*(2), 225–258.

Maienborn, C. (2001).
On the position and interpretation of locative modifiers.
*Nat. Lang. Semantics 9*(2), 191–240.

# When vs. Where clauses

The time/space asymmetry is reflected in the difference between *when*-clauses (which can take an a-temporal meaning, Farkas and Sugioka 1983) and *where*-clauses.

(34) a. Bob was happy where he was.
b. *Bob was happy when he was. *unless "...when he was happy"*

Not derivable from: *Bob was [at 5pm]*: same problem with eventive subjects:

(35) a. The party was successful where it was. *i.e. they picked the right venue*
b. *The party was successful when it was. *i.e. they picked the right time*

*Whenever* vs. *Wherever* meanings:

(36) a. Bob was happy when he was in Rome.
b. *Bob was happy where he was in 1995.