Aspectual differences between agentive vs. non-agentive uses of causative predicates

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Do the aspectual properties of causative VPs vary with the thematic role associated to the subject?

- Causative predicates may have both agent and causer external arguments.
- External arguments are not arguments of their verbs.

Not uncommon conclusion from these two assumptions:

- The alternation between agent and causer external arguments is irrelevant for the aspectual properties of the VP, for they lie outside the event structure relevant for the calculation of these properties.

Take home message

Agentivity is decisive for the aspectual properties of causative predicates.

Data under study

'Zero-change' use of causative predicates: no change developing towards a *P*-result state in the theme's referent.

Mandarin

(1) Lùlu **guān-le** nà-shàn mén, dàn méi guān-shàng.
Lulu close-PFV that-CL door but NEG close-up
'Lulu closed that door, but it didn't get closed at all.'

(1) true if Lulu tried to close the door, but didn't manage even to partly close it because something was blocking it.

(2) Nà-zhen feng **guān-le** nà-shàn mén, #dàn méi guān-shàng
that-CL wind close-PFV that-CL door but NEG close-up
Intended:'That gust of wind closed that door, but it didn't get closed at all.'

Data under study

(3) Mandarin, Demirdache and Martin (2015)
Lùlu **shāo le** tā-de shu, dàn méi shāo zháo.
Lulu burn-PFV 3SG-DE book but NEG burn touch
'Lulu burned her book, but it didn't get burnt at all'

True if Lulu put the book into the fire, and the book didn't get burned at all before I took it away from it, because it was too humid to immediately get on fire.

(4) Huǒ **shāo le** tā-de shu, #dàn méi shāo zháo.
fire burn-PFV 3SG-DE book but NEG burn touch
Intended: 'The fire burned her book, but it didn't get burnt at all'

Zero-change use: not with anticausatives

When used intransitively, the zero-change reading is impossible.
Mandarin, Martin et al. (2018):

(5) Mén **guān le**, (#dàn gēnběn méi guān-shàng).
door close PFV but at all NEG.PFV
Intended: 'The door closed (but it didn't get closed at all).'

(6) Shū **shāo-le**, (#dàn gēnběn méi shāo-zháo).
book burn-PFV but at all NEG.PFV burn-ignite
Intended: 'The book burned, but it didn't get burned at all.'

Mandarin causative SVs with zero-change uses

(7)
a. *shāo* 'burn'
b. *sī* 'tear'
c. *mái* 'bury'
d. *fā* 'leaven'
e. *kāi* 'open'
f. *guān* 'close'
g. *rǎn* 'dye (one's hair)'
h. *zhé yí ge shù zhī* 'break a branch'

(8)
a. *shā* 'kill'
b. *chú* 'get rid of (the tyrant)'
c. *zhāi* 'pick (a flower)'
d. *suì* 'break (a plate)'
e. *xī* 'blow out (a candle)'

All these verbs are run-of-the-mill causative verbs:

(9) *guān mén* 'close the door' $\rightsquigarrow \lambda e.\exists s \mathbf{cause}(e, s) \wedge \mathit{closed}(s) \wedge \mathbf{theme}(\mathbf{door}, s)$

Further illustration from English

English, adapted from Oehrle 1976, 22

(10) a. Ivan **taught** me the basics of Russian, but I still don't know anything.
b. Lipson's textbook **taught** me the basics of Russian, #but I still don't know anything.

Cf. Oehrle (1976), Martin and Schäfer (2017).
These verbs are not run-of-the-mill causative verbs:they encode a sublexical modal operator (Koenig and Davis 2001).

(23) teach y to $z \rightsquigarrow$
$\lambda y \lambda z \lambda e[\mathbf{teach}(e) \wedge \mathbf{theme}(e, y) \wedge \Box_{\rho} \exists s.(\mathbf{cause}(e, s) \wedge \mathbf{know}(s) \wedge \mathbf{theme}(s, y) \wedge \mathbf{holder}(s, z))]$

Further illustration from French

French, adapted from Martin and Schäfer 2017, 22

(11) a. Certes, ce professeur leur **a enseigné** l'espagnol. Mais
true this teacher them teach.PFV.3SG the spanish but
ils ne l'ont jamais vraiment appris
they NEG it-have never really learned
'True, this teacher taught them Spanish, but they never really learned it.'

b. Certes, ce bain linguistique prolongé leur **a enseigné**
true this bath linguistic extended them teach.PFV.3SG
l'espagnol. #Mais ils ne l'ont jamais vraiment appris.
the spanish but they NEG it-have never really learned
'True, this extended linguistic bath taught them Spanish, but they never really learned it.'

These verbs are not run-of-the-mill causative verbs.

Further illustration from French

(12) French, Martin (2015)

a. Dr Li **m'a** **soigné**, (mais je n'ai pas guéri du tout).
dr Li me=has treated but I NEG=has NEG cured at all
'Dr. Li **treated** me, but I didn't recover at all.'

b. Ce séjour chez sa soeur l'a **soignée**, (#mais elle n'a pas guéri du tout).
this stay at her sister she=has treated but she NEG=has NEG cured at all
'This stay at her sister's cured (lit.: **treated**) her, (#but she didn't recover at all).'

No zero-change reading with anticausative uses

(13) French

Ma blessure **s'est** **soignée** (toute seule), #mais elle n'a
My wound REFL.is treated (by itself) but she NEG.has
pas guéri du tout.
NEG cured at all

'My wound cured (lit.: treated) by itself, but it didn't cure at all.'

Cross-linguistic generalization

Cross-linguistic generalization: with a subset of causative verbs,

- The theme's referent does not have to endure any change developing towards a result state of the type encoded by the VP if the subject is individual-denoting and associated with some agentive properties (zero-change reading available)
- In contrast, at least part of a change developing towards a *P*-result state is typically assumed to take place when the subject denotes an an eventuality or an inanimate entity devoided of agentive properties (zero-change reading not available)

See Sato (today's previous talk) on Indonesian, Jacobs 2011 on Salish languages, Demirdache and Martin 2015, Liu 2018 and van Hout et al. 2017 on Mandarin, Tsujimura 2003, 297-298 on Japanese, Travis 2010, 213 and Paul et al. 2016 on Malagasy, Park 1993 and Beavers and Lee 2019 on Korean, Kratochvíl and Delpada 2015 on Abui

Cross-linguistic generalization

Further related generalization:

- for alternating verbs, the zero-change use is not available when the verb is used as an anticausative.

See Mandarin, as well as Korean and French.

Cross-linguistic difference

In languages such as Mandarin, the 'change' inference seems quite strong even with agent subjects:

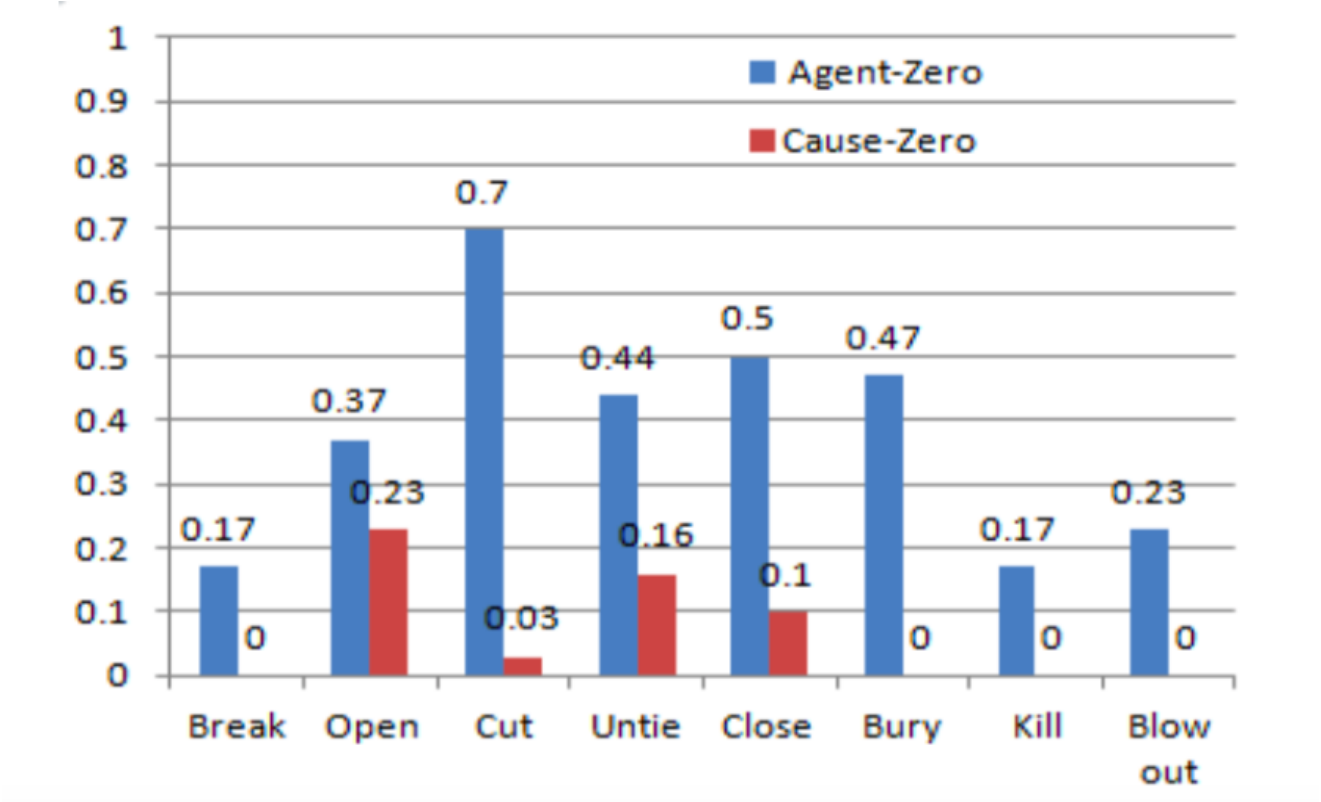


Figure: 'Yes' answers across verbs in a zero-change situation with 30 Mandarin speaking adults (TVJT, Liu 2018)

Cross-linguistic difference

Chen's 2016 collection of acceptability judgments from 84 Mandarin speakers on a [1-5] scale (1=completely acceptable; 5=completely unacceptable):

Rating\Sentences	1	2	3	4	5	Total	Mean	SD
1 crack	35	35	6	8	0	84	1·85	0·92
2 shoot	37	32	4	9	2	84	1·89	1·06
3 blow	37	31	5	8	3	84	1·92	1·1
4 fill	35	31	7	9	2	84	1·95	1·07
5 break	36	30	6	8	4	84	1·98	1·15
6 wake	13	37	9	20	5	84	2·61	1·18
7 pick	11	13	12	28	20	84	3·39	1·35
8 close	9	10	11	29	25	84	3·61	1·32
Total	213	219	60	119	61	672	2·57	1·19

$\rightsquigarrow$ zero-change uses of perfective causative SVs used agentively are possible, but restricted.

Cross-linguistic difference

For languages such as French, German and English, the few available experimental data suggest that the change inference is much easier to cancel with agents:

- Paper and pencil judgment survey on two French verbs:

N=19	Agent	Causer
soigner 'treat/cure'	4,8	1,7
enseigner 'teach'	4,8	2,3

Table: Mean score judgments on a [0-5] scale for the zero-result use of *soigner* and *enseigner* (0=totally unacceptable; 5=totally acceptable)

- Kazanina et al.'s 2019: 90% of 29 English speaking adult speakers tested accepted sentences such as *Jane threw the frisbee to Woolly* as a description of a failed transfer.

Research questions

Two research questions:

Q1 Why is the zero-change use easier with agents than with causers?

Q2 Why is the change inference with agents stronger in Mandarin than in French, German or English, at least with the predicates under study?

Source of the zero-change use in Mandarin: not lexical aspect

Claim 1

Mandarin SVs licensing zero-change uses under study are run-of-the-mill causative predicates (Martin et al. 2018a), rather than activity verbs conventionally associated with a result, i.e. *wash*-verbs (*pace* Talmy 1991, Chen 2017)

(14) a. *guān mén* 'close the door'
$\rightsquigarrow \lambda e.\exists s \mathbf{cause}(e, s) \wedge \mathit{closed}(s) \wedge \mathbf{theme}(\mathbf{door}, s)$
b. *xǐ jiàn* 'wash the coat' $\rightsquigarrow \lambda e.\mathbf{wash}(e) \wedge \mathbf{theme}(\mathbf{coat}, e)$

Arguments (Martin, Sun, Demirdache and Liu 2018a):

- Restitutive use of *again* with bi-eventive SVs only;
- The middle form entails a change with bi-eventive SVs only

Source of the zero-change use in Mandarin: not inner aspect

Lulu bought a toy castle with a door which is built-in closed. She opened the door once and then pulled the door to close it once.

(15) Lùlu yòu guān-le nà-shàn mén.
Lulu again close-PFV that CL
'Lulu closed the door again.' (restitutive reading OK, *pace* Beck 2005)

Lulu bought a brand new jacket, and washed it once after it got dirty:

(16) Lùlu yòu xǐ le nèi-jiàn shàngyī.
Lulu again wash PFV that-CL jacket
'Lulu washed her jacket again.' (no restitutive reading)

Source of the zero-change use in Mandarin: not inner aspect

(17) Yīfú xǐ le, dán yīdiǎn dōu méi xǐ-gānjíng.
coat wash PFV but a.little DOU NEG.PFV wash-clean
'The coat got washed, but not a little bit of it did even get clean.'

(18) Mén guān le, (#dàn gēnběn méi guān-sháng).
door close PFV but at all NEG.PFV close-up
Intended: 'The door got closed, but it didn't get closed at all.'

Source of the zero-change use in Mandarin: outer aspect

Claim 2

The locus of the zero-change use for the causative SVs under study is the Mandarin perfective (Koenig and Muansuwan 2000, Martin et al. 2018b a.o.)

- Koenig and Muansuwan (2000), Altshuler (2014): the standard definition of the perfective is not appropriate for many South and East Asian languages (Thai, Hindi, Mandarin Chinese): (the neo-Kleinian relation between the topic time and the event time is here ignored)

(19) $[\![\text{PFV}_C]\!] = \lambda P \exists e[P(e)]$ (standard definition)

- In these languages, the perfective entails event maximality, not event completion (Martin and Gyarmathy 2018 call them weak perfectives)

(20) $[\![\text{PFV}_M]\!] = \lambda P \exists e[\text{MAX}(e, P)]$ (Koenig & Muansuwan/Altshuler's def.)

Source of the zero-change use in Mandarin: outer aspect

Weak perfectives are partitive operators (Altshuler 2014):

(21) MAX(e, P) :=

a. e is a (proper or improper) part of a possible P-event and
b. e is not a proper part of any actual event that is part of a possible P-event. (Altshuler's definition is more elaborate)

(22) Lùlu kāi-le nà-shàn mén, dànshì mén gēnběn méi kāi.
Lulu open-PFV that-CL door but door at all not open
'Lulu opened that door, but it didn't open at all.'

(23) #Lùlu kāi-le nà-shàn mén, érqiě hái zài kāi.
Lulu open-PFV that-CL door and still PROG open
Intended: 'Lulu opened that door, and she is still opening it.'

Source of the zero-change use in Mandarin: weak perfectivity

Perfective operator	**Requires completion?**	**Requires max.?**	**Semantics**
Weak (Hindi, Mandarin)	No	Yes	$[\![\text{PFV}_M]\!]$
Strong (French, English, Russian)	Yes	Yes	$[\![\text{PFV}_{C+M}]\!]$

Table: A finer-grained typology of perfective operators (Altshuler and Filip 2014, Altshuler 2014; 2016, Martin and Gyarmathy 2018)

- $[\![\text{PFV}_M]\!] = \lambda P \exists e[\text{MAX}(e, P)]$, while
- $[\![\text{PFV}_{C+M}]\!] = \lambda P \exists e[\text{MAX}(e, P) \wedge P(e)]$.

Source of the zero-change use in Romance/Germanic: sublexical modality

In languages such as French, English, or German, which do not have a partitive perfective, zero-change uses are licensed by a modal operator encoded at the sublexical level (Koenig and Davis 2001, Martin and Schäfer 2017):

(24) enseigner y à z 'teach y to z' $\rightsquigarrow$
$\lambda y \lambda z \lambda e[\textbf{teach}(e) \wedge \textbf{theme}(e, y) \wedge$
$\Box_\rho \exists s.(\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge \textbf{theme}(s, y) \wedge \textbf{holder}(s, z))]$

- These verbs have the (morpho-)syntax and event structure of causative predicates, but do not entail that the caused state obtains in w_0.
- Hence the label 'defeasible causatives'.

Source of the zero-change use in Romance/Germanic: sublexical modality

(25) teach y to $z \rightsquigarrow$
$\lambda y \lambda z \lambda e[\textbf{teach}(e) \wedge \textbf{theme}(e, y) \wedge \Box_\rho \exists s.(\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge \textbf{theme}(s, y) \wedge \textbf{holder}(s, z))]$

(26) Ivan **taught** me the basics of Russian, but I still don't know anything.

- In (25), when the causing event e is bound by a perfective requiring event completion, e must therefore be complete with respect to the 'manner' predicate (**teach-the-basics-of-Russian** in (26)).
- This is a welcome prediction: (26) is false if Ivan didn't perform a complete **teach-the-basics-of-Russian** event.
- events complete wrt $P \neq$ events successful wrt P.

Proposal in a nutshell (Q1)

Why is the change inference stronger with causer than agent subjects across languages?:

- The way the VP combines with the functional head introducing the external argument is crucial for the change inference triggered by the resulting structure;
- Although causative verbs keep the same semantics (i.e. causative, bi-eventive event structure) when combined with Voice_{ag} and Voice_{c}, the causative event type is tokenized in a different way (is mapped with different event chunks in the model) depending on whether the external argument is an agent or a causer.
- This difference in the tokenization of the causative event type is due to the semantic differences between Voice_{ag} and Voice_{c}.

Basic assumptions on the syntax and semantics of lexical causative verbs

- A derivation starts with a non-decomposable root, which combines with functional categories to build words (Marantz 1997, Embick and Noyer 2006);
- Voice is the functional category introducing the external argument of the predicate it combines with (Kratzer 1996);
- Voice receives a different meaning depending on whether it introduces a causer or an agent external argument (Schäfer 2008).

Voice$_{ag}$ vs. Voice$_{c}$

The functional head introducing agent subjects, or Voice$_{ag}$

- does not introduce any further eventuality;
- only introduces an external argument x of an event e denoted by the VP it combines with, and
- specifies that x is the agent of e (Kratzer 1996).

The functional head introducing causer subjects, or Voice$_{c}$

- introduces a further eventuality v (an external argument)
- as well as a relation R between v and the event e denoted by the VP it combines with, (Pylkkänen 2008).

Key question: the nature of the relation R.

Causative and anticausative verbs have a bi-eventive structure

- Kratzer (2005), Schäfer (2008), Alexiadou et al. (2006; 2015) a.o.: we can dispense with the BECOME predicate in the representation of lexical causatives, and simply be left with a causing event *e* and a result state *s*.
- $\rightsquigarrow$ Causatives and anticausatives have exactly the same event structure, and semantically differ only by the presence vs. absence of Voice (Schäfer 2008).
- The causative alternation is essentially a Voice alternation.

Causative and anticausative verbs have a bi-eventive structure

Take e.g. *shā* 'kill' in Mandarin, also used as an anticausative by a subset of Mandarin speakers:

(27) *shā Fido* 'kill Fido/Fido die' $\rightsquigarrow$
$\lambda e.\exists s(\mathbf{cause}(e,s) \wedge \mathbf{dead}(s) \wedge \mathbf{theme}(s,\mathbf{fido}))$

On its anticausative use, *shā Fido* receives the meaning (27), while on the agentive causative use, it receives the meaning in (28b).

(28) a. $\text{Voice}_{ag} \rightsquigarrow \lambda P \lambda x \lambda e.\mathbf{agent}(e,x) \wedge P(e)$
b. Voice_{ag} [shā Fido] $\rightsquigarrow$
$[\lambda P \lambda x \lambda e.\mathbf{agent}(e,x) \wedge P(e)]$
$(\lambda e.\exists s(\mathbf{cause}(e,s) \wedge \mathbf{dead}(s) \wedge \mathbf{theme}(s,\mathbf{fido})) =$
$\lambda x \lambda e.\exists s(\mathbf{agent}(e,x) \wedge \mathbf{cause}(e,s) \wedge \mathbf{dead}(s) \wedge \mathbf{theme}(s,\mathbf{fido}))$

But... the causative event type is tokenized differently

OK, the event structure is identical in both the intransitive and transitive uses....
But the causative event type $\lambda e...P(e)...$ is tokenized differently, because the number of participants involved in causing events in $[\![\text{VP}]\!]$ is different.

But... the causative event type is tokenized differently

Intransitive use:

- only one participant is involved in causing events in ⟦VP⟧ (the theme's referent).
- ⇝ Therefore, the causative event type denoted by the VP is tokenized as a change-of-state of the participant—aka a BECOME event.
- Note that it is quite normal to conceive a change developing towards a *P*-result state as a cause of this state.
- Causative analyses have been proposed for inchoative verbs.

E.g., Piñón (2011) analyses Hungarian inchoative verbs such as *hőssé válik* 'turn into a hero' or *el tűnik* 'disappear' as encoding a causal relation between a (turn-into or disappear) event and an ensuing result state (of being a hero or out of sight).

But... the bi-eventive event type is tokenized differently

Transitive (agentive) use: (uncontroversial)

- two participants are involved in causing events in $[\![\text{VP}]\!]$, namely the subject's referent—the agent of e—and the theme's referent;
- $\rightsquigarrow$ the causative event type denoted by the VP is tokenized as a *bigger* and more *complex* event.

Transitive (non-agentive) use: (less uncontroversial)

- one participant is involved in causing events in $[\![\text{VP}]\!]$, namely the theme's referent (in canonical cases);
- $\rightsquigarrow$ the causative event type denoted by the VP is tokenized as a CoS of the theme.

Proposal (part I)

Tokenizations of agentive vs. non-agentive causative event types

- Event types denoted by causative VPs used agentively are tokenized as events having an action e' of the subject's referent and an ensuing change-of-state e'' of the theme's referent as proper parts.
- Event types denoted by causative VPs used non agentively are tokenized as changes of state e'' of the theme's referent (in canonical cases).

Onset of agentive vs. non-agentive causing events

$\rightsquigarrow$ A causing event e in $[\![\text{VP}]\!]$ starts either with an action (with agents) or with a CoS of the theme (with causers) (in canonical cases)

Proposal (Part 1)

- $\rightsquigarrow$ If we abstract away from the external argument, a non-agentive causative VP is tokenized the same way as its anticausative counterpart.
- The main difference between non-agentive causative VPs and anticausative VPs is that in the former case, there is an external argument which introduces an eventuality v causing the event e denoted by the VP.

Proposal (part II)

Definition for Voice_{ag}:

$\text{Voice}_{ag} \rightsquigarrow \lambda P \lambda x \lambda e.\textbf{agent}(e, x) \wedge P(e)$ (Kratzer 1996)

Definition for Voice_{c} by Pylkkänen (2008)

Voice_{c} identifies the event introduced by the subject e and the causing event introduced by the verb:

(29) $\text{Voice}_{P} \rightsquigarrow \lambda P \lambda e \lambda e'.P(e') \wedge e = e'$

New definition for Voice_{c}:

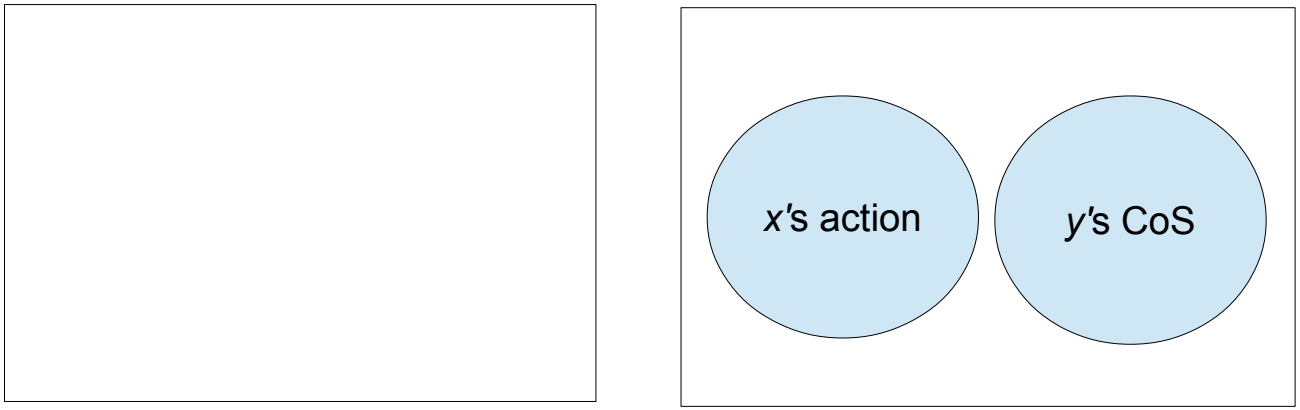
- $\text{Voice}_{c} \rightsquigarrow \lambda P \lambda v \lambda e.\textbf{event}(v) \vee \textbf{state}(v) \wedge R(v, e) \wedge P(e)$
- R can either be **cause**, or **overlap** '$\circ$'
- **cause** is very much preferred

Tokenization of causative event types: 1) standard causatives with agents

(30) a. $\text{Voice}_{ag} \rightsquigarrow \lambda P \lambda x \lambda e.\mathbf{agent}(e, x) \wedge P(e)$ (Kratzer 1996)

b. $\text{Lulu}[\text{Voice}_{ag}[\text{close the door}]] \rightsquigarrow$
$\lambda e.\exists s(\mathbf{agent}(e, \mathbf{lulu}) \wedge$
$\mathbf{cause}(e, s) \wedge \mathbf{closed}(s) \wedge \mathbf{theme}(s, \iota x.\mathbf{door}(x)))$

The event type $\lambda e...P(e)...$ corresponding to $[\![\text{causative VP}]\!]$ is tokenized by an action of x and a CoS of the theme y in the model:



no eventuality denoted by the subject causing event denoted by the VP

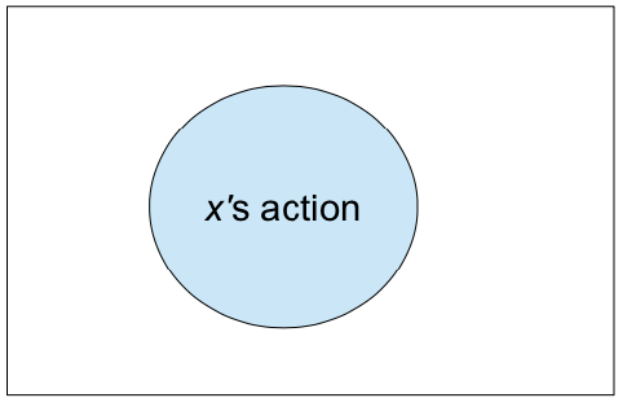
Tokenization of causative event types: 2) defeasible causatives with agents

(31) a. $\text{Voice}_{ag} \rightsquigarrow \lambda P \lambda x \lambda e.\textbf{agent}(e, x) \wedge P(e)$ (Kratzer 1996)

b. Lulu[Voice_{ag}[teach Mary the basics of Russian]] $\rightsquigarrow$
$\lambda e.(\textbf{teach}(e) \wedge \textbf{agent}(e, \textbf{lulu}) \wedge \textbf{theme}(e, \textbf{basics-Russian}) \wedge$
$\Box_\rho \exists s.(\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge \textbf{theme}(s, \textbf{basics-Russian}) \wedge$
$\textbf{holder}(s, \textbf{mary}))$

The event type $\lambda e...P(e)...$ corresponding to defeasible ⟦causative VP⟧ is tokenized by an action of x in the model:

no eventuality denoted by the subject



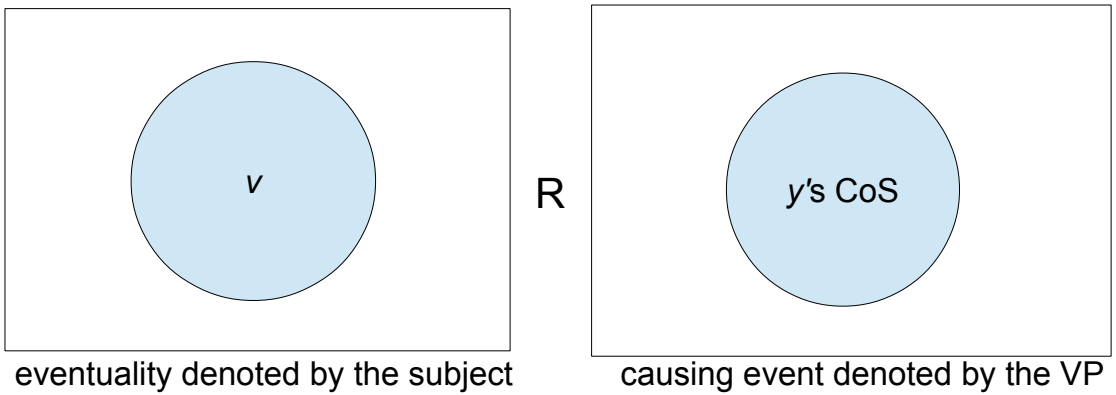
causing event denoted by the VP

Tokenization of causative event types: 3) (all) causatives with causers

(32) $\text{Voice}_c \rightsquigarrow \lambda P \lambda e \lambda v.\textbf{event}(v) \vee \textbf{state}(v) \wedge \textbf{cause}(v, e) \wedge P(e)$

(33) The gust of wind[Voice_c[close the door]] $\rightsquigarrow$
$\lambda e.\exists s(\textbf{cause}(\iota v.\textbf{gust-of-wind}(v), e) \wedge \textbf{event}(v) \vee \textbf{state}(v) \wedge$
$\textbf{cause}(e, s) \wedge \textbf{closed}(s) \wedge \textbf{theme}(s, \iota x.\textbf{door}(x))$

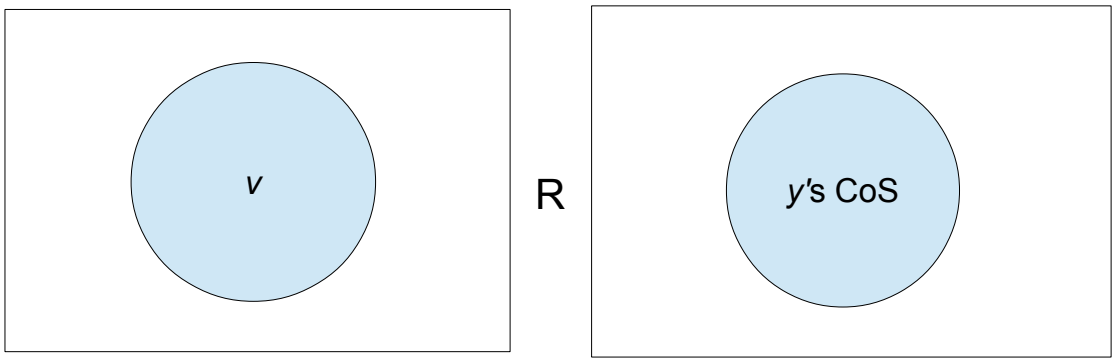
The event type $\lambda e...P(e)...$ in ⟦causative VP⟧ is tokenized by a CoS of the theme in the model (when R=**cause**):



Tokenization of causative event types: 3) (all) causatives with causers

(34) $\text{Voice}_c \rightsquigarrow \lambda P \lambda e \lambda v.\mathbf{event}(v) \vee \mathbf{state}(v) \wedge \mathbf{cause}(v, e) \wedge P(e)$

(35) This experience[Voice_c[teach Mary the basics of medicine]] $\rightsquigarrow$
$\lambda e.(\mathbf{cause}(\iota v.\mathbf{this\text{-}exp}(v), e) \wedge \mathbf{event}(v) \vee \mathbf{state}(v)) \wedge \mathbf{teach}(e) \wedge$
$\mathbf{theme}(e, \iota x.\mathbf{basics\text{-}of\text{-}med}(x)) \wedge \Box_\rho \exists s.\mathbf{cause}(e, s) \wedge \mathbf{know}(s) \wedge$
$\mathbf{theme}(s, \iota x.\mathbf{basics\text{-}of\text{-}med}(x) \wedge \mathbf{holder}(s, \mathbf{mary}))$



Argument 1: *in*-adverbials

- An *in*-adverbial measures the time span between the onset and the telos of the (complete) eventualities denoted by the predicate.
- With a causative predicate, it therefore measures the time span of the causing event (telos(e)=left boundary(s)).

Let us compare the interpretation of such adverbials when modifying causatives used agentively and non-agentively.

Argument 1: *in*-adverbials

(36) Mary killed the mosquito in ten minutes (OK that said, it died in less than a minute).

The *in*-adverbial measures the time span of the causing event e, mapped to the x's action e' *and* y's change-of-state e''.
$\rightsquigarrow$ The continuation in parenthesis is not contradictory, because it might be that $\tau(\text{CoS } e'') \subset \tau(\text{causing event } e)$.

Argument 1: *in*-adverbials

(37) The poison killed him in ten minutes (#that being said, he died in less than a minute).

In (37), the *in*-adverbial measures *y*'s change-of-state—the dying event, exactly as in the anticausative counterpart of (37):

(38) He died in ten minutes because of the poison.

Argument 2: *begin*-statements

A third argument concerns the interpretation of *begin*-causative statements.
When the causative predicate has a causer subject, the causative *begin*-statement requires the change-of-state to start:

(39) a. The conversation started giving her an idea.
b. The heat started breaking the stone.
c. The fire started burning the books.

This is expected if a causative event type is tokenized as a change-of-state when the predicate is combined with Voice_c.

Argument 2: *begin*-statements

When the causative predicate is used agentively, the *begin*-statement entails that an action performed by the subject's referent has started (onset of the action=onset of the causing event). But in an appropriate context, such an action may start although no ensuing CoS has been initiated yet:

(40) a. Paul started giving her an idea (but she is even not listening to him...).
b. The workers started breaking the stone (but it's so hard, it will take some time before it starts breaking).
c. Lulu started burning the book (but it's so humid, it may take a lot of time before it starts burning).

Argument 3: progressive causative sentences

(41) a. The bulldozer is destroying this house.
b. The storm is destroying this house.

- Sentence (41a) is typically judged true although this house is still untouched if the intention of the bulldozer's driver is known.
- Is (41b) equally judged true if the house hasn't started getting destroyed yet? (No: Bonomi 1997, Truswell 2011 a.o.)
- TVJT on (42) after the tornado-video (N=28, native speakers of French):

`www.youtube.com/watch?v=M77jJh6B4ok&feature=youtu.be`

(42) In the first seconds of the video, the tornado is destroying the house.

- Results: 70% NO, 21% YES, and 9% undecided.
- Again, this supports the view that a causative event type denoted by a VP used non-agentively is tokenized as a CoS of the theme.

Argument 4: separate adverbial modification

Martin (2018):

(43) Fred$_i$ shot$_e$ his dog on Dec. 23!
#**He**$_i$ eventually **killed**$_{e' \supset e}$ it on Dec. 25.

(44) Fred shot his dog on Dec. 23!
OK**This gunshot/this** eventually **killed** it on Dec. 25.

- Fodor (1970) is right: separate modification never seems possible with entity-denoting subjects...
- ...but with eventuality-denoting subjects, it is possible to modify separately the eventuality denoted by the subject, and the (causing) *P*-ing event.

Argument 4: separate adverbial modification

(45) a. Fred accidentally shot his dog on Dec. 23!
OK**This gunshot/this** eventually **killed** it on Dec. 25.

The gunshot *causes* the causing event e leading to death denoted by the verb (rather than being identified with it). $\rightsquigarrow$ v may take place before the event e that must take place on December 25, e.g. on December 23:

(46) The gunshot[Voice$_c$[On December 25[kill Fido]]] $\rightsquigarrow$
$\lambda e.\exists s(\mathbf{cause}(\iota v.\mathbf{gunshot}(v), e) \wedge \mathbf{event}(v) \vee \mathbf{state}(v) \wedge \tau(v) \subseteq$
$\mathbf{dec.\ 23} \wedge \mathbf{cause}(e, s) \wedge$
$\mathbf{dead}(s) \wedge \mathbf{theme}(s, \mathbf{fido}) \wedge \tau(e) \subseteq \mathbf{dec.\ 25})$

See also:

(47) Yesterday's stabbing eventually killed him this morning.

Argument 4: separate adverbial modification

(48) Fred$_i$ shot$_e$ his dog on Dec. 23!
#**He**$_i$ eventually **killed**$_{e' \supset e}$ it on Dec. 25.

The problem of (48) is due to the fact that the temporal adverbial *must* scope on the single (causing) event in the event structure:

(49) Voice$_{ag}$ [on December 25[kill Fido]] $\rightsquigarrow$
$[\lambda P \lambda x \lambda e.\mathbf{agent}(e, x) \wedge P(e)]$
$(\lambda e.\exists s(\mathbf{cause}(e, s) \wedge \mathbf{dead}(s) \wedge \mathbf{theme}(s, \mathbf{fido}) \wedge \tau(e) \subseteq \mathbf{dec.\ 25}) =$
$\lambda x \lambda e.\exists s(\mathbf{agent}(e, x) \wedge \mathbf{cause}(e, s) \wedge \mathbf{dead}(s) \wedge \mathbf{theme}(s, \mathbf{fido}) \wedge$
$\tau(e) \subseteq \mathbf{dec.\ 25})$

Why the change inference is stronger with causer subjects

We can now account for why the change inference of standard lexical causatives is easier to cancel when the external argument is introduced by Voice_{ag} than when introduced by Voice_{c}.

Why the change inference is stronger with causer subjects

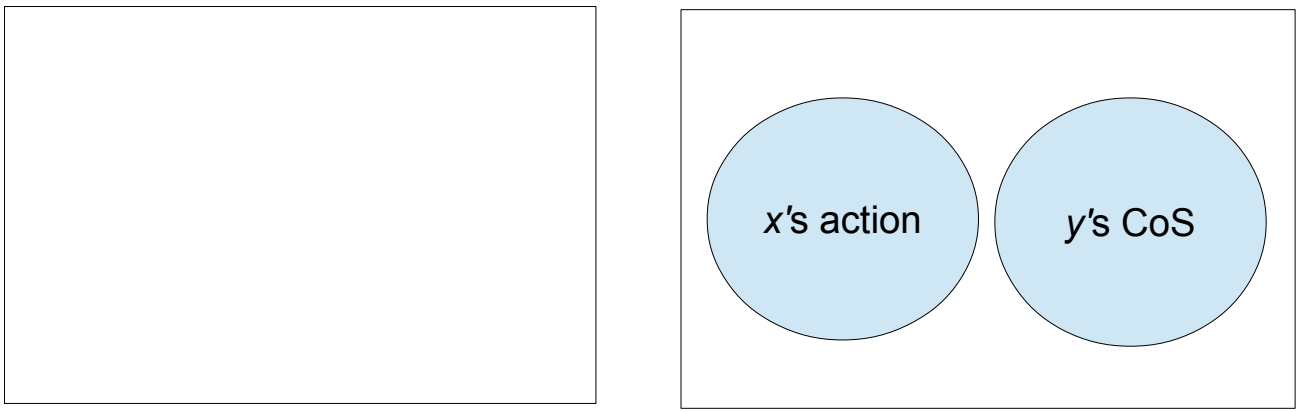
- Partitive aspectual operators such as the Mandarin PFV only require that there be a part of a VP-event in w_0.
- When the causative predicate is combined with Voice_{ag}, the causative event type is tokenized as an event that may (in the right conditions) starts before y's CoS e''.
- The partitive may therefore return an initial fragment of e which is causally inert.
- Denying the occurrence of any part of the change therefore does not generate a contradiction.

Why the change inference is stronger with causer subjects

(50) a. Lùlu **guān-le** nà-shàn mén (dàn méi guān-shàng).
Lulu close-PFV that-CL door but NEG close-up

b. $\text{PFV}_M[\text{Lulu}[\text{Voice}_{ag}[\text{close the door}]]] \rightsquigarrow$
$\exists e \text{MAX}(e, \lambda e'.\exists s(\textbf{agent}(e', \textbf{lulu}) \wedge \textbf{cause}(e', s) \wedge$
$\textbf{close}(s) \wedge \textbf{theme}(s, \iota x.\textbf{door}(x)))$

The Mandarin perfective existentially quantifies over a **part** of a VP-event:



no eventuality denoted by the subject — causing event denoted by the VP

Why the change inference is stronger with causer subjects

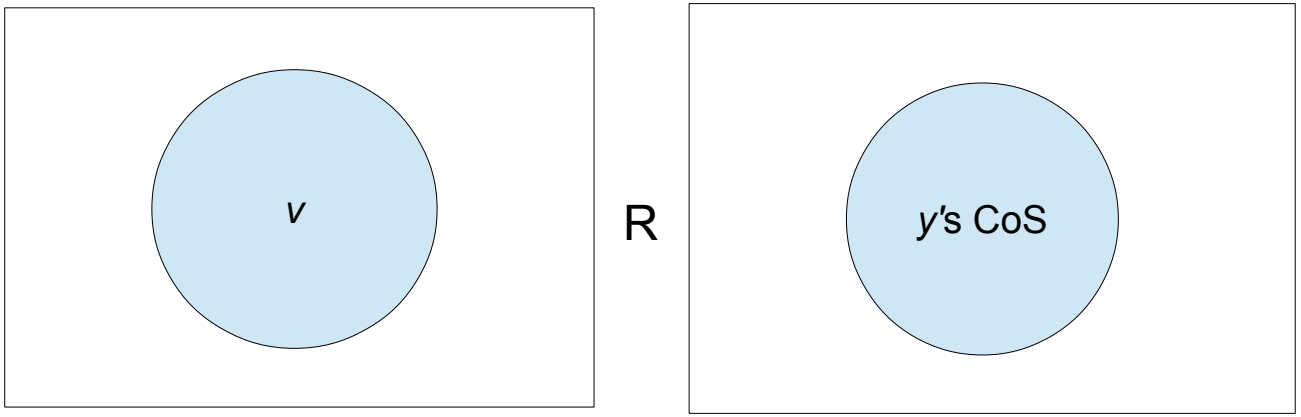
- When the causative predicate is combined with Voice_c, the causative event type denoted by the VP *is* by assumption tokenized as *y*'s CoS.
- $\rightsquigarrow$ The partitive operator must return a part of that change.
- Denying the occurrence of any part of the CoS in the subsequent discourse therefore generates a contradiction.
- That the zero-change use is always infelicitous with anticausatives is due to the same reason.

Why the change inference is stronger with causer subjects

(51) a. Nà-zhen feng **guān-le** nà-shàn mén (#dàn méi guān-shàng)
that-CL wind close-PFV that-CL door but NEG close-up
'That gust of wind closed that door (but it didn't get closed at all).'

b. PFV_{MA}[The gust of wind[Voice$_c$[close the door]]]$\rightsquigarrow$
$\exists e.\text{MAX}(e, \lambda e'.\exists s(\textbf{cause}(\iota v.\textbf{gust-of-wind}(v), e) \wedge \textbf{event}(v) \vee \textbf{state}(v) \wedge$
$\textbf{cause}(e', s) \wedge \textbf{close}(s) \wedge \textbf{theme}(s, \iota x.\textbf{door}(x))))$

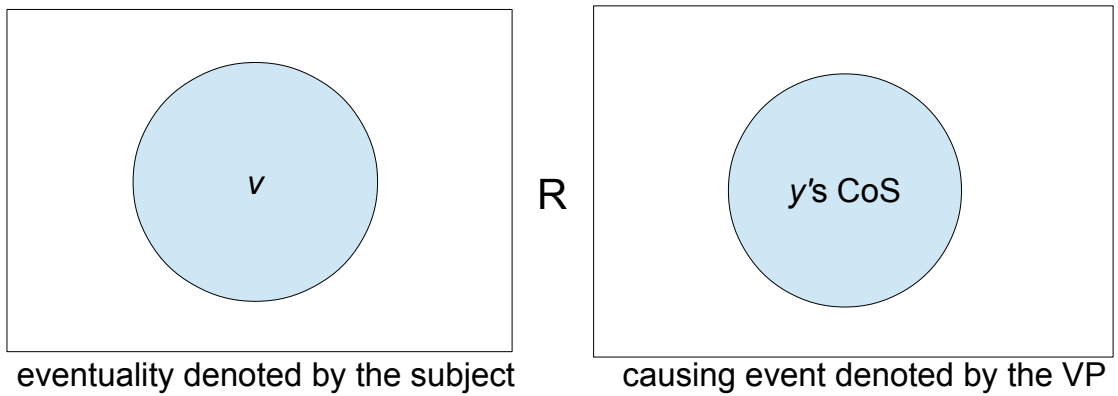
PFV_M can only quantify over a part of the theme's CoS:



Why the change inference is stronger with causer subjects

(52) $\text{Voice}_c \rightsquigarrow \lambda P \lambda e \lambda v.\textbf{event}(v) \vee \textbf{state}(v) \wedge \textbf{cause}(v, e) \wedge P(e)$

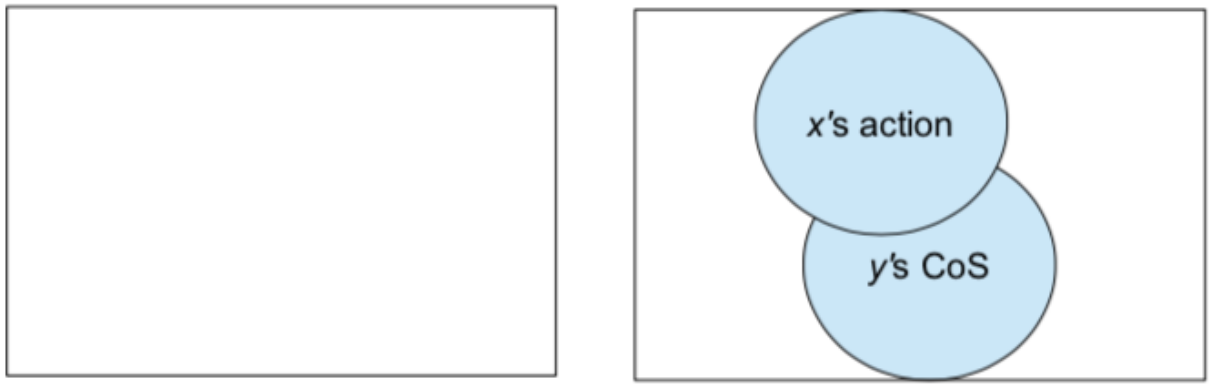
(53) This experience[Voice_c[teach Mary the basics of medicine]] $\rightsquigarrow$
$\lambda e.\exists s(\textbf{cause}(\iota v.\textbf{this-exp}(v), e) \wedge \textbf{event}(v) \vee \textbf{state}(v) \wedge \textbf{teach}(e) \wedge$
$\textbf{theme}(e, \iota x.\textbf{basics-of-med}(x)) \wedge \Box_\rho \exists s.\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge$
$\textbf{theme}(s, \iota x.\textbf{basics-of-med}(x) \wedge \textbf{holder}(s, \textbf{mary}))$



Why is the change inference strong even with agents in Mandarin? (Q2)

Typically, the action of the subject's referent and the CoS of the theme's referent are conceived as largely overlapping spatio-temporally:

✂ ✂ ✂ ✂



no eventuality denoted by the subject causing event denoted by the VP

Why is the change inference strong even with agents in Mandarin? (Q2)

- Zero-change construals licensed by weak perfectives require the identification of a part of the causing event which is still causally inert
- May be difficult to find a context where an act fragment is already a V-ing event while still causally inert.
  - E.g., some native speakers of Mandarin found the zero-change reading of *guan* 'close' at first sight very marked, but then accepted it in a second phase, imagining a scenario where an obstacle prevents the closing of the door.

Why is the change inference strong even with agents in Mandarin? (Q2)

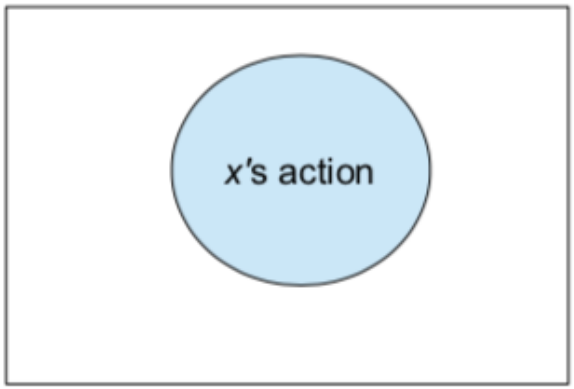
See the following contrasts in English:

(54) a. John started burning the book, # but it hasn't started burning yet.
b. John started burning the book, but it's so humid, it may take a lot of time before it really starts burning!

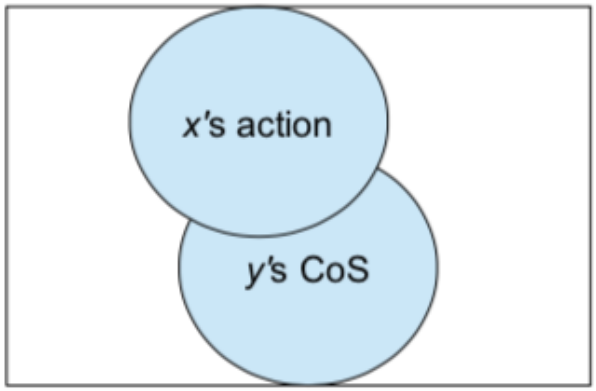
(55) a. John started opening the door, # but it hasn't started opening yet.
b. John started opening the safe, but the code is so complicated, it might really take long!

Why is the change inference easier to defeat with defeasible causatives?

Causative event types are tokenized differently (matched with different event chunks in the model) when denoted by defeasible or standard causatives:



causing event denoted by **defeasible causative VPs** (e.g., *teach*)



causing event denoted by **standard** causative VPs (e.g., *open*)

(56) enseigner y à z 'teach y to z' $\rightsquigarrow$
$\lambda y \lambda z \lambda e[\textbf{teach}(e) \wedge \textbf{theme}(e, y) \wedge$
$\Box_\rho \exists s.(\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge$
$\textbf{theme}(s, y) \wedge \textbf{holder}(s, z))]$

(57) *kāi* 'open' $\rightsquigarrow$
$\lambda e.\exists s(\textbf{cause}(e, s) \wedge \textbf{opened}(s))$

Why is the change inference easier to defeat with defeasible causatives?

(23) teach y to $z \rightsquigarrow$
$\lambda y \lambda z \lambda e[\textbf{teach}(e) \wedge \textbf{theme}(e, y) \wedge \Box_\rho \exists s.(\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge \textbf{theme}(s, y) \wedge \textbf{holder}(s, z))]$

- The causing event e can be completed with respect to the manner predicate **teach-y** (and thus reaches the telos encoded by *teach y*), even if it is an unsuccessful teaching!

(58) Ivan **taught** me the basics of Russian in 10 days, but I still don't know anything.

- No need to fight to find a causally inert part of a VP-event. With defeasible causatives, even complete VP-events are causally inert!

Predictions wrt the availability of the zero-change use across languages

Predictions: the zero-change use should be easier to obtain for defeasible (sublexical modal) causative predicates than for run-of-the-mill (non-modal) ones, in a same language or across languages.

A final note on causative psych-verbs

An intriguing property of causative *psych*-verbs:

(59) Masha$_i$'s talk$_j$ on December 23 was really good. And today **she**$_i$/**it**$_j$ gave me the idea I needed for my term paper! (uttered on Dec 25)

(60) Fred$_i$ (accidentally) shot$_e$ his dog on Dec. 23!
#**He**$_i$ eventually **killed**$_{e' \supset e}$ it on Dec. 25.

- What is remarkable about (59) is that it is possible to identify Masha's speech on December 23 as the single one of her actions causing me to get the idea I needed for my paper (on December 25), and this even in presence of an individual-denoting subject.
- Hypothesis: individual-denoting subjects of psych-verbs may be reinterpreted as covert event descriptions.

Summary

the causative event type $\lambda e ... P(e) ...$ is tokenized differently under the agentive and non-agentive use, because the number of participants involved in causing events in $[\![\text{VP}]\!]$ is different.

Onset of agentive vs. non-agentive causing events

$\rightsquigarrow$ A causing event e in $[\![\text{VP}]\!]$ starts either with an action (with agents) or with a CoS of the theme (with causers) (in canonical cases)

New definition for Voice$_c$:

- Voice$_c$ $\rightsquigarrow$ $\lambda P \lambda v \lambda e.\textbf{event}(v) \vee \textbf{state}(v) \wedge R(v, e) \wedge P(e)$
- R can either be **cause**, or **overlap** '$\circ$'
- **cause** is very much preferred

To-do list

- Test experimentally
  - the way speakers localise in time the left boundary of causing events with agents, instruments and causers
  - the strength of the change inference triggered by defeasible causative verbs (in Romance/Germanic) and with standard causative SVs (in South and East Asian languages) in perfective sentences with agents, instruments and causers
- Explain why R in $[\![\text{Voice}_c]\!]$ is preferably interpreted as **cause**
  - The evaluative time for the causative statement is the culprit (Martin 2018)
- Extend the analysis to causative psych-verbs.

Thank you!

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Jinhong Liu, Hongyuan Sun and Florian Schäfer and the reviewers for Bar-Asher Siegal, Elitzur and Boneh, Nora (ed.), *Perspectives on Causation*. Springer, forthcoming.
Additional thanks to Louise McNally and Giorgos Spathas and the audience of the *Types, tokens, roots, and functional structure Workshop* (Paris, November 2018) and the RUESHeL group meeting for valuable feedback.

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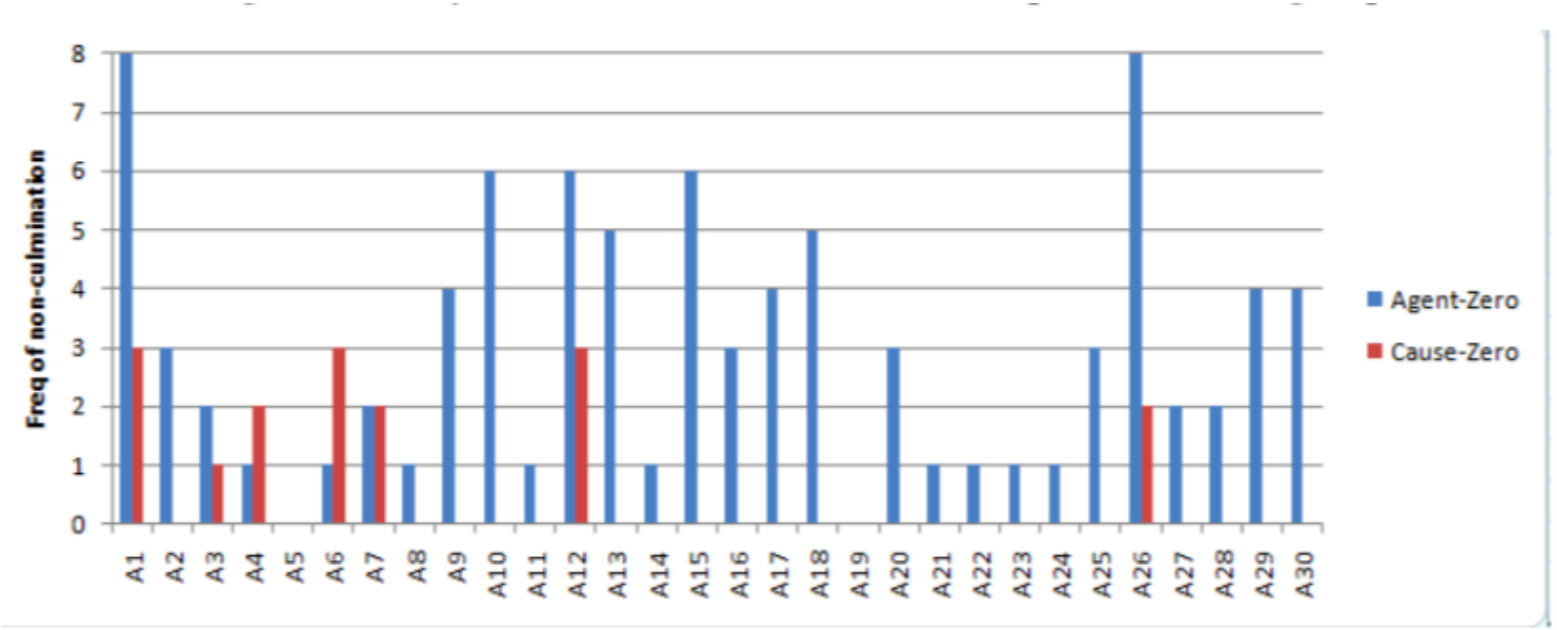
Cross-linguistic generalization: caveat

Caveat: for some speakers and in some contexts/with some verbs, even with a causer subject, the change inference seems defeasible;

- For Mandarin, Liu (2018) observed that 7 out of the 30 tested speakers accept some causative predicates in non-agentive uses in a zero-change situation:



Cross-linguistic generalization: caveat

- For French, German and English, Martin and Schäfer (2017) and Gyarmathy and Altshuler (forthcoming) observe that the change inference is sometimes defeasible even with causer subjects
- In a paper/pencil judgment survey on *enseigner/soigner* with 19 French speakers, 6 accepted the change denial even with causer subjects (e.g. 3 rated *c-soigner* with 3/5, 3 with 5/5).

(61) Ce livre lui a clairement et objectivement **enseigné** les rudiments
this book her has clearly and objectively taught the basics
du russe, il faut vraiment qu'elle l'ait lu sans rien
of Russian, it must really that she have-SUBJ.3SG read without nothing
comprendre pour ne rien apprendre du tout.
understand for NEG nothing learn at all
'This book clearly and objectively taught her the basics of Russian, she really must have read it without understanding anything in order not to learn anything.'

Why is the change inference sometimes cancellable with causer subjects?

Reminder:

New definition for Voice_c:

- $\text{Voice}_c \rightsquigarrow \lambda P \lambda v \lambda e.\textbf{event}(v) \vee \textbf{state}(v) \wedge R(v, e) \wedge P(e)$
- R can either be **cause**, or **overlap** '$\circ$'
- **cause** is very much preferred, but '$\circ$' is also possible!

Why is the change inference sometimes cancellable with causer subjects?

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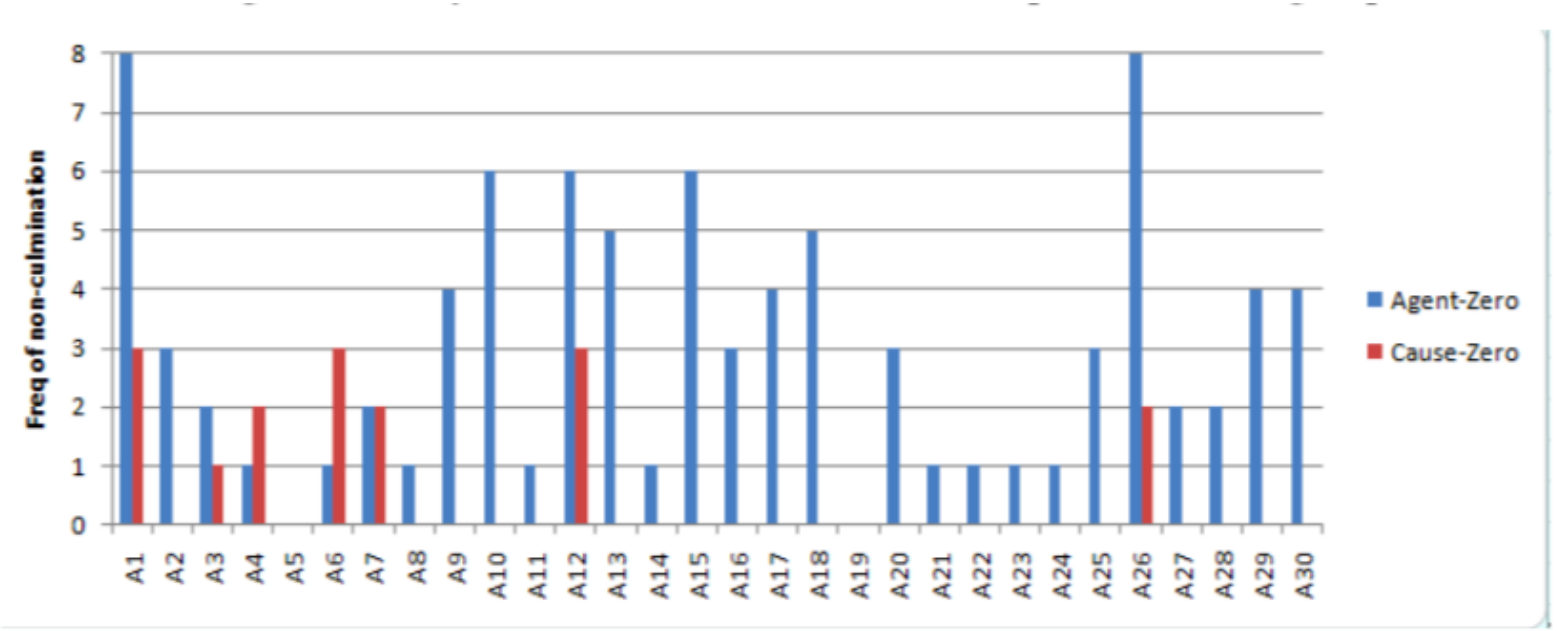
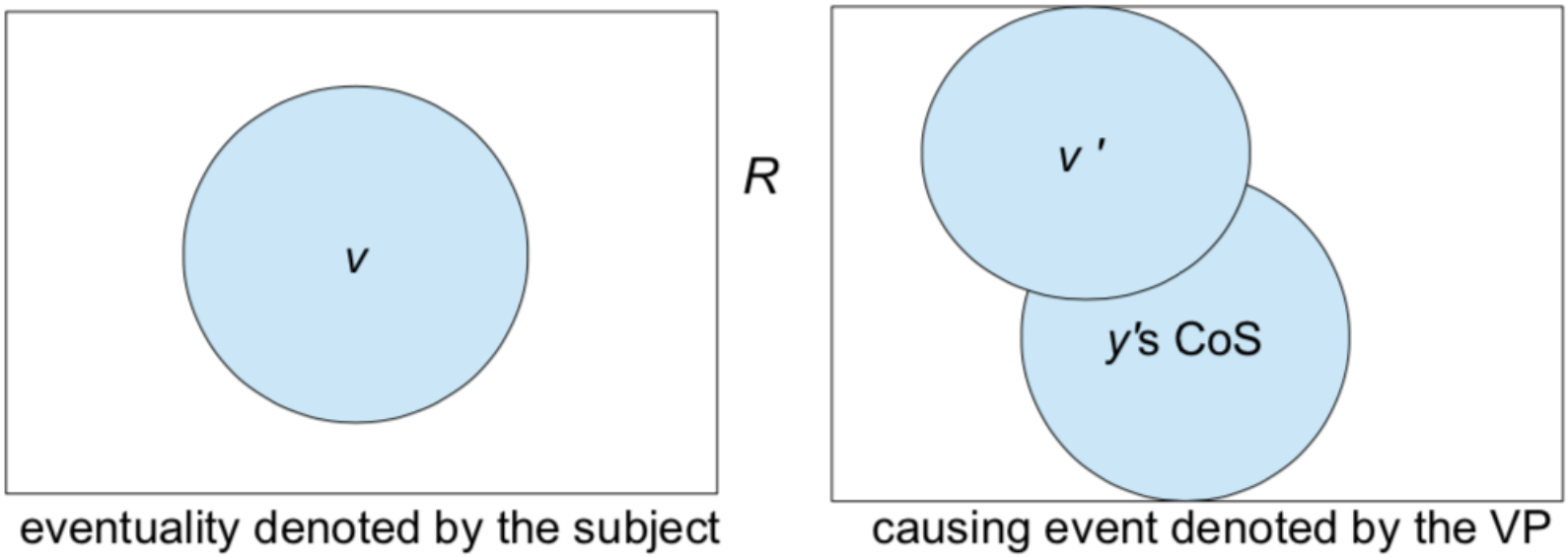


If R in $[\![\text{Voice}_c]\!]$ is interpreted as the overlap relation, causing events in $[\![\text{VP}]\!]$ may start earlier than the theme's CoS.

Why is the change inference sometimes cancellable with causer subjects?

If R in $[\![\text{Voice}_c]\!]$ is interpreted as the overlap relation, causing events in $[\![\text{VP}]\!]$ may start earlier than the theme's CoS ($v' \sqsubseteq v$)



Why is the change inference sometimes cancellable with causer subjects?

(62) Ce livre lui a clairement et objectivement **enseigné** les rudiments
this book her has clearly and objectively taught the basics
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of Russian, it must really that she have-SUBJ.3SG read without nothing
comprendre pour ne rien apprendre du tout.
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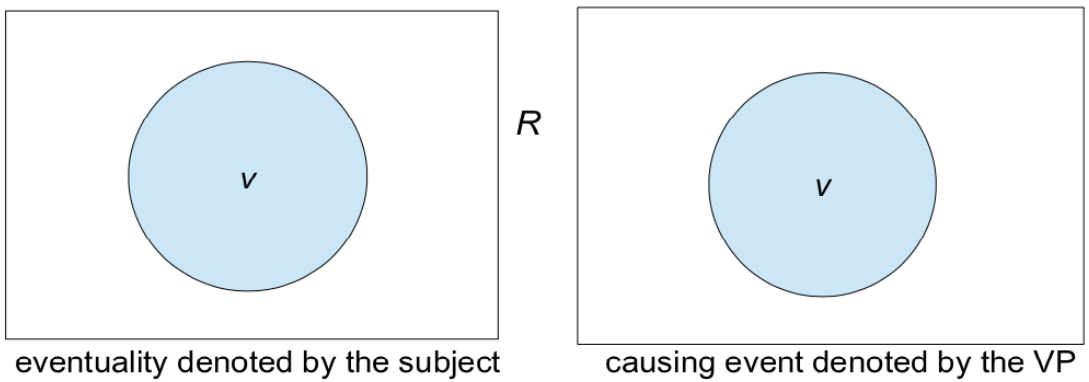
'This book clearly and objectively taught her the basics of Russian, she really must have read it without understanding anything in order not to learn anything.'

Why is the change inference sometimes cancellable with causer subjects?

(63) $\text{Voice}_c \rightsquigarrow \lambda P \lambda e \lambda v.\textbf{event}(v) \vee \textbf{state}(v) \wedge \circ(v, e) \wedge P(e)$

(64) This experience[Voice_c[teach Mary the basics of medicine]] $\rightsquigarrow$
$\lambda e.\exists s(\circ(\iota v.\textbf{this-exp}(v), e) \wedge \textbf{event}(v) \vee \textbf{state}(v) \wedge \textbf{teach}(e) \wedge$
$\textbf{theme}(e, \iota x.\textbf{basics-of-med}(x)) \wedge \Box_\rho \exists s.\textbf{cause}(e, s) \wedge \textbf{know}(s) \wedge$
$\textbf{theme}(s, \iota x.\textbf{basics-of-med}(x) \wedge \textbf{holder}(s, \textbf{mary}))$



Why is the change inference sometimes cancellable with causer subjects?

(65) a. Leur donner ce cours leur **a enseigné** l'espagnol. Mais ils
them give this course them teach.PFV.3SG the Spanish but they
ne l'ont jamais vraiment appris.
NEG it-have never really learned
'Giving them this class taught them Spanish, but they never really learned it.'

b. Suivre ce cours leur **a enseigné** l'espagnol. #Mais ils ne
taking this course them teach.PFV.3SG the Spanish but they NEG
l'ont jamais vraiment appris.
it-have never really learned
'Taking this class taught them Spanish, but they never really learned it.'

A giving-a-class event can easily be conceived as a teaching event, while a taking-a-class less so.