Two types of transitives with inchoative semantics

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(1) a. The shapes of life on Earth will change.

<div align="right">(intransitive anticausative)</div>

b. Geneticists will change the shapes of life on Earth.

<div align="right">(agentive causative)</div>

Standard view on the causative alternation:

Intransitive (1a)	Transitive (1b)
simpler syntax	more complex syntax
simpler semantics	more complex semantics
inchoative VP-event	causing VP-event

Three types of transitives with alternating verbs

a. agentive causative

b. non-agentive causative

c. transitive anticausative (Schäfer 2021)

(2) a. Geneticists will change the shapes of life on Earth.

(agentive causative)

b. **Today**'s consumption of fossil fuels will change the shapes of life on Earth **tomorrow**.

(non-agentive causative, see Martin 2018)

c. Life on Earth will change its shapes tomorrow.

(transitive anticausative, see Schäfer 2021)

(2) a. Geneticists will change the shapes of life on Earth.   (agentive causative)

    b. Today's consumption of fossil fuels will change the shapes of life on Earth tomorrow.   (non-agentive causative)

    c. Life on Earth will change its shapes tomorrow.   (transitive anticausative)

Proposal

- These three types of transitives differ in their interpretation;
- The VP-event is interpreted just as the VP-event of an anticausative (i.e., as a mere change) not only in (2c), but also in (2b);
- *Syntax/semantics mismatch* in (2b/c): syntactically transitive (since Voice is present), but VP semantically intransitive/inchoative;
- **The VP is interpreted the same way in the absence of Voice and in the presence of any other Voice head than agent Voice**.

Proposal

intransitive	transitive
simpler syntax	more complex syntax
	same or more complex semantics
inchoative VP-event	**causing or inchoative** VP-event

Further assumption: inchoative events are a subkind of causing
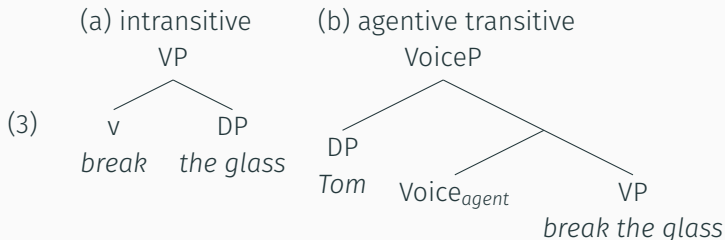events (see below)

Background: the causative alternation

Non-agentive causatives
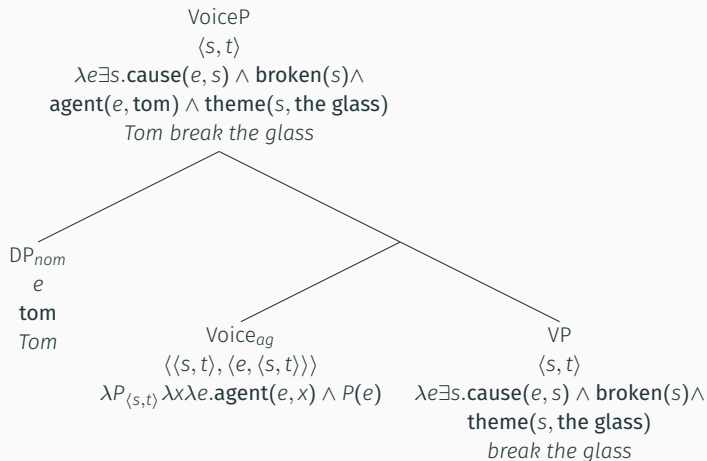
Transitive anticausatives

Causative alternation = Voice alternation

The causative alternation is a voice alternation (Alexiadou et al. 2006, Schäfer 2008, Alexiadou et al. 2015)

(3)

(a) intransitive

VP
├── v — *break*
└── DP — *the glass*

(b) agentive transitive

VoiceP
├── DP — *Tom*
└── Voice$_{agent}$
    └── VP — *break the glass*

- No change in event complexity for the VP across causative and anticausative uses (Alexiadou et al. 2006, 2015).
- But the VP-event has one participant more in the **agentive** causative

Causative alternation = Voice alternation

VoiceP
$\langle s, t \rangle$
$\lambda e \exists s.\mathbf{cause}(e, s) \land \mathbf{broken}(s) \land$
$\mathbf{agent}(e, \mathbf{tom}) \land \mathbf{theme}(s, \mathbf{the\ glass})$
Tom break the glass

DP$_{nom}$
e
tom
Tom

Voice$_{ag}$
$\langle \langle s, t \rangle, \langle e, \langle s, t \rangle \rangle \rangle$
$\lambda P_{\langle s,t \rangle} \lambda x \lambda e.\mathbf{agent}(e, x) \land P(e)$

VP
$\langle s, t \rangle$
$\lambda e \exists s.\mathbf{cause}(e, s) \land \mathbf{broken}(s) \land$
$\mathbf{theme}(s, \mathbf{the\ glass})$
break the glass

See Kratzer 1996 and Bruening 2013 for Voice$_{ag}$ with/without Event Identification

No additional subevent for the agentive transitive variant

If the agentive transitive projected one subevent more than the intransitive, we would expect separate modification to be possible, but it is not (Fodor 1970, Higginbotham 2002, Pylkkänen 2008, Alexiadou et al. 2015 a.o.)

(4) a. Mary **stabbed** Fido on Saturday, and he eventually **died** on Sunday.

b. #Mary **stabbed**$_i$ Fido on Saturday and she eventually **killed**$_i$ him on Sunday.

(see also Fodor 1970)

Note: the problem of (4b) is not due to the infelicity of indirect causation with lexical causatives (Danlos 2000, Neeleman and Van de Koot 2012, Martin 2018):

(5) Mary killed Fido. She stabbed him on Saturday and he died on Sunday.

Do causative and anticausative VPs differ in event structure?

	yes Dowty (1979) Levin and Rappaport Hovav (1995) Ramchand (2008)	no Fodor (1970) Rapp and von Stechow (1999) Alexiadou et al. (2015)
anticausative	1 event (+state)	1 event (+state)
causative	2 events (+state)	1 event (+state)

- With Alexiadou et al. 2006, 2015 a.o., we analyse the events denoted by alternating verbs as *causing* events.
- Rapp and von Stechow (1999) call it a become event.

What *is* the causing event denoted by alternating verbs?

Agentive causatives

(6)   John broke the window.

- The VP-event is identified as a 'hybrid' event gluing an action and a change (NOT distinct in the syntax/semantics)

Anticausatives

(7)   The window broke from the wind.
- Alexiadou et al. (2015): the *from*-PP names the VP-event
- → VP-event ≈ hybrid event gluing an external cause and a CoS.
- But the (VP)-event in (7) is identified as a mere CoS.
- Martin (2020):
  - CoSs *are* a type of causing events: they are the most proximate causes (i.e. in time and space) of some state (see also the internally caused CoS verbs in Levin & Rappaport 1005)
  - The *from*-PP in (7) doesn't name the VP-event; rather, it describes an additional event beyond the VP-event.

Plan

Agent vs. Causer subjects

1. *External arguments (of eventive predicates) introduced by thematic Voice are agents or$_{excl}$ causers* (on agent vs. causer subjects, see Davis and Demirdache 2000, Doron 2003, Levin and Rappaport Hovav 2005, Alexiadou et al. 2006, Kallulli 2006, Folli and Harley 2008, Alexiadou and Schäfer 2006)

2. *Agent and Causer subjects differ in their semantic type*
   - Agent subjects are entity denoting **type *e***
   - Causer subjects are eventuality denoting **type *s***

     (See Pylkkänen 2008, Alexiadou et al. 2015 a.o.)

3. *'Agent' is a thematic role, 'Causer' is not*
   - 'Causer' does not specify how the DP-event participates to the VP-event. (Pylkkänen 2008, Martin 2020)
   - 'Agent' is the single thematic role that can be associated with the external argument of eventive predicates.

See Kratzer (1996) on Holder Voice with stative transitives

Type difference between Agent vs. Causer subjects

- No causer subject of type e
- If a DP is of type e under its literal reading, it must be reinterpreted as of type s to be classified as a Causer
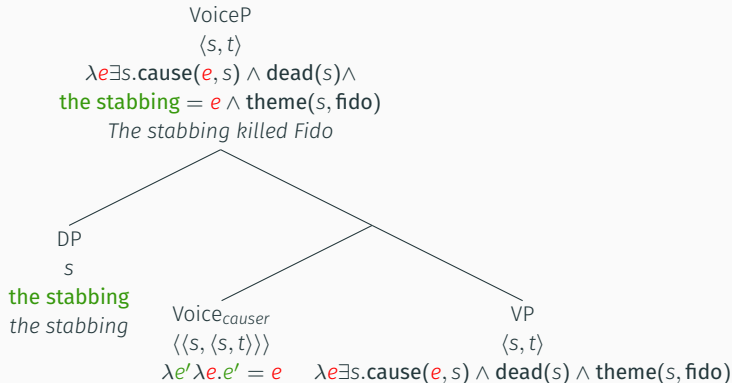- This type shift is not possible with manner verbs:

(8) a. The stone accidentally hit the window.   (not a Causer)

b. #The movements of the stone hit the window.

c. The sea destroyed the sandcastle.   (possibly a Causer)

d. The movements of the sea destroyed the sandcastle.

- The stone is an *agent* in (8a).
- The semantics for the role agent must be flexible enough so as to be applicable to accidental animate agents and inanimates.

(Cruse 1973, Fauconnier 2012, Joo et al. 2022, Martin et al. 2021)

Pylkkänen 2008 and Alexiadou et al. 2015 on non-agentive causatives

(9) a. $Voice_{causer} \rightsquigarrow \lambda e' \lambda e.e = e'$ (Pylkkänen 2008, Alexiadou et al. 2015)
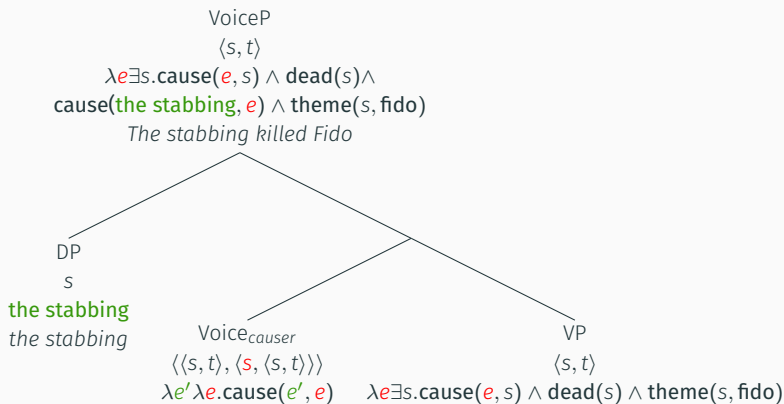
b. The stabbing killed Fido.

VoiceP
$\langle s, t \rangle$
$\lambda e \exists s.\textbf{cause}(e, s) \wedge \textbf{dead}(s) \wedge$
the stabbing $= e \wedge \textbf{theme}(s, \textbf{fido})$
The stabbing killed Fido

DP
s
the stabbing
the stabbing

$Voice_{causer}$
$\langle\langle s, \langle s, t \rangle\rangle\rangle$
$\lambda e' \lambda e.e' = e$

VP
$\langle s, t \rangle$
$\lambda e \exists s.\textbf{cause}(e, s) \wedge \textbf{dead}(s) \wedge \textbf{theme}(s, \textbf{fido})$

Problems (Martin 2018, 2020):

(10)   a.   Mary stabbed$_i$ Fido **yesterday** and this$_i$ eventually killed Fido **this morning.**

       b.   The snow melt **on Sunday** eventually flooded the valley **on Thursday.** (M. Rappaport Hovav, p.c.)

       c.   **Today**'s consumption of fossil fuels will change the shapes of life on Earth **tomorrow.**

(11) a. $[\![\text{Voice}_{agent}]\!] \leadsto \lambda P_{\langle s,t \rangle} \lambda x \lambda e.\textbf{agent}(e,x) \wedge P(e)$ $\langle \langle s,t \rangle, \langle e, \langle s,t \rangle \rangle \rangle$

b. $[\![\text{Voice}_{causer}]\!] \leadsto \lambda P_{\langle s,t \rangle} \lambda e' \lambda e.\lambda P(e) \wedge R(e,' e)$
   R is by default understood as **cause** $\langle \langle s,t \rangle, \langle s, \langle s,t \rangle \rangle \rangle$

c. **Yesterday**'s stabbing eventually killed Fido **this morning**.

VoiceP
$\langle s,t \rangle$
$\lambda e \exists s.\textbf{cause}(e,s) \wedge \textbf{dead}(s) \wedge$
$\textbf{cause}(\text{the stabbing}, e) \wedge \textbf{theme}(s, \text{fido})$
The stabbing killed Fido

DP
s
the stabbing
the stabbing

Voice$_{causer}$
$\langle \langle s,t \rangle, \langle s, \langle s,t \rangle \rangle \rangle$
$\lambda e' \lambda e.\textbf{cause}(e', e)$

VP
$\langle s,t \rangle$
$\lambda e \exists s.\textbf{cause}(e,s) \wedge \textbf{dead}(s) \wedge \textbf{theme}(s, \text{fido})$

- This difference in the semantics of Agent vs. Causer Voice has an important consequence on the way the VP-event is interpreted.
- Below Voice, the VP-event is always interpreted as a change-of-state.

1. *Agent subjects*
   - 'Agent' adds a participant to the VP-event, which thus cannot be identified as a mere change anymore (the agent doesn't *participate* in the change).
   - ⤳ The VP-event changes in **size** (it now hosts 2 inhabitants and is thus spatially bigger) and in **quality** (it is now a hybrid event with agentive and inchoative properties).
   - !!!Still a single VP-event only projected in syntax/semantics!!!

2. *Causer subjects*
   - The event denoted by DP_{nom} does not participate in the VP-event — it causes it.
   - The interpretation of the VP-event remains unchanged (that is, it is identified as a CoS, just as below Voice).
   - Non-agentive causatives $\approx$ anticausatives with a *from*-PP.

[*Tom **woke up Ana***]
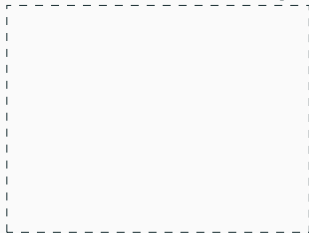
no *e* in the DP

the waking up (VP)-event

Tom's action
⊕Ana's CoS

[*The dishwasher's noise **woke up Ana***]

the d.'s noise

cause

Ana's CoS

e in the DP

the waking up (VP)-event

Non-agentive causatives have inchoative semantics

- With an agentive causative, the VP-event starts once the action starts (and the change might not have started yet)
- With a non-agentive causative, the VP-event starts once the change-of-state starts.

(12) a. **Tom** is waking up Ana (I've already shaken her two times!), but she drank a lot; there is a good chance that it will take long before she starts to make a little step out of her sleep.

b. **The dishwasher's noise** is waking up Ana, but she drank a lot; #there is a good chance that it will take long before she starts to make a little step out of her sleep.

See Martin (2015, 2018, 2020) and Martin et al. (2020) for further arguments relying on French, English and Mandarin data.

Plan

(13) a. The process changed the temperature of the gas.

(non-agentive causative)

b. The temperature of the gas changed.

(intransitive anticausative)

c. **The gas changed its temperature**.

(**transitive anticausative, or TrAC**)

Necessary ingredients for TrACs: (i) a verb leaving the dimension of change underspecified, (ii) a dimensional noun in object position and (iii) and possessor/possessee relation between subject and object. See Löbner (1979), Schumacher (1986) for earlier descriptions of TrACs, and Hasegawa (2004) (citing Kageyama 2002 and Sugioka 2002) for discussion of TrACs in Japanese under the term of 'self-change transitives'; see Löbner (1979, 2020) on the semantics of verbs such as *change* and nouns like *temperature*.

(14)

```
                        VoiceP
                   ╱          ╲
                  ╱            ╲
            DP_nom             ╲
            the gas      Voice_expletive        VP
                                          ╱          ╲
                                         ╱            ╲
                                        v              DP
                                     change    its temperature (of the gas)
```
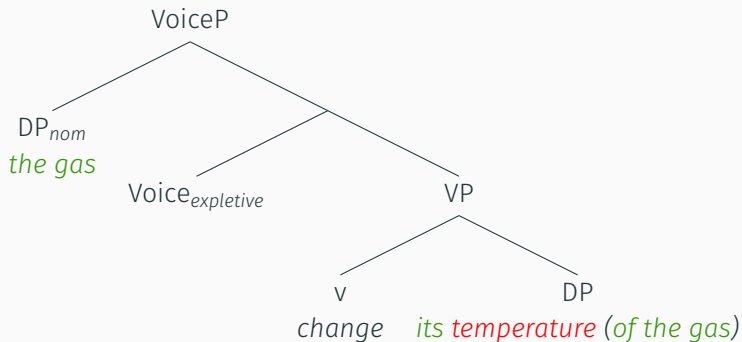
The subject of TrACs is a syntactic external argument (it is in the specifier of VoiceP), but is not a semantic argument of the verb.

TrACs are semantically identical to intransitive ACs and their subject is neither a Causer nor an Agent
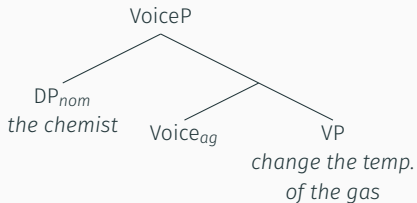
Schäfer 2021: Four tests showing that

- TrACs have exactly the same meaning as intransitive anticausatives (with a VP with inchoative semantics)
- the subject of TrACs is neither a Causer nor an Agent

1. no passive (no external argument to absorb)
2. Symmetric entailment between intransitive and transitive ACs
3. not paraphrasable by *make*+intransitive (for the subject is no Causer/Agent)
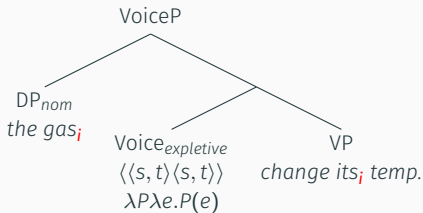4. no ambiguity under sentential negation

(15) a. The chemist changed the temperature of the gas.

b. ≈ The chemist made the temperature of the gas change.

(transitive causative)

(16) a. The gas changed its temperature.

b. ≉ #The gas made its temperature change.

(transitive anticausative)

No ambiguity under sentential negation

(a) transitive causative

```
                    VoiceP
                   /      \
                  /        \
            DP_nom          \
         the chemist    Voice_ag    VP
                              change the temp.
                                  of the gas
```

(b) transitive anticausative

```
                    VoiceP
                   /      \
                  /        \
            DP_nom          \
          the gas_i   Voice_expletive    VP
                     ⟨⟨s,t⟩⟨s,t⟩⟩   change its_i temp.
                      λPλe.P(e)
```
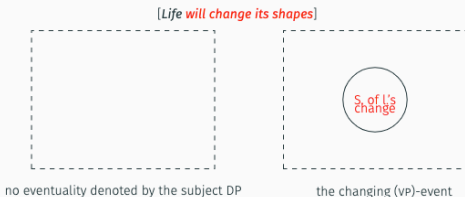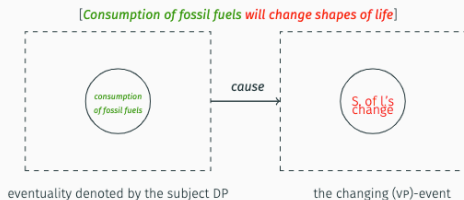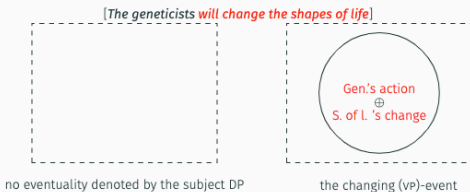
- Negation can associate with VoiceP or VP
- The two readings are not truth-conditionally equivalent in (a), but they are in (b) (since Voice_expletive is semantically inert).

(17) a. The chemist didn't change the temperature of the gas (but its temperature did change).   (transitive causative)

     b. The gas didn't change its temperature (#but its temperature did change).   (transitive anticausative)

Conclusion: TrACs are syntactically transitive, but semantically intransitive/inchoative

- TrACs show the same syntax/semantics mismatch as non-agentive causatives: they are syntactically transitive but their VP semantically intransitive;
- The VP-event is identified as a mere change-of-state;
- While the subject of non-agentive causatives express an event (causing the VP-event), the subject of TrACs does not.

[*The geneticists will change the shapes of life*]

Gen.'s action ⊕ S. of L. 's change

no eventuality denoted by the subject DP

the changing (vP)-event

[*Consumption of fossil fuels will change shapes of life*]

consumption of fossil fuels

cause

S. of L's change

eventuality denoted by the subject DP

the changing (vP)-event

[*Life will change its shapes*]

S. of L's change

no eventuality denoted by the subject DP

the changing (vP)-event

The underspecification of the external argument generalization

(18) a. Voice$_{A/C}$ ⌢ ∅   (*break*-type)

     b. *Voice$_{A/*C}$ ⌢ ∅   (*murder*-type)

(19) a. John/*the accident murdered the president.

     b. *The president murdered

Compatibility with Voice$_C$ is a necessary condition to alternate because a VP has the same interpretation in the absence of Voice and in the context of Voice$_C$.

(20) $Voice_{C/*A} \frown \emptyset$ (*wilt*-type)

(21)   a.   *The farmer withered the crops.   (Rappaport Hovav 2020)

         b.   Early summer heat blossomed fruit trees across the valley.

                                                        (Rappaport Hovav 2014)

Transitivization of internally caused CoS verbs is easier with causer subjects than with agent subjects (Rappaport Hovav and Levin (2012), Alexiadou 2014, Alexiadou and Anagnostopoulou 2020, Llabrés and Fontanals 2018, Mendikoetxea 1999, Rappaport Hovav 2014, Rappaport Hovav 2020) because a VP has the same interpretation in the absence of Voice and in the context of Causer Voice.

1. Can all alternating verbs have an overtly event-denoting subject?
2. TrACs seem to mostly work with alternating verbs (not with pure unaccusatives such as *fall*) (Schäfer 2021)

(22) a. The gas fell in price.

  b. The price of the gas fell.

  c. *The gas fell its price.

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