Causation in Semantics and Grammatical Structure

Week 3: Direct and indirect causation

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Review and recap: causation in language

- connectives/conjunctions, prepositions: *because, thanks to*

  (1) Maria is tired because she ran a marathon.

  (2) Thanks to the firefighters, the wildfire was contained.

- resultatives:

  (3) a. The housekeeper wiped the table clean.

  b. The woodworker sanded the tabletop smooth.

- lexical causatives:

  (4) a. The sun melted the ice.

  b. Heavy winds felled the tree.

  c. The gunsmith killed the sheriff.

- periphrastic or morphological (productive) causatives:

  (5) a. The sun caused the ice to melt.

  b. Heavy winds caused the tree to fall.

  c. The gunsmith caused the sheriff to die.

Recap and review: causation in language

Question: What unites these causal constructions?

- how do we know that they all express causation or describe causal situations?
- conceptually: what is a causal situation?
- linguistically/analytically: what do the representations of causal expressions have in common?
- . . . and how and why do the differ?

Causal situations

Shibatani's (1976) working definition of a causal situation:

- involves two events: a cause C and an effect (or result) E
- the time at which E occurs or is initiated cannot precede the time at which C occurs
- E is counterfactually dependent on C: if C had not occurred, E would not have occurred

Event structure and temporal ordering are generally agreed on, but recently counterfactual dependence has been challenged.

Question: are these features encoded in the same way across all causative constructions?

- are they necessarily all encoded in causal language?
- Fodor's (1970) and Shibatani's (1976) arguments against deriving lexical from productive causatives suggest not

Lexical vs. periphrastic/productive causatives

Hypothesis: lexical causatives are derived from the same basic underlying structure as productive causatives

(6) $\lambda x \lambda y.\textsc{cause}(x, \textsc{become}(\textsc{not}(\textsc{alive}(y))))$

a. $\longrightarrow$ *x* kill *y* b. $\longrightarrow$ *x* cause *y* to die

Problem: *kill*, *cause to die* don't behave the same

- syntactic differences: adverbial modification, *do-so* replacement, reflexivization (in Japanese) suggest different underlying syntactic structures
  - lexical causatives are mono-clausal
  - productive causatives are bi-clausal
- semantic/pragmatic differences:
  - lexical causatives tend to express direct causation, manipulative causation, limit causee control
  - productive causatives often express indirect, directive, causee-controlled forms of causation

Causative verbs: meaning and use differences

McCawley (1976, 1978), Shibatani (1973, 1976a,b):

- lexical causatives seem to be restricted to direct causation

  (7) *Context:* The gunsmith does not repair the sheriff's gun properly, so it fails to fire in a moment of need, and the sheriff gets shot.

  a. The gunsmith caused the sheriff to die [caused the sheriff's death].

  b. ??The gunsmith killed the sheriff

  (8) #Floyd dropped the glass to the floor by tickling Sally, who was holding it. [Jackendoff]

- productive causatives seem more permissive:

  (9) a. I didn't sit the child down, but I caused him to sit down.

  b. #I didn't cause the child to sit down, but I sat him down.

Causative verbs: meaning and use differences

Shibatani (1976): lexical and periphrastic causatives differ with respect to directive/manipulative causation

- **manipulative**: often involves a non-volitional causee, direct physical manipulation
- **directive:** 'direct,' but often involves volitional causee, expressed authority

Lexical causatives usually express manipulative causation:

(10) a. Juri moved the chair.
b. Juri sat the child down.

Productive causatives are used for directive causation:

(11) a. #I made the chair move.
b. I got the child to sit down/had the child sit down.

- NB: Shibatani claims that *cause* is more general than any other causative

Causative verbs: meaning and use differences

Exceptions to the manipulative/directive split:

- productive causatives express manipulative causation when there are lexical gaps

  (12) I made Juri fall into the pool (by scaring her/by pushing her).

  - this seems pragmatic, especially since:

    (13) I made Juri sit down by pushing on her shoulders.

- lexical causatives can express directive causation when:
  - Shibatani (1976): "there is a conventionalized purpose associated with the causative situation"

(13) a. I stopped the man in the street (to ask for directions)

b. ?I made the man stop in the street (to ask for directions)

Causative verbs: meaning and use differences

The manipulative/directive distinction might be mapped onto the direct/indirect distinction:

- directive causation involves using the causee's volition as an intermediary
- so directive might just be a specific kind of indirect causation

Other kinds of distinctions:

- coercive vs. non-coercive (causee resistance)
- authoritative vs. non-authoritative

(114) a. I had the cobbler repair my shoes.
b. ?I had my boss pick up my laundry.

- factitive vs. permissive

(15) a. I had the kids go to the movies. $\vdash$ *They went.*
b. I let the kids go to the movies. ?

Questions

Top level: how and where is causation encoded in language?

- what is the basic causal unit (or units) of meaning?
- what parameters are relevant for the distinctions we see?

Specific question: how to account for the differences between lexical and productive causatives?

- they share inferential features

(16) Bill caused the sheriff to die./killed the sheriff.

a. $\vdash$ The sheriff died/is dead. [result]

b. The gunsmith did something which brought about the death. [causal chain]

c. *p'supp:* The sheriff was alive before. [pre-state]

- but, patterns of use and syntactic behaviour differ
- so, if the commonalities are due to a basic CAUSE element, it has to play different roles

Lexical and productive causatives

McCawley's proposal: the differences follow from the fact that lexical causatives are restricted to direct causation

- this explains the 'Wild West' contrast:
  - in the faulty-repair scenario, the gunsmith didn't *kill* the sheriff because he didn't act directly
  - in the shooting scenario, it's still true that he caused the sheriff's death
- but:

  (17) The gunsmith's negligence killed the sheriff.

  (18) I stopped the man in the street (without touching him).
- if lexical causatives are restricted to direct causation, why do (17) and (18) count as direct when the original faulty-repair example does not?

Direct causation and lexical causatives

Two possible ways of preserving McCawley's approach:

(I) The direct causation criterion actually reflects a different kind of constraint

- this is the approach taken by Neeleman & van de Koot (2012)
- the 'real' constraint may also explain some of the other contrasts between productive and lexical causatives

(II) *Direct causation* is a label for a certain kind of construal or perception of events, which is influenced by a variety of factors

- this is a more cognitive/psychological approach
- as pursued by Wolff (2003), it postulates *causal pluralism* – there is more than one kind of causal link, and the configuration/combination of these links governs lexical choice

The two approaches are not mutually exclusive.

The linguistic expression of causation

Approach I: Neeleman & van de Koot (2012)

Main claim:
Causation, understood as a type of dependence relation between two events, is not fully expressed in natural language. Instead, certain distinguished parts of the underlying relation are referred to by the syntax/semantics of causal predicates.

- causation isn't primarily a linguistic object (evidence from, e.g., aphasics, preverbal children)
- causation isn't a theory about the world, but instead about how we perceive it
- "It seems reasonable to construe causation as one of the principles involved in the construction of our mental model of reality." (cf. Johnson-Laird 1983; p.2)

The linguistic expression of causation

Specific claim:
There's no CAUSE primitive in natural language; instead, we specify two other primitives that belong to causing situations.

(i) **crucial contributing factor** (CCF), which is (and can only be) merged as the external argument (subject)

(ii) culmination of **event/result state**

(19) Linguistic representation:
$\lambda y \lambda x [[_e x [_s \ldots y \ldots]]$ & $x = \text{CCF}]$

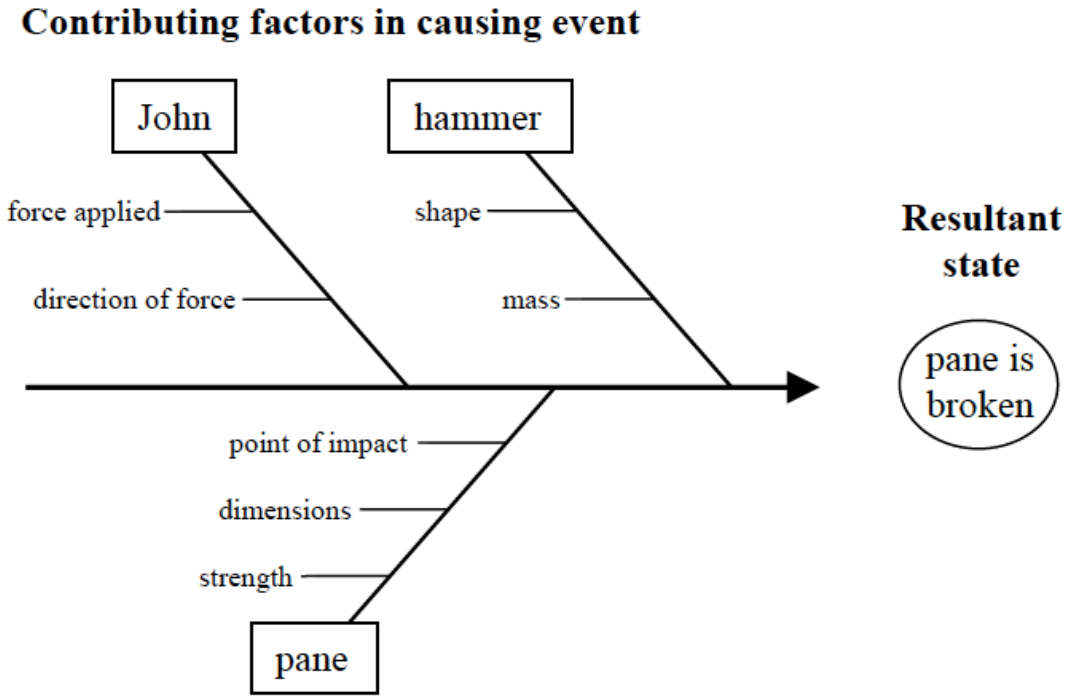
- for a lexical causative, the subject specifies the CCF
  - this is the CCF of the 'macrosituation'
- for productive causatives, the subject specifies a CCF of a *causing/making/having* situation
  - the caused event can have its own external argument
  - this is where intervening causers come in

The linguistic expression of causation

Conceptually, any event is caused by a multitude of factors.

- causes/causing conditions are split into essential and *ceteris paribus* conditions

(20) John broke the window (with a hammer)



question: why do we pick out certain things as CCFs?

The linguistic expression of causation

First argument: It's not actually true that lexical causatives are restricted to direct causation

- lexical causatives can be used to express indirect causation

(21) a. As usual, a kind word with the manager opened the door to the Stardust nightclub.
someone speaks to manager → manager speaks to doorman → doorman opens door

b. A slip of the lip can sink a ship.
loose talk → information obtained by spy → spy informs foreign navy → submarine torpedoes ship

c. A large fleet of fast-charging cars will melt the grid.
many electric cars on road → many cars charging simultaneously → high electricity demand → heating of electric cables → melting of the grid

- these examples are a problem if the causing event is supposed to be encoded, but are fine if the external argument is simply a CCF

The linguistic expression of causation

Second argument: temporal modifiers

- original argument: the temporal modification facts are evidence for the direct causation requirement

(22) a. John caused Bill to die on Sunday by stabbing him on Saturday.

b. #John killed Bill on Sunday by stabbing him on Saturday.

- counterargument: it's not the selection restrictions imposing these requirements, but a general (cognitive) logic of causation

The linguistic expression of causation

Temporal modifiers continued:

(23) John caused Bill to die on Sunday.

- interp 1: Bill dies on Sunday (John causes at other time)
  interp 2: John causes death, death occurs on Sunday (macroevent)
- interp 2 isn't available for (22b), 'because it would imply that the causing event precedes the macroevent'

Conclusion: difference between lexical and periphrastic causatives is that the latter syntactically project constituent which expresses the *caused* event, while former have it as coda of macro-event

The linguistic expression of causation

Question: If it's not about direct causation, how do we explain the Katz effect?

- what's important is what qualifies something to be a CCF
- . . . and, the kinds of things that external arguments can be specified for

In the Wild West scenario, what matters is **accountability:**

(24) *Accountability*
The referent of a DP specified as $[+m]$ ($\sim$ mind) is held accountable for the action expressed by the verb if and only if it is the CCF argument of that verb

- so, this is about intentionality and volition (of the causer)
- gunsmith scenario becomes okay if the gunsmith deliberately sabotaged the gun, knowing that the sheriff gets into pitched gun battles with regularity

The linguistic expression of causation

Accountability and 'direct' causation: there is a three-way involvement hierarchy (for external arguments of causative)

(i) periphrastic causatives (*the gunsmith caused the sheriff to die*)
- gunsmith is CCF of *cause*, not *die*, so accountability limited to causing event (accountability for result state is pragmatically determined)

(ii) lexical causatives (*the gunsmith killed the sheriff*)
- CCF argument must be accountable for the full macroevent, Katz effect occurs

(25) *Local Accountability Assignment*. Consider a mental model containing a causal chain $e_1, e_2, \ldots, e_n$. If an individual that is a participant in e_k is held accountable for a subsequent event e_{k+i}, then no individual who is a participant in e_l, where e_l intervenes between e_k and e_{k+i} can be held accountable for e_{k+i}

The linguistic expression of causation

Accountability and 'direct' causation:

(iii) instrumental causatives: instrument specification is associated with direct manipulation by user (requires [+*m*] CCF) (instrument needs to bring about result state)

(26) The gunsmith shot the sheriff.

(27) *Instrument condition.* Consider a mental model containing a causal chain $e_1, e_2, \ldots, e_n$. If an instrument is specified for an event e_k, then (i) the user of that instrument must be the [+*m*] CCF argument of e_k, and (ii), the instrument must be used to bring about e_{k+1}.

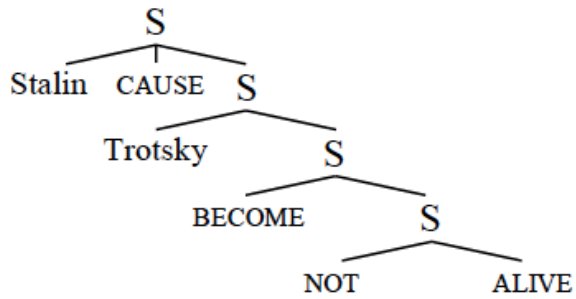
Accountability and other distinctions: intentionality, causee control

- goals of the CCF (if agentive)
- does the causee count as an agent? could he/she have stopped the event?

The linguistic expression of causation

Additional arguments:

- McCawley-Fodor style decomposition actually doesn't encode causing event



- Dowty (1979):

(29) a. If t is a singular term and φ a formula, CAUSE(t, φ) is also a formula.
b. "CAUSE(t, φ)" is true at instant i in world w iff there is a property P such that P(t) and φ are both true at i in w and in all worlds w' that minimally differ from w and in which φ is untrue, P(t) is untrue as well.

"Dowty's proposal may be an adequate characterization of the interpretation of causal predicates, but it also amounts to an admission that causation is not expressed linguistically" (p.20)

The linguistic expression of causation

What about cases where the proposed CCF slot seems to be filled by an event?

- even in these cases, the external argument is not interpreted *as* a causing event (strictly speaking)

  (28) Tomorrow's strike by London Underground staff caused mayhem on the North Circular road during this evening's rush hour.

- if the external argument were a causing event in this case, it would violate the temporal constraint on causal situations
- instead, it has to be interpreted as contributing to/involved in a causing event that is not represented in the structure
  - e.g., the effect that knowledge of the upcoming strike had on people's behaviour
- in general, there is no fixed interpretation for external argument (unlike the result state)

The linguistic expression of causation

Additional arguments for CCF role

- CCFs also appear in **maintenance** situations:

(29) *Working definition of* **maintenance:**

a. . . . a relation between two eventualities: a maintaining state or event and a maintained state.

b. . . . lacks a temporal dimension: the eventualities must be contemporaneous

c. . . . is counterfactual

(30) a. The wall protects the city

b. The beam carries the wall above it

- maintenance also has ceteris paribus/CCF conditions
- maintenance can't be reduced to a special case of causation because it lacks the temporal dimension of causation

Question: can we think about maintenance situations as related to permissive causation?