On the interaction of aspect and ability in two Hindi/Urdu constructions

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Causal reasoning and causal language

'Practical' causal intuitions vs. linguistic causation

- causal reasoning draws on complex networks of relationships: **causal models**
- linguistic causation: typically binary *cause-effect* relations

An alternative: causal models as discourse parameters

- causal language describes structures in an online language-independent representation
- discourse contributions interact (in familiar ways) with such representations
- model relationships can explicate linguistic effects

(Nadathur & Lauer 2020, Baglini & Bar-Asher Siegal 2021, a.o.)

Today: use this approach to shed light on two surprising inference patterns in abilitative constructions

Two Hindi/Urdu ability constructions

The patterns of interest involve the interaction of **aspect** and **ability**:

1. **Aspectual complex predicates** with **le** ('take'):

(1) a. Anjum gaaṛii calaa **le-tii** (hai).
Anjum car drive take-IMPF.F.SG (be.PRS.SG)
'Anjum will/does drive the car.'

b. Anjum-ne gaaṛii calaa **l-ii**.
Anjum-ERG car drive take-PFV.F.SG
'Anjum drove the car.' (deliberately, completely)

Light verb **le** reinforces an episodic interpretation with **perfective** marking, but licenses a **dispositional** (modal) reading in the **imperfective** (Butt 1997)

Two Hindi/Urdu ability constructions

The patterns of interest involve the interaction of **aspect** and **ability**:

2. **Ability attributions** with **sak** ('can'):

(2) a. Anjum gaaṛii calaa **sak-tii** thii (lekin
Anjum car drive can-IMPF.F.SG be.PST.F.SG (but
us-ne gaaṛii kabhii nahĩĩ chalaa-yii.)
3SG.ERG car sometime NEG drive-PFV.F.SG.
'Anjum could drive the car (but she never drove the car).'

b. Anjum gaaṛii calaa **sak-ii** (#lekin us-ne gaaṛii
Anjum car drive can-PFV.F.SG (#but 3SG-ERG car
nahĩĩ calaa-yii)
NEG drive-PFV.F.SG
'Anjum was able to drive the car (#but she didn't drive the car).'

'Pure' (unrealized) ability in with the **imperfective**, but **actuality entailments** under **perfective** marking (Bhatt 1999)

Two Hindi/Urdu ability constructions

The patterns of interest involve the interaction of **aspect** and **ability**:

- In both cases, perfective marking flattens a modal meaning which emerges in the imperfective
- **Actuality entailments** are a cross-linguistic phenomenon (English *was able*, French *pouvoir*, Greek *boro*, Spanish *poder, ser capaz*, . . .), making an account from ambiguity unlikely
- The similarity between the **dispositional** and **actualizing** alternations suggests a unified analysis is possible

Main idea: abilitative/dispositional readings reflect a shared **causal** structure, with consequences for aspectual composition

Outline of the talk

Outline of the talk

Light verb constructions

Hindi/Urdu **complex predicates** combine an (uninflected) lexical verb with a **light verb** from a delimited set (Hook 1974, a.o.)

Based on (di)transitives	Based on intransitives
le ('take')	*aa* ('come')
de ('give')	*jaa* ('go')
ḍaal ('put')	*paṛ* ('fall')
maar ('hit')	*mar* ('die')
nikaal ('pry out')	*nikal* ('emerge')

Table: Some common light verbs (Butt 1993)

Aspectual light verbs carry information about inception/completion and often volitionality (Masica 1976, Butt 1993, Singh 1990, 1998, a.o.)

(3) a. Anjum-ne gaanaa gaa **ḍaal**-aa
Anjum-ERG song sing put-PFV.M.SG
'Anjum sang a song (deliberately, forcefully).'

b. Anjum gaanaa gaa **paṛ**-ii
Anjum song sang fall-PFV.F.SG
'Anjum fell to singing (spontaneously, involuntarily).'

The dispositional predicate

Perfective **le** ('take') is often treated as an **aspectual auxiliary**:

(4) a. Maayaa-ne biskaṭ khaa-yaa lekin use puuraa nahĩĩ
Maya-ERG cookie eat-PFV.M.SG but it.ACC whole NEG
khaa-yaa
eat-PFV.M.SG
'Maya ate the cookie but did not finish it.'

b. Maayaa-ne biskaṭ khaa li-yaa, #par use puuraa nahĩĩ
Maya-ERG cookie eat take-PFV.M.SG, #but it.ACC whole NEG
khaa-yaa.
eat-PFV.M.SG
'Maya ate the cookie, #but did not finish it.'

- **Le** appears to introduce a strong **culmination** requirement (plus intentionality)
(Singh 1998, Arunachalam & Kothari 2011, Altshuler 2014, Nadathur & Filip 2021)

The dispositional predicate

The episodic Hindi/Urdu **perfective** contrasts with a **habitual imperfective**: so where does **le**'s dispositional reading come from? (Butt 1997)

(1a) Anjum gaaṛii calaa **le-tii** (hai).
Anjum car drive take-IMPF.F.SG (be.PRG.SG)
'Anjum will/does drive a car.' *(Anjum can and does drive a car)*

- Comparable to **dispositional** (existentially-interpreted) English generics (Lawler 1973)

(5) My pet toad will eat flies.
The toad can and does eat flies (under the right circumstances), but not necessarily in all eating situations, and not necessarily to the exclusion of other foods

Characterizing the dispositional reading

The **dispositional complex predicate** (DCP) is particularly appropriate as a counter to *negative expectation*:

(6) a. acchaa, vo hindi bhii bol-tii hai?
yes, she Hindi also speak-IMPF.F.SG be.PRS.SG
'Oh, she also speaks Hindi?'

b. hãã hãã, bol **le-tii** hai. kyũ nahĩĩ bol-e?
yes yes, speak take-IMPF.F.SG be.PRS.SG. why NOT speak-SUBJ
'Yes, she (can and) does speak Hindi. Why not?' (Butt 1997)

(7) climate change-kii vajah-se vo aaj-kal gaaṛii nahĩĩ calaa
climate change-GEN reason-INST 3.SG today-tomorrow car NEG drive
rahii hai, lekin bilkul vo gaaṛii calaa **le-tii**
PROG.F.SG be.PRS.SG, but certainly 3.SG car drive take-IMPF.F.SG
hai.
be.PRS.SG
'Due to climate change, she's not driving the car (regularly) these days, but she certainly (can and) does drive the car.' (R. Bhatt)

Characterizing the dispositional reading

The **DCP** differs from **standard ability** in whether or not the ability is exercised:

(8) a. Anjum gaaṛii calaa **sak-tii** hai, lekin
Anjum car drive can-IMPF.F.SG be.PRS.SG, but
cala-tii hii nahĩĩ
drive-IMPF.F.SG only NEG
'Anjum can (has the ability) to drive a/the car, but (she) doesn't drive.'

b. Anjum gaaṛii calaa **le-tii** hai, #/??lekin
Anjum car drive take-IMPF.F.SG be.PRS.SG, #/??but
cala-tii hii nahĩĩ
drive-IMPF.F.SG only NEG
'Anjum (can and) does drive a/the car, #/??but (she) doesn't drive.'

Characterizing the dispositional reading

The **DCP** and **standard ability** also come apart in conditional constructions:

(9) a. agar raastaa pakkaa ho, Anjum saikal calaa **le-gii**
if road correct be, Anjum cycle drive take-FUT.F.SG
'If the road is good, Anjum will ride a bicycle.'

b. ??agar raastaa pakkaa ho, Anjum saikal calaa **sak-egi**
if road correct be, Anjum cycle drive can-FUT.F.SG
'If the road is good, Anjum will be able to ride a bicycle.'

- **(9b) ≠ (9a):**
  (9a) predicts what Anjum *will* do, (9b) establishes what she's capable of
- The conditional antecedent in (9a) seems to fill in "the right circumstances" under which the target disposition is exercised

NB: (9a) shows that the dispositional reading also arises with future marking, further motivating a unified semantic analysis of LV *le*

Characterizing the dispositional reading

Generalizations:[1]

1. The subject (necessarily an agent) has the ability to perform some action (specified by the 'main' predicate)
2. The agent *chooses* to exercise the ability on a regular or at least predictable basis (hence, *dispositional*)
3. The above combination makes the DCP well-suited to negative contexts (emphasizes countering the negative expectation)

Interim conclusion: the DCP should be given a modal analysis (potentially involving conditional necessity)

[1] From Butt (1997), adapted with some carefully-chosen liberties

Happenstance: insights from Sinhala

Inman (1993) offers a helpful **happenstantial** analysis of the Sinhala **involitive** verb form, which also has a dispositional reading:[2]

(10) Mahatuŋ atiŋ mee kææmə hoňdəṭə **hædenəwa**
Mahatun ERG this food well make.INV.PRS
'Mahatun makes this food well (as it turns out/unexpectedly).' **Sinhala**

(11) Mahatun ye khaanaa acchaa banaa **le-taa** hai.
Mahatun this food well make take-IMPF.M.SG be.PRS.SG
'Mahatun (can and) does make this food well.' **Hindi/Urdu**

(12) Mahatun **happens** to make this dish well (#but he doesn't make it well).

Happenstance is cashed out as **doxastic non-necessity**:

(13) $[\![\text{INV}]\!]^{w,f,g} := \lambda\phi_{st}.\phi(w)\ \&\ \neg\forall w' \in \text{Best}_{\text{ep,nm}}(w)[\phi(w')]$

(10) $\sim$ *Mahatun makes this food well and there is some world maximally compatible with the speaker's expectations in which he does not do so.*

[2] INV is used in accidental contexts, but is not anti-volitional; the dispositional use is neutral

A happenstantial view of the dispositional predicate?

First pass:

(14) $[\![\text{le}]\!]^w := \lambda\phi.\phi(w)\ \&\ \neg\forall w' \in \text{Best}_{\text{ep,nm}}(w)[\phi(w')]$

(1a) Anjum gaaṛii calaa **le-tii** (hai).
Anjum car drive take-IMPF.F.SG (be.PRS.SG)

'(As it happens), Anjum (can and) does drive a/the car.'

Anjum drives the car and there is some world compatible with (my) expectations in which she does not drive the car.

- **Captures:** the entailment facts, and appropriateness in 'unexpected' contexts
- **Does not capture:** inference of 'conscious choice' (subject chooses to exercise the disposition)
- **Unclear:** what happens to the (presupposed) conditions of exercise?[3]

[3] Butt (1997): *le* invokes conditional necessity, with a modal base containing "the speaker's expectations and the conditions under which the subject will perform the given action"

A happenstantial view of the dispositional predicate?

Idea: three changes will help us to get the facts right

(a) Distinguish the **dispositional target** (associated with main verb) from the **conscious choice** (to exercise ability)

(b) Condition the dispositional target on the (determinative) choice

(c) Move modality into **not at-issue** content: this might help to reconcile the dispositional and *completive* (PFV) uses of *le*

(15) Mahatun didn't happen to make this dish well
→ *He didn't make it well (and it was possible that he would).*
(Not: He made the dish well and it was certain that he would do so.)

Preliminary proposal:

(16) Given a one-place predicate P and an agent x, **le**$(P)(x)$

a. *Presupposes:* A prior choice $A(x)$ for x is **necessary** and **sufficient** to bring about $P(x)$

b. *Asserts:* that x realized (made choice) $A(x)$

Outline of the talk

The ability/actuality alternation

The Hindi/Urdu **ability modal sak** licenses **actuality entailments** (Bhatt 1999)

- **imperfective** aspect has a **pure ability** reading

(17) Yusuf havaii-jahaaz uṛaa **sak-taa** thaa, lekin
Yusuf air-ship fly can-IMPF.M.SG be.PST.M.SG, but
us-ne havaii-jahaaz kabhii nahĩĩ uṛaa-yaa.
3SG-ERG air-ship sometime NEG fly-PFV.M.SG
'Yusuf had the ability to fly planes, but he never flew a plane.'

- **perfective** aspect gives rise to an **actuality entailment**

(18) Yusuf havaii-jahaaz uṛaa **sak-aa**, #lekin us-ne
Yusuf air-ship fly can-PFV.M.SG, #but 3SG-ERG
havaii-jahaaz nahĩĩ uṛaa-yaa.
air-ship NEG fly-PFV.M.SG
'Yusuf was able to fly the plane, #but he didn't fly the plane.'

(also in French, Greek, Russian, . . .)

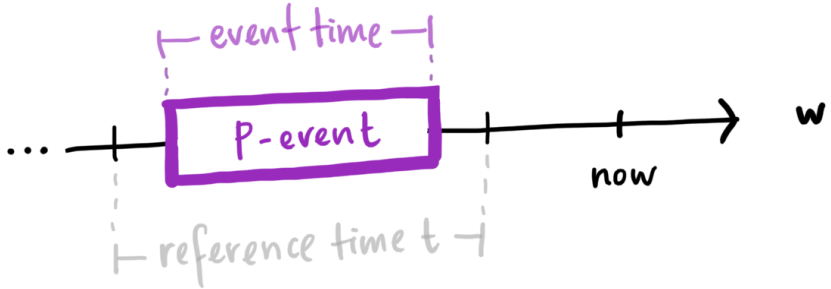
The problem of actuality

- **Ability** is (typically) analyzed as **circumstantial possibility**

  (19) $[\![\text{CAN}]\!]^{w,\text{circ}} := \lambda P \lambda e. \exists w' \in \text{circ}(w)[P(e)(w')]$ (cf. Hacquard 2009)

- Grammatical **aspect** instantiates an event in relation to reference time

  (20) $[\![\text{PFV}]\!] := \lambda w \lambda t \lambda P. \exists e[\tau(e) \subseteq t \,\&\, P(e)(w)]$ (Kratzer 1998)



- Composition at best predicts a **bounded time of possibility**

  (21) Yusuf could-PFV fly the plane
  $\sim \exists e[\tau(e) \subseteq t\{\prec t^*\} \,\&\, \exists w \in \text{circ}(w^*)[\text{fly-plane}(Y)(e)(w)]]$
  The relevant past interval contains an event of Yusuf flying a plane in some circumstantially accessible world

A starting point: implicative *manage*

Observation: actualized ability is closer to managed than to did (Bhatt 1999)

(18) Yusuf havaii-jahaaz uṛaa **sak-aa**, #lekin us-ne havaii-jahaaz
Yusuf air-ship fly can-PFV.M.SG, #but 3SG-ERG air-ship
nahĩĩ uṛaa-yaa.
NEG fly-PFV.M.SG
'Yusuf was able to fly the plane, #but he didn't fly the plane.'

(22) ≡ Yusuf **managed** to fly the plane, #but he didn't fly the plane

- **Manage** and actualized **ability** also share a **projective inference:**

(23) a. Anjum **managed** / did not **manage** to ride a bike.
b. Anjum saikal (nahĩĩ) calaa **sak-ii**
Anjum cycle (NEG) drive can-PFV.F.SG
'Anjum was (not) able to ride a bike.'

$\rightsquigarrow$ *cycling was unexpected? abnormal? difficult?*

Actuality as implicativity?

- **Bhatt's hypothesis:** ABLE ≡ **manage**
- **But:** no **pure ability** reading for **manage**

(24) Yusuf **manages** to fly a plane, #but he never flies a plane.

- . . . even in an aspect-marking language (French **réussir**)

(25) Yusuf { **réussissait** / **a réussi** } à piloter un avion,
Yusuf { managed-IMPF / managed-PFV } to fly a plane,
#mais il n'a pas piloté d'avion.
#but he NEG-has NEG fly-PFV the-plane
'Yusuf { used to manage / managed } to fly a plane, #but he did not fly a plane.'

Actuality entailments as implicative entailments:

1. Equivalence is analytical, not lexical (ABLE ≢ *manage*)
2. **Manage** seems closer to the **dispositional predicate**

The implicative semantic template

Manage (and **happen**) are semantically bleached members of the class of **implicative verbs** (Karttunen 1971, Baglini & Francez 2016, Nadathur 2023, a.o.):

1. **Projective prerequisite inference:** (not at issue)

   (26) Ria { **dared** / did not **dare** } to open the door.
   $\rightsquigarrow$ *Opening the door required Ria to act bravely*

2. **Assertion resolves prerequisite status** (at issue)

   (27) a. Ria **dared** to open the door. $\rightarrow$ *Ria acted bravely*
   b. Ria did not **dare** to open the door. $\rightarrow$ *Ria did not act bravely*

3. **Complement entailments are derived as causal consequences**

   (26a) $\sim$ *Ria's bravery resulted in her opening the door* sufficiency
   (26b) $\sim$ *Ria's lack of bravery prevented her from opening the door* necessity

Managing and *doing*

Manage to *P* presupposes the existence of a **causal prerequisite** for *P*

Reasoning about **non-triviality:** *P* is non-trivial if you can't **just** do it

- something additional (and prior) is **required** in order to do *P*
  (alternatively: some obstacle must be overcome *en route* to *P*) (Karttunen 2014)
- **causal necessity** and **causal sufficiency** derive complement entailments
- **causal background knowledge** fills in the details in a specific context

Support for the causal component: deontic necessity/sufficiency is not enough

(28) *Suppose that Khalid is a U.S. high school junior, but speaker and addressee are not mutually aware of his exact age.*

?Khalid managed to register for selective service.
(cannot convey that he was/became 18 at reference time)

Implementation: causal network models (Pearl 2000)

Causal information is represented using a **directed acyclic graph** D:

- **nodes** (finite set Σ): salient propositional variables (can be valued $u, 0, 1$)
- **edges:** atomic relations of **causal relevance** ($P \xrightarrow{\text{c-influences}} Q$)
- **structural equations:** Θ_D specifies how node value depends on its ancestors'
  Function Θ_D assigns to each $X \in \Sigma$ a pair $\langle Z_X, \theta_X \rangle$ where Z_X is the set X's immediate ancestors, $\theta_X : \{0,1\}^{|Z_X|} \rightarrow \{0,1\}$
- **causal consequences:** of *situation s* (3-way val. of Σ) are calculated via D, Θ_D

Causal language refers to particular structural configurations as different causal dependency types (cf. Nadathur & Lauer 2020, Baglini & Bar-Asher Siegal 2021)

(29) **Informally:** given a situation s and two *facts* $\langle C, c \rangle, \langle E, e \rangle$

a. $\langle C, c \rangle$ is **causally necessary** for $\langle E, e \rangle$ iff there's no (consistent) path from s to $\langle E, e \rangle$ which does not set $\langle C, c \rangle$

b. $\langle C, c \rangle$ is **causally sufficient** for $\langle E, e \rangle$ iff adding $\langle C, c \rangle$ to s guarantees $\langle E, e \rangle$

(see Appendix slides for illustration)

Interim summary: unpacking implicativity

Three key components work together to derive **implicative inferences:**

1. **Presupposition:** the existence of an unresolved **jointly necessary & sufficient condition** (or set thereof) for the complement
2. **Assertion: determines** the truth value of the **necessary & sufficient condition**
3. **Modal flavour:** necessity & sufficiency are **causal**

$$[\![\mathit{manage}(P)(x)]\!]^{w,t} := \lambda e.(\iota A_{evt}.\forall w' \in \text{caus}(w,t)[\text{in}(t,w',A(x)) \leftrightarrow \text{in}(t,w',P(x))])(e)(w)^a$$

Recall: if actuality entailments are (analytically) **implicative,** these components should come together in the composition of ability and perfectivity

[a] Kaufmann (2013) outlines a procedure for mapping causal information from an SEM to the standard premise semantics format

Choosy causal semantics for ability

Basic idea: **ability** attributing predicates (including *sak*) share the **causal background** of **manage** but differ in asserted content

(30) A statement of the form x *is able to / can* P

a. *Presupposes:* the existence of some action $A(x)$ which is **causally necessary/sufficient** for $P(x)$

b. *Asserts:* A is in x's **choice set** (doing A is a live option for x)

- *Background assumption:* agents have **choice sets** (sets of immediately available actions) at given world-time pairs

(31) $\forall w, t, x[A(x) \in \text{ch}(x, w, t) \rightarrow \exists w' \in \text{circ}(w)[\text{in}(t, w', A(x))]]$
Actions in x's choice set at $\langle w, t\rangle$ are possibilities for x at $\langle w, t\rangle$

Ability as a **hypothetical guarantee** (cf. Mandelkern et al 2017):
$[\![\text{ABLE}(P)(x)]\!]^{w,t} :=$
$(\iota A.\forall w' \in \text{caus}(w, t)[\text{in}(t, w', A(x)) \leftrightarrow \text{in}(t, w', P(x))])(x) \in \text{ch}(x, w, t)$
Agent x is able to P at $\langle w, t\rangle$ iff x can choose the final cause of $P(x)$

Getting from ability to actuality: an overview

The **ability** semantics make it a special stative: a **dynamic capacity attribution**

(32) Juno is loud/fast/tactful.
Juno is capable of actions which are loud/fast/tactful.

Dynamic capacities have distinctive interactions with grammatical aspect (key data from French; see Homer 2011, 2021; Nadathur 2023a,c)

- **Imperfective** requires consistency through reference period (non-uniform), but **perfective** is interpreted as **manifestation**

(33) a. Juno **était** rapide.
Juno was.IMPF fast
'Juno was (generally) fast.'

b. Juno **a été** rapide.
Juno was.PFV fast
'Juno was (did something) fast.'

Getting from ability to actuality: an overview

Enough constructions as specific abilities (compare *dare* to *manage*):

(34) Juno was fast enough to win the race
$\sim$ *Juno can win the race, in view of her capacity for speed*[4]

(35) a. Juno était assez rapide pour gagner la course
Juno was-IMPF enough fast for win the race
'Juno was fast enough to win the race.'

b. Juno a été assez rapide pour gagner la course
Juno was-PFV enough fast for win the race
'Juno ran fast enough to win the race.' $\rightarrow$ *She won*

Aspectual coercion: PFV selects **eventives** (Moens & Steedman 1988, Bary 2009)

- robust evidence for *inchoative* and *complexive/maximalizing* forms of coercion
- **evidential** coercion (as in 35b) reported previously as *dynamic, actualistic inchoative* (de Swart 1998, Fernald 1999, Homer 2011/2021, Nadathur 2019/2023)

[4] *Juno's actual speed (capacity) is at least as great as the min necessary speed for race-winning* (becomes sufficient as the final necessary complement cause; Nadathur 2023a)

Getting from ability to actuality: an overview

Upshot: if ABLE/*sak* is a **dynamic stative**, PFV-triggered **coercion** levels the contrast with *manage*

(36) Yusuf gaaṛii calaa **sak-aa**
Yusuf car drive can-PFV.M.SG
'Yusuf managed to drive the car.'

a. *Presupposes:* Some action by Yusuf was the final cause of car-driving
$\exists A : \forall w' \in \text{caus}(w, t)[\text{in}(t, w', A(Y)) \leftrightarrow \text{in}(t, w', \text{drive-car}(Y))]$

b. *Base assertion:* The proximate cause was in Yusuf's (local) choice set
$A(x) \in \text{ch}(Y, w, t)$ (stative)

c. *With coercion + PFV:* Yusuf chose (acted on) the proximate cause
$\text{in}(t, w, A(Y))$

d. **Entailed result:** Yusuf drove the car
$\text{in}(t, w, \text{drive-car}(Y))$

Outline of the talk

Le as an implicative

Recall the proposal sketch for the **dispositional complex predicate:**

(16) **Proposal sketch:**
Given predicate P and agent x, *le*$(P)(x)$ presupposes that some (prior) choice by x is **necessary** and **sufficient** to **bring about** $P(x)$. *Le*$(P)(x)$ asserts that x made (acted on) this choice.

(1a) Anjum gaaṛii calaa **le-tii** (hai).
Anjum car drive take-IMPF.F.SG (be.PRS.SG)
'Anjum will/does drive the car.' (Anjum (can and) does drive the car)

This looks a lot like **manage**, or actualized **ability**:

(37) $[\![\text{le}(P)(x)]\!]^{w,t} := \lambda e.(\iota A_{vt} \in \text{ch}(x,w,t).\forall w' \in \text{caus}(w,t)$
$[\text{in}(t,w',A(x)) \leftrightarrow \text{in}(t,w',P(x))])(e)(w)$

$\sim$ *Agent x chooses the proximate cause of* $P(x)$

Le as an implicative

Eventives get **habitual** readings under **imperfective**:

- eventive $P \mapsto$ predicate of *relevant times* when P is instantiated
- First pass at HAB: relevance specified via salient pred. R, which picks up presuppositions of eventive P (cf. Schubert & Pelletier 1989 on GEN)

(38) $[\![\text{HAB}]\!] := \lambda w \lambda t \lambda R \lambda P. \forall t' [t' \subset t \,\&\, R(w)(t')][\text{in}(t', w, P)]$

(39) $[\![\text{IMPF}(\text{HAB}(\text{le}(P)(x)))]\!] =$
$\lambda w \lambda t. \exists t' [t' \supset t \,\&\, \forall t'' [t'' \subset t' \,\&\, \exists! A \in \text{ch}(x, w, t). \forall w' \in \text{caus}(w, t'')$
$[\text{in}(t'', w', A(x)) \leftrightarrow \text{in}(t'', w', P(x))]][\text{in}(t'', w, A(x))]$

All situations in which x has a choice which is necessary/sufficient for P are ones in which x acts on this choice

(40) agar raastaa pakkaa ho, Anjum saikal calaa **le-tii** hai
if road correct be, Anjum cycle drive take-IMPF.F.SG be.PRS.SG

'If the road is good, Anjum rides a bicycle.'

When the road is good, Anjum has a choice which is necessary/sufficient for her to ride a bike, and she makes this choice.

Le as an implicative

Eventive **le predicate** combines straightforwardly with **perfective**:

(41) $[\![\text{PFV}(\text{le}(P)(x))]\!] = \exists e[\tau(e) \subseteq t \,\&\, (\iota A \in \text{ch}(x, w, t).\forall w' \in \text{caus}(w, t)$
$[\text{in}(t, w', A(x)) \leftrightarrow \text{in}(t, w', P(x))])(e)(w)]$

Agent x had a choice which was causally necessary and sufficient for realizing P within reference time and acted on that choice

(1b) Anjum-ne gaaṛii calaa **l-ii**.
Anjum-ERG car drive take-PFV.F.SG

'Anjum drove the car.' (Anjum chose to drive the car)

Anjum had a choice which was necessary/sufficient for her to drive, and she made this choice (so she drove)

- **Prediction:** this should only be appropriate in contexts that support the causal presupposition. (Easily accommodated for agentive behaviours)
- In principle, the presupposition contributes to the volitionality effect by establishing that the agent *chose* (acted deliberately) in bringing about *P* ...

Three complications

1. If *le* ≡ *manage*, the following **should share an interpretation:**

(42) a. Anjum managed to open the door.

b. Anjum darvaazaa khol **sak**-**ii**
Anjum door open can-PFV.F.SG
'Anjum was able to open the door.'

c. Anjum-ne darvaazaa khol **li**-yaa.
Anjum-ERG door open take-PFV.M.SG
'Anjum opened the door.' (Anjum chose to open the door)

- **But:** (42c) seems weaker than (42a) and (42b): *P* is still non-trivial, but easier than *manage* and *sak* suggest
- Two notions of *choice*: (42a) is acceptable if Anjum's causing action was not intended to open the door, but (42c) is not
- **Upshot:** the choice element of *le* predicates is (explicitly) a choice for the dispositional target (not required for *manage*/*sak* prerequisites)

Three complications

2. Complex **le** predicates are **not compatible with negation**[5]

(43) a. *us-ne gaanaa nahĩĩ gaa **li-yaa**
3SG-ERG song NEG sing take-PFV.M.SG
Intended: 'He didn't (choose to) sing a song (completely).'

b. *vo gaanaa nahĩĩ gaa **le-taa**
3SG-ERG song NEG sing take-IMPF.M.SG
Intended: 'He doesn't/won't (choose to) sing songs.'

- If *le* ≡ *manage*, no explanation for (43)
- An **explanation sketch from Singh (1990):**
  Light verbs focus points of inception/completion and instantiate full main predicate event; negation targets the event, so inception/culmination points do not exist

[5] Well-reported previously for *le-* and other light verb perfectives (Singh 1990, Butt 1993).

Three complications

3. How does the **culmination contrast** arise?

(4) a. Maayaa-ne biskaṭ khaa-**yaa** lekin use puuraa nahĩĩ
Maya-ERG cookie eat-PFV.M.SG but it.ACC whole NEG
khaa-yaa
eat-PFV.M.SG
'Maya ate the cookie but did not finish it.'

b. Maayaa-ne biskaṭ khaa **li-yaa**, #par use puuraa nahĩĩ
Maya-ERG cookie eat take-PFV.M.SG, #but it.ACC whole NEG
khaa-yaa.
eat-PFV.M.SG
'Maya ate the cookie, #but did not finish it.'

- **Previously:** simple PFV has modal semantics, complex *le* PFV has the 'standard' culminating meaning (e.g., Singh 1998, Altshuler 2014)
- **So:** if *le* only establishes that $P(x)$ was chosen/caused, we predict the possibility of a non-culminated reading under PFV

Towards a resolution

Idea: causal skeleton introduced by *le* **merges** with event structure of main verb

- **Aspectual light verbs are not clause embedding:** evidence from scrambling (below), adverbial modification, coordination (Butt 1993)

(44) a. anjum-ne [likh **li-yaa**] patr.
Anjum-ERG [write take-PFV.M.SG] letter
'Anjum wrote a letter.'

b. *anjum-ne likh patr li-yaa.
anjum-ERG write letter take-PFV.M.SG
'Anjum wrote a letter.'

- *Butt, Isoda & Sells (1990):* LVs introduce **transparent event** structures whose arg structure, *Aktionsart* get fused with main pred structure
- *Butt (1993):* transparent *le*-event is specified for volitional agents, endpoints
- *Butt & Ramchand (2005):* main and light verb merge into an **accomplishment** structure (containing cause, process, result)

Towards a resolution

1. **An alternative approach to non-culmination**
   - **Standard view:** telic *P* denotes exclusively culminated events
   - **Alternative:** *P* takes structure from a **causal model** specifying *causal pathways* for culmination; non-culminated events qualify via partial match to a pathway (Nadathur & Bar-Asher Siegal 2022)
   - **Partitive aspects**: non-culminating PFV selects 'local' max, culminating req's absolute max (Nadathur & Filip 2021)
2. **Fusion on the implicative approach:** let *le* impose a **causal skeleton** where (volitional) initiation is necessary and sufficient for culmination
   - **Telic** denotations will be **pruned** of non-culminating events; no difference between strong & weak PFV
   - **Atelic** predicates have **termination conditions**: we get a volitional event brought to an intended conclusion

(45) Anjum-ne Taaj Mahaal-mein naac **li-yaa**
Anjum-ERG Taj Mahal-in dance take-PFV.M.SG.
'Anjum danced (deliberately, completely) in the Taj Mahal.'

Outline of the talk

Summary

Observation: a parallel in the aspectual behaviour of two ability constructions

- PFV in both cases eliminates modality detectable with IMPF

Shared semantics: *le* and *sak* share causal background structure with *manage*

- *Shared presupposition:* action/choice is **causally necessary/sufficient** for target
- *Divergent assertion:* *sak*/ABLE asserts capacity (stative), *manage/le* realizes cause (eventive)
- Modal 'flattening' is an illusion: aspectual effects are predicted by *Aktionsart*

Implicativity and event structure:

- Aspectually and structurally: *le* $\sim$ *manage*, **but** *le* fuses with embedded predicate
- **Looking ahead:** 'true' implicatives vs. 'implicative' light verbs may offer support for a complex causal view of event structure (Baglini & Bar-Asher Siegal 2021, Nadathur & Bar-Asher Siegal 2022)

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Appendix: Structural equation models for implicatives

Causal information is represented using a **directed acyclic graph** D:

- **nodes** (finite set Σ): salient prop. variables (can be valued $u, 0, 1$)
- **edges:** atomic relations of **causal relevance** ($P \xrightarrow{\text{c-influences}} Q$)
- **structural equations:** specify how nodes' values are determined from their ancestors'

  Function Θ_D assigns to each $X \in \Sigma$ a pair $\langle Z_X, \theta_X \rangle$ where Z_X is the set X's immediate ancestors, $\theta_X : \{0,1\}^{|Z_X|} \rightarrow \{0,1\}$
- **causal consequences:** of a *situation s* (3-way valuation of Σ) are calculated using D and Θ_D

In lexical semantics:

Causal language refers to (predicates, presupposes) particular structural configurations (*necessity, sufficiency*) as different causal dependency types

(cf. Nadathur & Lauer 2020, Baglini & Bar-Asher Siegal 2021)

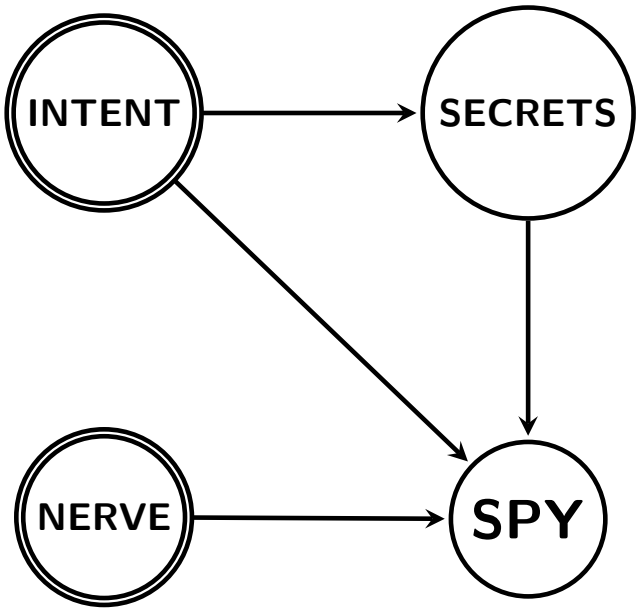
Appendix: Structural equation models for implicatives

Background. Captain Dreyfus was wrongly accused of spying for the Germans.

Relevant causal dependencies:

1. Collecting secrets requires treasonous intent
2. Spying (sharing secrets) requires treasonous intent, secret collection, risk-taking

A causal model for the Dreyfus affair: (finite graph + structural equations)

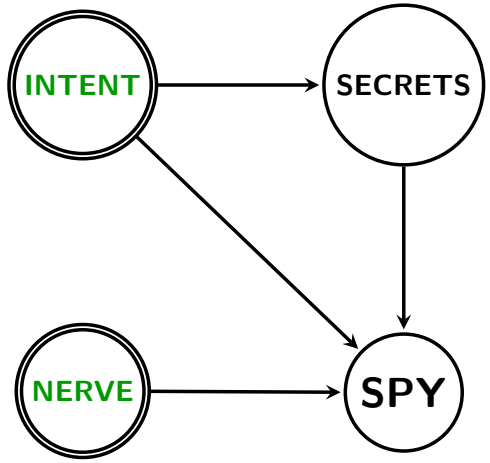


1. **SECRETS** := **INTENT**
2. **SPY** := **INTENT** $\wedge$ **SECRETS** $\wedge$ **NERVE**

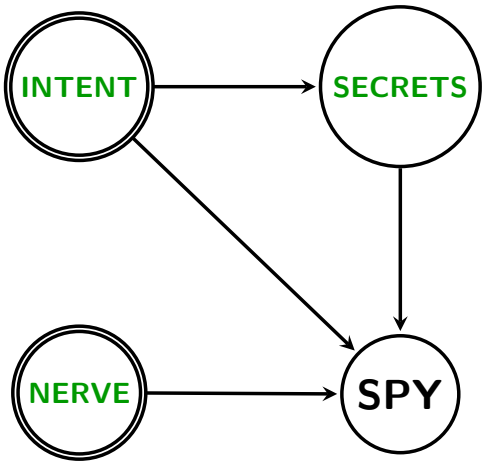
Appendix: Structural equation models for implicatives

Use background information to reason out causal consequences:

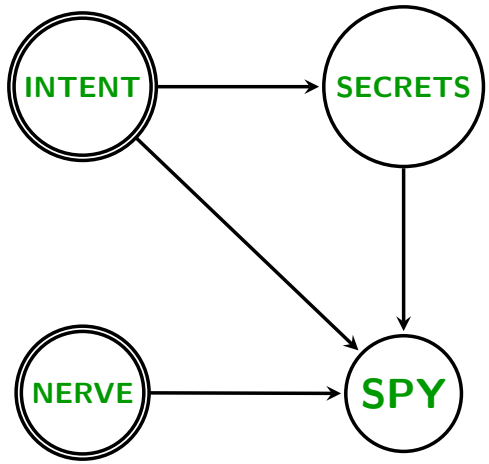
If **INTENT**, **NERVE** are **on**:



INTENT turns **SECRETS** **on**:



Which turns **SPY** **on** in turn:

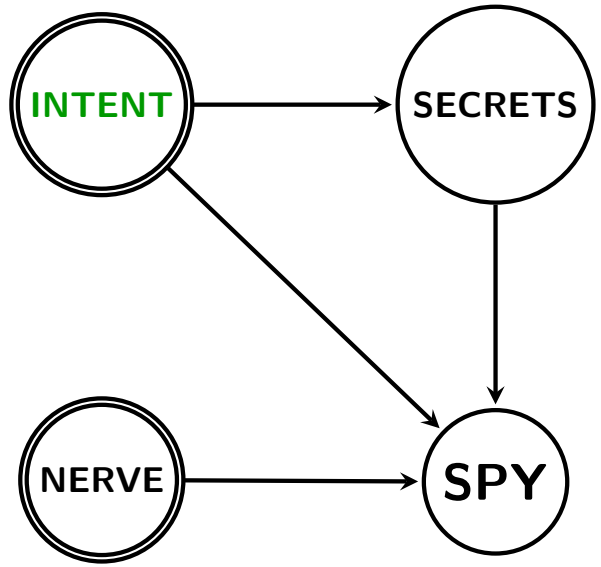


Appendix: Structural equation models for implicatives

Causal necessity, sufficiency are labels for different structural configurations:

- given a background situation s, a cause C is **causally necessary** for an effect E iff there's no (consistent) path from s to E which does not flip C

If we know that **INTENT** is **on**,
NERVE is **necessary** for **SPY**



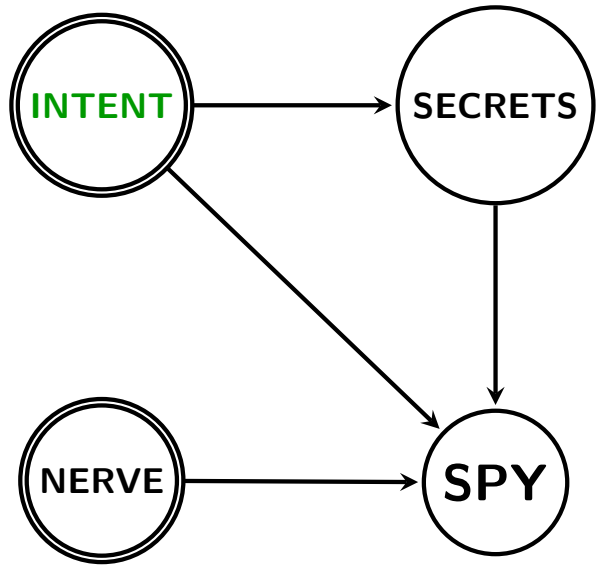
1. **SECRETS** := **INTENT**
2. **SPY** := **INTENT** $\wedge$ **SECRETS** $\wedge$ **NERVE**

Appendix: Structural equation models for implicatives

Causal necessity, sufficiency are labels for different structural configurations:

- given a background situation s, a cause C is **causally sufficient** for an effect E iff adding C to s guarantees E

If **INTENT** is **on**,
NERVE is **sufficient** for **SPY**



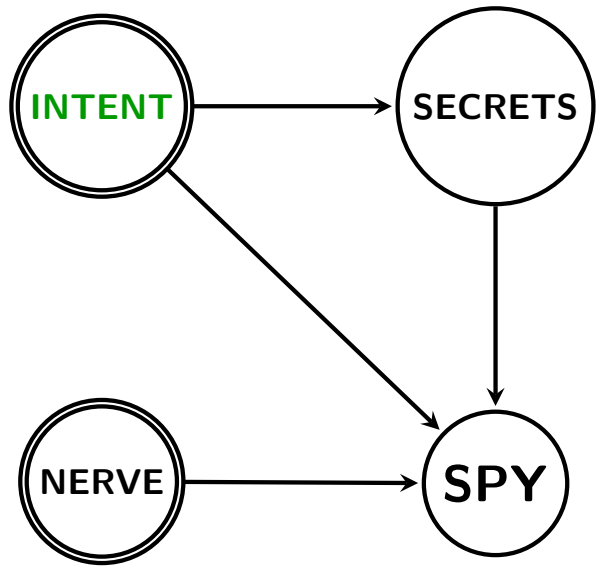
1. **SECRETS** := **INTENT**
2. **SPY** := **INTENT** $\wedge$ **SECRETS** $\wedge$ **NERVE**

Appendix: Structural equation models for implicatives

Causal necessity, sufficiency are labels for different structural configurations:

- given a background situation c, a cause C is **causally sufficient** for an effect E iff adding C to c guarantees E

If **INTENT** is **on**,
NERVE is **sufficient** for **SPY**

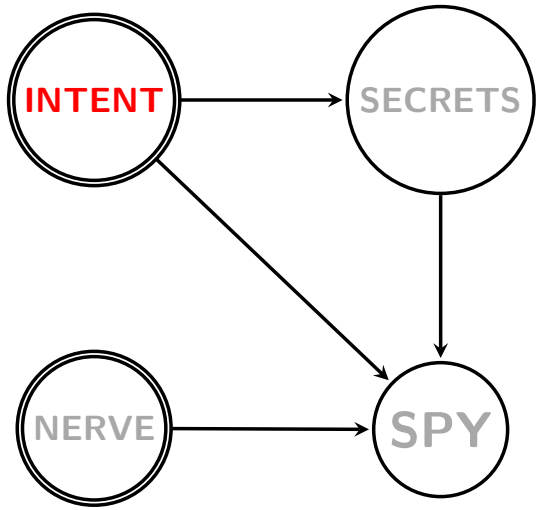


This is the right kind of context for **dare**:

(46) a. Dreyfus **dared** to spy for the Germans.
b. Dreyfus did not **dare** to spy for the Germans.

Appendix: Structural equation models for implicatives

In actuality, Dreyfus was loyal to France:



(46a) ??Dreyfus **dared** to spy.

requires: **NERVE** is **causally necessary, sufficient** for **SPY**

in context: NERVE is insufficient

(47) ??Dreyfus **managed** to spy.

requires: condition/s jointly **causally necessary, sufficient** for **SPY**

in context: no set of sufficient conditions