Causality, aspect, and modality in actuality inferences

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Introduction: Two ways of *being able*

A report of Brown's performance at the shooting gallery:

(1) 'He hit three bull's-eyes in a row.'

I admit that we are entitled to conclude:

(2) 'Brown *was able* to hit three bull's-eyes in a row.'

I deny, however, that this conclusion is equivalent to asserting that Brown has a certain degree of ability at target practice.

(3) 'Before he hit the three bull's-eyes, he fired 600 rounds, without coming close to the bull's-eye; and his subsequent tries were equally wild.'

This . . . in no way compels us to retract our assertion that he was able to hit three bull's-eyes in a row. He was able to do it, but without any regularity. Therefore he does not have this sort of ability . . .

"The story reveals the ambiguity of expressions from the 'being able' family. [. . .] **'Was able' sometimes means 'had the ability', and sometimes means 'did'.**" (Thalberg 1972)

Introduction: Two ways of *being able*

(4) This morning, Rebecca was able to swim across Lake Harriet.
$\rightsquigarrow$ *Rebecca did swim across Lake Harriet.*

- doesn't tell us anything about Rebecca's swimming in general
- odd if she didn't swim across the lake (this morning)
- **external viewpoint:** a lake-crossing event which began and ended this morning

(5) In her twenties, Rebecca was able to swim across Lake Harriet.
$\rightsquigarrow$ *Rebecca had the ability to swim across Lake Harriet.*

- a general assessment of her swimming ability (at a past time)
- okay if she never actually crossed Lake Harriet:

  (5') In her twenties, Rebecca was able to swim across Lake Harriet, but she always swam in Lake Nokomis instead.
- **internal viewpoint:** a persistent skill/competence, which might have begun in her teens and continue into her thirties

Introduction: Two ways of *being able*

Some languages mark the viewpoint contrast grammatically:

- **perfective aspect** corresponds to the external view
- **imperfective aspect** corresponds to the internal/ongoing view

The contrast occurs with the modal (possibility) verb **can** in these languages:

(6) French: **pouvoir**(=*can*)

a. *Rebecca* **a pu** *traverser le lac à la nage, #mais elle ne l'a pas traversé.* [did]
'Rebecca could-PFV swim across the lake, #but she didn't cross it.'

b. *Rebecca* **pouvait** *traverser le lac à la nage, mais elle ne l'a jamais traversé.* [had the ability]
'Rebecca could-IMPF swim across the lake, but she never crossed it.'

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

Introduction: Two ways of *being able*

Even in English, certain uses of **can** seem ambiguous:

- suppose we modify the shooting range story:

  (1') When you met Brown for the first time at the shooting gallery yesterday, you saw him miss the bullseye a few times, and then hit it three times in a row. After that you stopped paying attention. Later, a friend asks you about Brown's performance. You say:

  "Brown can hit the bullseye three times in a row."

- in one sense, this is true: he did hit the bullseye three times in a row, and you saw it
- in another sense, it seems premature: you don't have very much information about his shooting history, so it's hard to justify saying that he has this ability

Introduction: Three related puzzles

1. the apparent ambiguity is systematic with expressions of ability (*be able/can*):
   - what relates did and had the ability, and where does the contrast come from?

2. modal verbs like **can** are about possibility, not actuality:
   - in the did use, we must be referring to an actual event
   - in the had the ability use, we both want 'repeatability', but also don't require direct evidence:

   (5') In her twenties, Rebecca was able to swim across Lake Harriet, but she always swam in Lake Nokomis instead.

3. the external-internal (perfective-imperfective) distinction aligns with the did vs had the ability meanings:
   - why should the viewpoint/aspect make a difference to interpretation?

Introduction: Ability and actuality

The **did** interpretation is due to an **actuality inference** or an **actuality entailment** (Bhatt 1999):

(4') This morning, Rebecca was able to swim across Lake Harriet, ?!but she didn't cross it.
actuality inference

(6a) *Rebecca a pu traverser le lac à la nage, #mais elle ne l'a pas traversé.*
'Rebecca could-PFV swim across the lake, #but she didn't cross it.'
actuality entailment

Goals of the talk:

1. What do expressions of ability mean?
2. What is the connection between ability, actuality, and the possibility meaning usually associated with **can**?
3. What role does the viewpoint play in pushing us to one interpretation or the other?

Part I

Ability and possibility: what is an ability?

Part I: Modality

Language enables us to communicate about **displacement** (Hockett 1960): ideas or events beyond the here and now

- tense allows us to talk about the past and the future, as well as what is happening now
- **modality** allows us to talk about what might/might not be the case or what has to be the case:
  - **expressions of possibility**: *can*, *might*, *may*, ...
  - **expressions of necessity:** *must*, *should*, *ought*, *have to*, ...

(7) a. The light is on in the upstairs window, so he **must** be at home.

b. She turned 18 in September 2016, so she **may** have voted in the last presidential election

c. The climate in San Francisco is such that dahlias **can** grow here.

Part I: Modality

There are different kinds of possibilities:

(7) a. The light is on upstairs, so he must be at home.
In view of what I know about his energy-saving habits, the only way the light could be on is if he is at home

b. She turned 18 in September 2016, so she may have voted in the last presidential election.
In view of the laws about voting ages, it is consistent with what is legal that she voted

c. The climate in SF is such that dahlias can grow here.
The circumstances of weather/geography are consistent with dahlias growing in SF

We consider a set of alternatives which hold some body of information constant (Kratzer 1981):

- the information available to us or the beliefs we have
- the law (or what is 'right')
- facts and circumstances in the world

Part I: Ability modals

The **ability modal** – the **can** of *being able* – looks like a circumstantial possibility:

(8) Rebecca can/is able to swim across Lake Harriet.
Given the facts about the lake, Rebecca's strength, mental discipline, muscle memory, etc, one of the ways in which the world could go has her swimming across Lake Harriet

(9) Brown can hit the bullseye three times in a row.
Given the distance from the target, Brown's knowledge of shooting, steadiness of his eye/hand, etc, a possible future is one in which he hits the bullseye three times in a row

Consider alternative worlds which fix the actual circumstances:

- (8) $\equiv \top$ if there is a world where Rebecca swims across the lake
- (9) $\equiv \top$ if there is a world where Brown hits the bullseye three times

Part I: Ability modals

Circumstantial possibility has certain logical properties (Kenny 1975, 1976):

(10) I am in San Francisco and I see a clump of dahlias growing.

✓ Dahlias can grow in San Francisco.

> From the observation of a fact/event P, we conclude that P is possible (i.e., *can* P) **Axiom:** $P \rightarrow$ **can** P

But it's not clear that this holds for ability-**can**:

(11) Suppose Tara is a beginning golfer, who misses most of her shots. On this occasion, however, she strikes the ball from the tee, and it happens to go into the hole, so on this occasion she makes a hole in one.

? Tara $\text{can}_{\text{ability}}$ make a hole in one.

Claim: it's at least difficult to decide on (11) (Maier 2017)

Part I: Ability modals

The problem is about reliability/repeatability:

- as a beginning golfer, Tara doesn't have a reliable strategy or course of action for making a hole in one
- the 'pure chance' doesn't license the ability claim

Conclusion: circumstantial possibility is too weak for ability-**can**.

- necessity/requirement is obviously too strong:
  - Tara doesn't always need to make a hole-in-one for her to have the ability to do so
- we want something in between, that captures the idea of 'having a strategy'
- an ability is like a **hypothetical guarantee** (see also Brown 1988, Belnap 1991, Mandelkern et al 2017)

Part I: Ability as a hypothetical guarantee

Proposal for ability-can: for individual x, proposition P

$$x \ \textbf{can}_{\text{ability}} \ P$$

just in case there is some action A available to x such that if x does A, then x will do P

- possibility: $A(x)$ is possible, but doesn't have to take place
- for x, doing A represents a strategy for guaranteeing $P(x)$
- **question:** how are A and P conceptually connected?

This makes sense of the golfing example (cf. Maier 2017):

- Tara doesn't have a strategy for making a hole in one
- but she might make a hole in one by pure chance
- NB: this takes *Tara can make a hole in one* to be ambiguous between ability-**can** and 'pure possibility'-**can**

Interim summary: the three questions

1. **What do expressions of ability mean?**
2. What is the connection between ability, actuality, and possibility?
3. What is the role of viewpoint?

We've made progress on **Question 1**:

- an ability is a **hypothetical guarantee**: x has the ability to do P iff she has a strategy (possible course of action A) for P
- we still want to know how A and P are connected

  preliminary: $A(x)$ **brings about** $P(x)$

Question 2: Where does the actuality reading come from?

(6a) *Rebecca a pu traverser le lac à la nage.* [could-PFV]
→ Rebecca swam across the lake.

- **the problem:** this isn't a possibility meaning, and ability, as defined above, doesn't license $P(x) \rightarrow x$ *can* P!

Next: a closer look at the **actuality** interpretation of ability-**can**

Part II

Chasing the actuality interpretation

Part II: *Being able* as *managing*

Bhatt (1999) pointed out the existence of actuality entailments:

(14) Hindi: **saknaa**(=can), same pattern as French **pouvoir**

a. *Yusuf havaii-jahaaz uɽaa* **sakaa**, *#lekin us-ne havaii-jahaaz nahĩĩ uɽaayii.*
'Yusuf could-PFV fly the plane, #but he didn't fly the plane.'

b. *Yusuf havaii-jahaaz uɽaa* **saktaa** *thaa, lekin us-ne havaii-jahaaz kabhi nahĩĩ uɽaayii.*
'Yusuf could-IMPF fly planes, but he never flew a plane.'

Bhatt's claim: the actualized interpretation doesn't just mean *did*

(15) a. **could-pfv** = *managed to*
(14a) ≡ Yusuf managed to fly the plane.

b. **could-impf** = *had the ability to*
(14b) ≡ Yusuf had the ability to fly the plane.

Part II: *Being able* as *managing*

Bhatt's generalization:
Actualized **be able** and perfectively-marked ability-**can** have the same meaning as **managed to** claims.

Actuality-able and **managed** have the same logical consequences:

(4) This morning, Rebecca was able to swim across Lake Harriet.
$\sim$ Rebecca managed to swim across Lake Harriet.

(6a) *Rebecca* **a pu** *traverser le lac à la nage, #mais elle ne l'a pas traversé.* [French]
'Rebecca could-PFV swim across the lake, #but she didn't cross it.'
$\equiv$ Rebecca **managed** to swim across the lake, #but she didn't cross it.

(14a) *Yusuf havaii-jahaaz uɽaa* **sakaa**, *#lekin us-ne havaii-jahaaz nahĩĩ uɽaayii.* [Hindi]
'Yusuf could-PFV fly the plane, #but he didn't fly the plane.'
$\equiv$ Yusuf **managed** to fly the plane, #but he didn't fly the plane.

Part II: *Being able* as *managing*

Bhatt's generalization:
Actualized **be able** and perfectively-marked ability-**can** have the same meaning as **managed to** claims.

Actuality-able and **managed** also license the same additional inferences:

(16) I **managed** to sit through Wagner's 'Siegfried' last night.
   a. *suggests:* Sitting through 'Siegfried' was difficult for me
   b. *suggests:* I intended to sit through 'Siegfried'
   c. *suggests:* It was unexpected that I sat through 'Siegfried.'

(17) I **was able** to sit through 'Siegfried' last night.
   a. *suggests:* Sitting through 'Siegfried' was difficult for me
   b. *suggests:* I intended to sit through 'Siegfried'
   c. *suggests:* It was unexpected that I sat through 'Siegfried.'

Part II: *Managing* and *doing*

Question: What does it mean to *manage to* do something?

> *All that takes place when John* **manages to do** *something is that he does it. . . .* **managing to do** *is inseparable . . . from* **doing***; it is the same event.*
>
> (Karttunen 1971)

Manage gives rise to different inferences in different cases:

	difficulty	intention	unlikely
"Without intending to, Ms. Streisand managed to synthesize the problem of diversity mania."	✗	✗	✓
"By 1998, gun manufacturers had easily managed to bypass the laws by making small alterations to their weapons."	✗	✓	?
"The social democrats managed to strengthen their position as Denmark's strongest political force, as expected."	?	✓	✗

Part II: *Managing* and *doing*

Goal: assign a meaning to *manage* that captures this variability

- what do inferences about difficulty, intention, unlikelihood have in common?
- some obstacle must be overcome/some condition must be met for the *manage*-complement to occur (cf. Karttunen 2014)
- *because*-clauses tell us how this condition was handled

(18) I managed to buy the ring because it was cheap.
(vs: I bought the ring because it was cheap)

- *because* elaborates on a causal chain (Baglini & Francez 2016)

Manage to *P* backgrounds the **causal necessity** and **causal sufficiency** of some action or event for the realization of *P* (Nadathur 2016)

Part II: *Managing* and causal dependence

Manage belongs to a class of **implicative verbs**:

(19) a. I **managed** to sit through 'Siegfried' last night.
→ I sat through 'Siegfriend' last night.

b. I didn't **manage** to sit through 'Siegfried' last night.
→ I didn't sit through 'Siegfried' last night.

(20) a. Marja **dared** to open the door. → Marja opened the door.

b. Marja didn't **dare** to open the door.
→ Marja didn't open the door.

Verbs like **dare** are specific about the causal condition:

- **dare** presumes (presupposes) that (acting with) courage is necessary/sufficient for opening the door
- **dare** informs us whether or not Marja acted with the necessary/sufficient courage
  - if she did, then she opened the door
  - if she did not, then she didn't (and couldn't) open the door

Part II: *Managing* and causal dependence

Causal dependence captures bringing-about relationships:

- define dependencies in a **causal network model** (directed acyclic graph; Schulz 2011, Pearl 2000)
  - nodes are events, arrows are causal relevance links
  - given a set of facts, use the structure of the graph to figure out **causal consequences**
- dependence relations are labels for structural configurations, which appear as components of linguistic/lexical meaning

Informally, given two events A and P:

- A is **causally necessary** for P in a particular context c just in case all 'routes' from c to P's occurrence involve realizing A
- A is **causally sufficient** for P in context c just in case A's occurrence makes P's occurrence inevitable/unavoidable (where it was previously in question)

Part II: *Managing* and causal dependence

Proposal for manage: for individual x, proposition P

x **manage to** P

a. presupposes the existence of an action A for x such that $A(x)$ is causally necessary & sufficient for $P(x)$
b. asserts that $A(x)$ occurred (x did A)

Manage isn't specific about the type of causal condition:

- if $A(x)$ occurs, it causes **(=brings about)** $P(x)$
- if $A(x)$ does not occur, $P(x)$ is precluded

(16) I **managed** to sit through 'Siegfried' last night.

a. *presupposes:* being patient (e.g.) was necessary/sufficient for sitting through the opera
b. *asserts:* I was patient at the opera last night
c. **conclusion:** I sat through 'Siegfried' (due to patience)

Part II: *Managing* and causal dependence

Proposal for manage: for individual x, proposition P

x **manage to** P

a. presupposes the existence of an action A for x such that $A(x)$ is causally necessary & sufficient for $P(x)$
b. asserts that $A(x)$ occurred (x did A)

Causal dependence allows us to explain the 'variable' inferences:

- if I am notoriously impatient, then sitting through the opera was difficult/unlikely because being patient was difficult/unlikely
- in the gun manufacturing example, making small alterations was necessary/sufficient for bypassing the law

(21) "By 1998, gun manufacturers had easily managed to bypass the law by making small alterations . . ."

  - the causal condition here requires deliberate action/intention

Part II: *Being able* as *managing*

Proposal for manage: for individual x, proposition P

$$x \textbf{ manage to } P$$

a. presupposes the existence of an action A for x such that $A(x)$ is causally necessary & sufficient for $P(x)$
b. asserts that $A(x)$ occurred (x did A)

This should look familiar!

Proposal for ability-can: for individual x, proposition P

$$x \textbf{ can}_{\text{ability}} P$$

just in case there is some action A available to x such that if x does A, then x will do P

The key difference:

- the condition $A(x)$ for *manage* is not hypothetical
- ability-**can** doesn't resolve the status of $A(x)$

Part II: *Being able* as *managing*

Recap:

- the **ability** reading of **be able/can** tells us that there is some possible strategy for x to take to bring about $P(x)$
- this doesn't give us a handle on the **did** reading for **be able/can**
- to explain the **did** reading, we pursued Bhatt's idea that actualized **be able/can** has the same meaning as **managed**:
  - **manage** backgrounds a causal condition ($\sim$ strategy) for the complement, and tells us whether or not this strategy was acted on
  - the **manage/did** reading of **can/be able** tells us that x acted on a condition (strategy) for bringing about $P(x)$
  - what happened to the possibility?

Interim summary: the three questions

1. **What do expressions of ability mean?** ✓
2. **What is the connection between ability, actuality, and possibility?**
   - the ability reading seems to involve possibility
   - the manage/did reading does not, but does share structure with the ability reading
   - **problem:** the point of modals like *can* is to express possibility!

Recall: ability/actuality readings map onto aspect contrasts

(6a) *Rebecca* **a pu** *traverser le lac à la nage, #mais elle ne l'a pas traversé.*
'Rebecca could-PFV swim across the lake, #but she didn't cross it.'

(6b) *Rebecca* **pouvait** *traverser le lac à la nage, mais elle ne l'a jamais traversé.*
'Rebecca could-IMPF swim across the lake, but she never crossed it.'

This brings us to **Question 3: What is the role of viewpoint?**

Part III

Ability, actuality, and aspect

Part III: Splitting the difference

There's a class of *enough* constructions that license 'implicative' inferences:

(22) a. Juno **was fast enough** to win the race.
$\rightsquigarrow$ *Juno won the race.*

b. Juno **was** not **fast enough** to win the race.
$\rightarrow$ *Juno did not win the race.*

(23) a. Marja **was brave enough** to open the door.
$\rightsquigarrow$ *Marja opened the door.*

b. Marja **was** not **brave enough** to open the door.
$\rightarrow$ *Marja did not open the door.*

Compare (23) to (20):

(20) a. Marja **dared** to open the door.
$\rightarrow$ *Marja opened the door.*

b. Marja didn't **dare** to open the door.
$\rightarrow$ *Marja didn't open the door.*

Part III: Implicative *enough* constructions

They are sensitive to viewpoint/aspect (Hacquard 2005):

(24) a. *Juno* **a été assez rapide** *pour gagner la course, #mais elle n'a pas gagné.*
'Juno was-PFV fast enough to win the race, #but she didn't win.'

b. *Juno* **était assez rapide** *pour gagner la course, mais elle n'a jamais gagné.*
'Juno was-IMPF fast enough to win the race, but she never won.'

(25) a. *Marja* **a été assez courageuse** *pour ouvrir la porte, #mais elle ne l'a pas fait.*
'Marja was-PFV brave enough to open the door, #but she didn't do it.'

b. *Marja* **était assez courageuse** *pour ouvrir la porte, mais elle ne l'a jamais fait.*
'Marja was-IMPF brave enough to open the door, but she never did it.'

Part III: Non-implicative *enough* constructions

However, there is a class of systematic exceptions (Nadathur 2017):

(25) a. Nima **was tall enough** to reach the top shelf.
No strong inference about Nima reaching the shelf

b. Nima **was** not **tall enough** to reach the top shelf.
→ *Nima didn't reach the top shelf.*

(26) a. (!)*Nima* **a été assez grand** *pour atteindre l'étagère du haut, mais il ne l'a pas fait.*
'Nima was-PFV tall enough to reach the top shelf, but he didn't do it.'

b. *Nima* **était assez grand** *pour atteindre l'étagère du haut, mais il ne l'a jamais fait.*
'Nima was-IMPF tall enough to reach the top shelf, but he never did it.'

These exceptions involve **static** (non-actionable) properties (*tall, old, pretty*)

Part III: *Enough* constructions

Why look at *enough* constructions?

- they offer a bridge between **manage**/implicatives and 'pure' ability claims
  - they seem closer in meaning to implicatives than ability claims
  - but they pattern with ability claims in terms of aspectual marking, and the licensed conclusions
- because they have a more complex compositional structure than ability claims, they give us a view on what meaning components produce the key contrasts
- the first step is to understand why certain *enough* constructions are implicative and others are not:
  - this tells us about the basic nature of a strategy/available action in an ability claim

Part III: *Enough* and necessity

Both types of *enough* constructions involve a necessity condition:

(25a) Nima **was tall enough** to reach the top shelf.

a. ≡ *Nima was as tall as he had to be in order for him to reach the top shelf.* (von Stechow et al 2004)

b. ≡ *There was some minimum height h_{nec} such that, if Nima's height was less than h_{nec}, he could not reach the top shelf (by himself)*

c. → **Being h_{nec} tall was necessary for reaching the top shelf.**

(22a) Juno **was fast enough** to win the race.

a. ≡ *Juno was as fast as she needed to be to win the race.*

b. ≡ *There was some minimum speed s_{nec} such that, if Juno's speed was less than s_{nec}, she could not win the race*

c. → **Being s_{nec} fast was necessary for winning the race.**

Part III: *Enough* and necessity

From implicative verbs, we know that the necessity condition explains the negative/failure implications:

(20b) Marja didn't **dare** to open the door.

a. *presupposes:* acting with courage is causally necessary for opening the door

b. *asserts:* Marja didn't act with courage

c. **conclusion:** Marja didn't open the door

(27) *Juno n'***a été** *pas* **assez rapide** *pour gagner la course.*
'Juno was-PFV not fast enough to win the race.'

a. *presupposes:* there is a speed s_{nec} which is necessary for winning the race.

b. *asserts:* Juno is not s_{nec} fast (i.e. she is slower than s_{nec})

c. **conclusion:** Juno did not win the race.

Part III: *Enough* and sufficiency

We need sufficiency to get the positive inference:

(20a) Marja **dared** to open the door.

a. *presupposes:* acting with courage is causally sufficient for opening the door
b. *asserts:* Marja acted with courage
c. **conclusion:** Marja opened the door

(28) *Juno* **a été assez rapide** *pour gagner la course.*
'Juno was-PFV fast enough to win the race.'

a. **we need (28) to presuppose:** there is a speed s_{suff} ($= s_{\text{nec}}$) which is sufficient for winning the race.
b. *asserts:* Juno is s_{suff} fast
c. **conclusion:** if (28a), then Juno won the race.

Two problems:

1. how can the perfective introduce sufficiency?
2. there's no speed s such that *having* that speed (e.g. being capable of speed s) can, by itself, be sufficient

Part III: Static vs. dynamic properties

The key difference between the *enough* constructions that behave like *manage* and those that do not has to do with the adjective:

- *fast, brave, nimble* are **dynamic** (actionable) properties:
  - describe the capacity for actions which are characterized by speed, courage, dexterity, etc.
- *tall, old, pretty* are **static** properties:
  - they are states that an individual can be in, but they don't characterize actions/behaviour
- **upshot:** dynamic properties characterize action and have implicative inferences, static properties don't characterize action, and don't generate inferences

Why does this make a difference?

- what are we reasoning about when we assess whether Nima is tall enough to reach the top shelf, or Juno is fast enough to win the race?

Part III: Static *enough* constructions

(25a) Nima is tall enough to reach the top shelf
$\sim$ *Nima has the necessary/required height which enables him to reach the top shelf*

Another way of thinking about this:

- look at a set of alternative circumstances in which Nima's height varies (but other facts stay the same)
- across those alternatives where he reaches the top shelf, there's a certain minimum height he must have
- **observation:** alternatives where he reaches the top shelf also involve an action (attempt to reach the shelf)
  - the attempt is independent of his height (though height is an enabling condition for success)

Part III: Dynamic *enough* constructions

(29) Juno is fast enough to win the race.
$\sim$ *Juno has the speed required for winning the race.*

We do the same thing:

- across those alternatives where Juno wins, there's a minimum speed she must have
- latent speed isn't enough: she has to act
  - here, the action *is characterized by speed*
  - Juno's acting on her capacity brings about winning
  - dynamic properties automatically encode sufficiency: **manifesting the necessary speed causes the win**
- **upshot:** (29) presupposes the existence of a speed $s_{n/s}$ such that a manifestation of $s_{n/s}$ is causally necessary and causally sufficient for winning the race.
  - NB: if manifesting speed $s_{n/s}$ is causally necessary for winning, having the capacity for $s_{n/s}$ is itself necessary for winning

Part III: The meaning of dynamic *enough* constructions

Proposal for dynamic enough constructions: for individual x, propositions p, dynamic property ADJ

x **is adj enough to** P

a. presupposes the existence of a degree $d_{n/s}$ of ADJ such that a performance/manifestation of $d_{n/s}$-ADJ by x is causally necessary and causally sufficient for $P(x)$

b. asserts that x has the capacity to manifest $d_{n/s}$-ADJ

This looks more like ability than like *manage*:

- assertion is the key difference between *be* ADJ *enough* and *manage*
- *manage* tells us that the causing action was taken, so we conclude that $P(x)$ occurred
- *be* ADJ *enough* only tells us the causing action is possible (ability!)
- **crucially:** if we have some way of concluding that this capacity was acted on, then we can conclude that $P(x)$ occurred

Part III: Deus ex machina?

This is progress:

- dynamic adjectives have two (semi) interchangeable interpretations

(30) a. Alvin is polite.
b. Alvin is being polite.

> *. . . the non-progressive characterizes a person; the progressive reports on behaviour . . .*
>
> (Goldsmith & Woisetschlaeger 1982, p.85)

- English 'bare' dynamic adjective attributions are at least ambiguous:

(31) Juno was loud/fast.
a. **event/action:** Juno did something loud/quickly
b. **state:** Juno had the capacity for doing things loudly/quickly

Part III: Deus ex machina?

Viewpoint (aspect) to the rescue!

- the contrast between external and internal viewpoint produces the crucial event/state contrast

(34) a. *Juno* **a été assez rapide** *pour gagner la course.*
'Juno was-PFV fast enough to win the race.'
event: *Juno manifested the causally necessary/sufficient speed* $s_{n/s}$.

b. *Juno* **était assez rapide** *pour gagner la course.*
'Juno was-IMPF fast enough to win the race.'
state: *Juno had the capacity to manifest speed* $s_{n/s}$.

Question: why does this happen?

- the external viewpoint of the perfective aspect requires a complete event, having 'natural' boundaries
- capacities, as properties of individuals (states individuals can be in) don't have natural boundaries

Part III: Viewpoint aspect and boundaries

Since perfective requires a complete event, it doesn't automatically combine with property attributions:

(35) ??*Nima a été grand.*
int: 'Nima was-PFV tall.'

NB: explains the problem with (24a), *Nima was-PFV tall enough to reach the top shelf*

We can combine states with the perfective if we have a natural way of reinterpreting them (coercing them into the right shape):

(36) *Amira a été assez grande pour boire de l'alcool.*
'Amira was-PFV old enough to drink alcohol.'
→ Amira *became* old enough to drink alcohol (turned 21).

Dynamic capacity attributions have reinterpretation built in:

(37) Alvin is being tactful. → Alvin is acting on a capacity for tact.

(38) *Juno a été rapide.* → Juno acted on a capacity for speed.
'Juno was-PFV fast.'

Part III: Interpreting dynamic *enough* constructions

Proposal for dynamic enough constructions: for individual x, propositions p, dynamic property ADJ

x **is adj enough to** P

a. presupposes the existence of a degree $d_{n/s}$ of ADJ such that a performance/manifestation of $d_{n/s}$-ADJ by x is causally necessary and causally sufficient for $P(x)$

b. asserts that x has the capacity to manifest $d_{n/s}$-ADJ

(34b) *Juno* **était assez rapide** *pour gagner la course.*
'Juno was-IMPF fast enough to win the race.'

a. *presupposes:* there is a speed $s_{n/s}$ such that the event of Juno manifesting $s_{n/s}$ (running at speed $s_{n/s}$) is causally necessary/causally sufficient for her to win the race.

b. *asserts:* [state] Juno has the capacity to manifest speed $s_{n/s}$

c. **conclusion:** It is possible for Juno to win the race (because of her speed capacity); Juno has the ability to win the race.

Part III: Interpreting dynamic *enough* constructions

Proposal for dynamic enough constructions: for individual x, propositions p, dynamic property ADJ

x **is adj enough to** P

a. presupposes the existence of a degree $d_{n/s}$ of ADJ such that a performance/manifestation of $d_{n/s}$-ADJ by x is causally necessary and causally sufficient for $P(x)$

b. asserts that x has the capacity to manifest $d_{n/s}$-ADJ

(34a) *Juno* **a été assez rapide** *pour gagner la course.*
'Juno was-PFV fast enough to win the race.'

a. *presupposes:* there is a speed $s_{n/s}$ such that Juno's manifesting $s_{n/s}$ is causally necessary/sufficient for winning.

b. *asserts:* [event] Juno manifested (ran at) speed $s_{n/s}$

c. **conclusion:** Juno won the race (her acting on her speed capacity brought about her race win)

Under perfective reinterpretation, **be fast enough** behaves like **manage**

Part III: Tying things together

Enough constructions have the same structure as ability claims:

(39) x **is** ADJ **enough to** P
x has the capacity to act in a way that is causally necessary/sufficient for $P(x)$; this action is a manifestation of some particular level of ADJ

(40) x **can/is able to** P
x has an available action A such that $A(x)$ brings about $P(x)$

We can now fill in the gaps:

- the **bringing-about** connection between $A(x)$ and $P(x)$ is about **causal dependence**: $A(x)$ is causally necessary and causally sufficient for $P(x)$
- now: **having an available action/strategy** is a dynamic capacity, like **being fast enough**
- **so:** grammatical aspect/viewpoint has the same effect on the interpretation of **ability-can/be able** claims as it does on dynamic **enough** claims

Part III: Tying things together

Proposal for ability-can: for individual x, proposition P

$$x \ \textbf{can}_{\text{ability}} \ P$$

just in case x has the capacity for some action A such that $A(x)$ is causally necessary & sufficient for $P(x)$

Without the external viewpoint, this just expresses the possibility of $P(x)$, in view of x's capacities

- but with perfective-induced reinterpretation:

(41) *Olga a pu soulever cette table.* 'Olga could-PFV lift this table.'

a. *presumes:* Olga had the capacity for an action A such that Olga's doing A is causally necessary/causally sufficient for Olga to lift the table

b. *asserts:* [event reinterpretation] Olga did A

c. **conclusion:** Olga lifted the table

Conclusions

Conclusions: Back to the three questions

1. What do expressions of ability mean?
   - x **can/is able to do** P just in case x has the capacity to act in a way (A) that causes $P(x)$ to occur

$$\textit{presuppose: } A(x) \xrightarrow[\text{c-nec}]{\text{c-suff}} P(x)$$
$$\textit{assert: } \text{possible}_{\text{circ}}\ A(x)$$

2. What is the connection between ability, actuality, and possibility?
   - $P(x)$ is **possible** in view of x's capacities
   - $P(x)$ gets **actualized** if x acts on her capacity
3. What is the role of viewpoint?
   - the internal viewpoint leaves **was able** (and past-tense **can**) as a state/property description, which expresses a latent capacity
   - the external/completed viewpoint forces the 'event' reinterpretation, and asserts that x acted on the capacity

Conclusions

The puzzle we started with:

- why is there a systematic ambiguity in expressions of ability and possibility?
- how do the *ability* and *actuality* meanings map to a conception of possibility, and to each other?

The explanation:

- the two interpretations share a single basic structure
- . . . connected to possibility via the 'availability' of a strategy/course of action
- the 'ambiguity' isn't encoded, but arises in interpretation
  - from context in English
  - from combination with grammaticalized aspect in French, Hindi, etc

Conclusions: a positive consequence

We can explain the apparent tense asymmetry in ability claims:

(42) Brown aimed, fired, and hit the bullseye three times in a row.

a. He **was able** to hit the bullseye three times in a row. ✓

b. He **can/is able to** hit the bullseye three times in a row. ✗/**?**

x **can-**PFV/**was able to** P isn't licensed by observing $P(x)$

- instead, past-tense ability claims report on event structure:
- x **was able to** P conveys that, as it turned out, the action that x actually took had the causal consequence $P(x)$
- so the event has the right structure for an ability claim (even though the strategy might not have been clear in advance)

Conclusions: causation in language

The causal dependence analysis does real work here:

- previous accounts of ability didn't capture the non-accidental relationship between 'strategy' and consequence
- here, a **hypothetical guarantee** is cashed out in terms of causation/bringing-about
- this structure interacts with aspect to produce actuality inferences
- causal structure is crucial to reconciling the various interpretations with a unified semantic account

Big picture:

- causal dependencies (of different types) are encoded in semantic meaning
- these dependencies have important interactions with other components of meaning (e.g., aspect)
- the account presented here illustrates that causal reasoning is deeply embedded in the use and interpretation of language, even where the language involved is not overtly causal in nature