



# Variation in the actuality inference of circumstantial modals in French

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# Introduction

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Bhatt (1999), Hacquard (2006, 2009): in French and other languages with (im)perfective aspect, root possibility modals in perfective sentences seem to require the verification of their prejacent in the evaluation world:

- (1) Paul **a pu** parler au chef de service. **X**Et pourtant il n'a même pas essayé. Terrorisé.  
'Paul can.PFV speak to the boss. And nevertheless he didn't even try. Terrorized.'

# Introduction

- Bhatt (1999), Hacquard (2006): the **actuality inference (AI)** is an **entailment**
- Mari and Martin (2007, 2009), Homer (2021): various contexts allow one to **avoid the entailment**, i.e. the presence of a temporal adjunct, see (1) vs. (2)
- Piñón 2011 (focusing on abilitatives): the AI is not an entailment (in any context); it is a **defeasible** (abductive) inference

(1) Paul **a pu** parler au chef de service. ✗Et pourtant il n'a même pas essayé. Terrorisé.  
'Paul can.PFV speak to the boss. And nevertheless he didn't even try. Terrorized.'

(2) A un moment donné Paul **a tout à fait pu** parler au chef de service. ✓Et pourtant il n'a même pas essayé. Terrorisé.  
'At one point Paul really can.PFV speak to the boss. And nevertheless he didn't even try. Terrorized.'



- Inspired by Mucha and Renans (2020), we provide first quantitative data on the AI in French
- We compare the AI triggered by *être capable de* vs. *pouvoir*
- We argue that **three other factors** than previously discussed determine the strength of the AI:
  - i. **root flavor**: external, internal **or mixed** circumstantial modality
  - ii. **lexicalisation** of ‘abilitative’ modality via the verb *pouvoir* or the adjective *capable*
  - iii. the presence vs. absence of a **verum adverbial** (e.g., *vraiment* ‘really’, *tout à fait* ‘completely/totally’)

## Three factors influencing the strength of AI

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Introduction

Three factors influencing the strength of AI

Factor 1: flavour of circumstantial modality

Factor 2: lexicalization of the modality

Factor 3: focus-inducing adverbial

Contradiction questionnaire: methods and material

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# Factor 1: flavour of circumstantial modality

- Hackl 1998:25 introduces after Austin (1967) and Nowell-Smith (1967) a three-way distinction between three flavours of circumstantial modality:
  - ability-can
  - opportunity-can
  - all-in-can
- Ability-can: the relevant facts that determine the modal base are **stable, internal properties of the subject** (e.g., physical strength and skills) in the world of evaluation.
- Opportunity-can: the relevant facts that determine the modal base are **accidental or stable properties of the utterance situation, external to the subject**.
- All-in-can: the relevant facts that determine the modal base are **mixed**.





# Factor 1: flavour of circumstantial modality

## Internal circumstances



### ability-can

*I can write a novel*

*I can cross the Balaton Lake*

*I can pass the exam*

## External circumstances



### opportunity-can

*I can buy the novel there*

*I can take a taxi*

*I can take the exam*

- (3) a.  $\llbracket \text{can} \rrbracket = \lambda \mathcal{R} \lambda P \lambda e \exists w' \mathcal{R}(w)(w') = 1$  such that  $P(w')(e)$
- b. **Abilitative:**  $\mathcal{R}_{abil} := \lambda w \lambda w'. w'$  is comp. with some subject-internal circumstances in  $w$ .
- c. **Pure circumstantial/opportunity:**  $\mathcal{R}_{circ} := \lambda w \lambda w'. w'$  is compatible with some external circumstances in  $w$ .

## Factor 1: flavour of circumstantial modality

- Authors arguing for or against the AE pick up different flavours
- AI stronger with ability *pouvoir* than with opportunity-*pouvoir* (see Mari and Martin 2008: 12)

(4) a. “ABILITY” *pouvoir*: stronger AI

Jean a **pu-👤 soulever un frigo**. Mais il ne l’a pas soulevé.

‘Jean can-PFV lift a fridge, but he didn’t lift it.’

(Hacquard 2020)

b. OPPORTUNITY *pouvoir*: weaker AI

Jean a **pu-🌐 prendre le train pour Londres**, et cet imbécile ne l’a pas fait.

‘Jean can-PFV take the train to London. And this idiot didn’t do it.’

(Mari and Martin 2008)

- **Note.** This is exactly the opposite picture as depicted for English *able to* according to Piñón (2003).



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## Factor 2: lexicalization of the modality

- Hacquard 2006: AI amounts to an **implicature** with **nouns** (via biclausality)
- Whether the AI is also weaker with French **adjective** *capable* has not been very much discussed yet.
- **Claim: AI is weaker when ability is expressed by *capable* than by *pouvoir***

	Lexicalization	Strength of AI ( <b>max</b> =entailment)
Noun	<i>a eu la possibilité d'écrire un roman</i>	
Adj	<i>a été capable d'écrire un roman</i>	
Verb	<i>a pu écrire un roman</i>	
(Baseline)	<i>a réussi à écrire un roman</i>	

## Factor 2: lexicalisation of the modality

In (5), the adjunct is present in both examples but the IA seems easier to defeat with *capable* than with *pouvoir*:

- (5) a. **MIXED** “ABILITY” *pouvoir*: stronger AI  
**A un moment donné** j’ai vraiment **pu-#** l’écrire, mon roman.  
Et pourtant je n’ai pas écrit une ligne. Paralysée.  
‘At some point I really could write it, this novel. And  
nevertheless I didn’t write a line of it. Paralysed.’
- b. (PURE) ABILITY *capable*: weaker AI  
**A un moment donné** j’ai vraiment **été capable de-#** l’écrire,  
mon roman. Et pourtant je n’ai pas écrit une ligne.  
Paralysée.

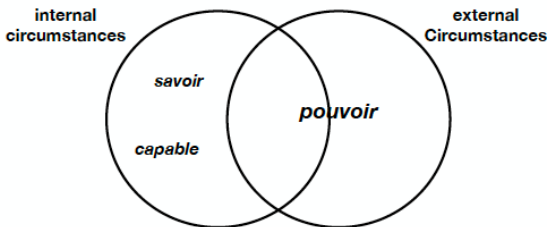
- *pouvoir* in the TLFi: “have the ability to (according to inherent properties of the individual) and in some material conditions”.



## Factor 2: lexicalisation of the modality

Proposal: French *pouvoir*<sub>circ.</sub>  $\neq$  English *can*<sub>circ.</sub>

- With circumstantial *pouvoir*, relevant circ. tend to **always be external** to the subject, and **optionally subject-internal**, too
- Circumstantial *pouvoir* = *opport-pouvoir* or **mixed ability-pouvoir**
- These restrictions of *pouvoir*<sub>circ.</sub> may rather reflect the division of labour between circumstantial modals in French than being coded hard-wired in the lexicon



# Division of labour between French circumstantial modals

External circumstances tend to be systematically picked up by circumstantial *pouvoir*

- *Example forcing the modal to pick up internal circumstances only (purely abilitative context):*

(6) Tu es bon nageur? Oui je **#peux-♿/sais** nager. (Hackl 1998)  
'Are you a good swimmer? Yes I can swim.'

- *Example allowing the modal to pick up both external and internal circumstances:*

(7) Paul **peut-♿+🌐/#sait** la sauver, il nage bien et elle n'est pas loin.  
'Paul can save her, he swims well and she's not far.'

~> *pouvoir* does not work well as a pure abilitative



# Division of labour between French circumstantial modals

*pouvoir* may select the accessibility relation in (3b/c), but not (so easily) the one in (3d), which is the hunting ground for abilitative *capable* and *savoir*

- (8) a.  $\llbracket \text{pouvoir} \rrbracket = \lambda \mathcal{R} \lambda P \lambda e \exists w' \mathcal{R}(w)(w') = 1$  such that  $P(w')(e)$
- b. **Mixed/all-in circumstantial:**  $\mathcal{R}_{\text{circ}} := \lambda w \lambda w'. w'$  is compatible with some **external** and **subject-internal circumstances** in  $w$ .
- c. **Pure circumstantial/opportunity:**  $\mathcal{R}_{\text{circ}} := \lambda w \lambda w'. w'$  is compatible with some **external circumstances** in  $w$ .
- d. **Pure abilitative:**  $\mathcal{R}_{\text{abil}} := \lambda w \lambda w'. w'$  is comp. with some **subject-internal circumstances** in  $w$ .





# Variation in the AI of circumstantial modal in French: summary

Summary of the empirical claims:

AI+	AI-
WITHOUT TEMPORAL ADJUNCT	WITH TEMPORAL ADJUNCT
	AI- AI- -
	<i>pouvoir</i> -🌐+👤 <i>pouvoir</i> -🌐
	<i>être capable de</i> -👤

In the presence of a temporal adjunct, the AI is stronger with *mixed* circumstantial.



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## Factor 3: focus-inducing adverbial

- Focus-inducing adverbials like *vraiment*, *tout à fait* or *even* are sometimes present in examples illustrating the avoidability of AI
- We believe this is not accidental: they help avoiding the AI.

- (9) a. Notre nouveau robot a même pu repasser les chemises à un certain stade de son développement, mais cette fonction n'a jamais été utilisée. Mari and Martin (2007)  
'Our new robot even could iron skirts at a certain stage of its development, but this function was never used.'
- b. A un moment donné j'ai vraiment été capable de l'écrire, mon roman. Et pourtant je n'ai pas écrit une ligne. Paralisée.  
'At a certain point I was really able to write it, this novel. And nevertheless I never wrote a line of it. Paralyzed.'



## Contradiction questionnaire: methods and material

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# Experiment on AI in a language without aspect: Mucha & Renans 2020 on German

Mucha and Renans 2020 on German: first experimental study on the AI.

Two variables manipulated

- lexicalization: verb vs. noun
- modal flavour: root vs. epistemic

Items:

- 6+6 verbs
- 6+6 nouns

(10) Maria konnte gestern den Zug nehmen um nach Berlin zu fahren, aber sie hat nicht den Zug genommen.

‘Maria can-SP take the train yesterday to go to Berlin, but she didn’t take the train.’

(11) **Question:** ist der Satz widersprüchlich? *ja/nein*



# Pilot study: Methods and materials

- Like Mucha and Renans, we ran a questionnaire in French to assess the **contradiction** generated by an assertion with a root modal in the perfective followed by the denial of its AI
- Given our hypothesis that some test sentences are more contradictory than others, we asked participants to assess the level of contradiction on a Likert scale.
- We manipulated three variables:
  - (between participants) the **presence/absence of an adjunct**
  - (within participants) the circumstantial **flavour**: favouring an opportunity vs. ability use
  - (within participants) the **lexicalization** of the modal: adjective (*capable*) vs. verb (*pouvoir*)
- Flavour and lexicalization partially overlap: *capable* is always abilitative (no opportunity use)



# Contradiction questionnaire: methods and materials

- 90 native speakers of French, 83 after exclusions
- 10 abilitative items (expressed either by *pouvoir* or by *capable*) and 5 opportunity items
- All experimental items included a verum adverbial modifying the modal (*tout à fait* or *complètement*)

Groups	N	Adjunct	Abil-Adj	Abil-Verb	Opport-Verb	Fillers
A	22	Y	5	5	5	32
B	36	N	5	5	5	32
C	25	Y	5	5	5	32



# Contradiction questionnaire: methods and materials

Predicates used for the Abil-Flavour condition and the Opport-Flavour condition (translated, all with verum adverbial):

## Internal circumstances (ability)

- 1 *I can write my novel*
- 2 *Our robot can iron skirts*
- 3 *Adam can lift the safe*
- 4 *Onur can get hired as a programmer*
- 5 *Leonor can do professional competition*
- 6 *Marie can hit a deer with a bow*
- 7 *Ana can count up to 10.000*
- 8 *Jean can appease Mary*
- 9 *Jean can eat 50 hot-dogs in a row*
- 10 *Adam can pass the university entry exam*

## External circumstances (opportunity)

- Paul can escape from the cave*  
*Marie can buy tickets on the black market*  
*Marie can take the train*  
*Thomas can get out of the classroom*  
*Paul can speak to the boss*





# Certainty questionnaires: procedure

- The questionnaire required participants to rate how contradictory was the test sentence on a scale from 1 (not at all contradictory) to 7 (completely contradictory).
- The experiment was presented using Qualtrics, and the subjects recruited via Prolific

# Contradiction questionnaire: methods and materials

## Example of test items (with the adjunct)

A un moment donné Onur a été tout à fait capable de se faire embaucher comme programmeur. Et pourtant, il n'en avait aucune envie, et il ne s'est même pas présenté.

(1=pas du tout contradictoire, 7=complètement contradictoire)

1

2

3

4

5

6

7



# Contradiction questionnaire: methods and materials

- Experimental items were intermixed with filler items.
- 10 of these fillers were from unrelated experiments, and 22 served to anchor the scale at its endpoints.
- The high and low anchors also included a verum adverbial.

## 12 High anchors

### **implicatives/causatives**

manage to open the door

know that Mary is married

know that Pierre moved

manage to enter through the window

kill the mosquito

refuse to open

fail to submit a project

burn all the letters

melt all the butter

paint the whole table in red

assemble the whole Ikea cupboard

translate the whole letter

## 10 Low anchors (translated)

try to convince him to come

say that Pierre is married

want to go to the cinema

encourage Mary to take the new job

try to dissuade him to marry Mary

believe that Mary has a young boy

invite Oscar to come for dinner

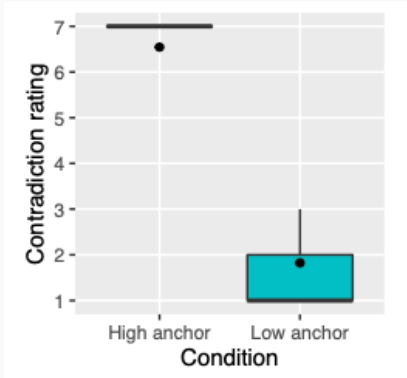
ask Mary to lend me her computer

doubt that I could pass this exam

teach the rule of three



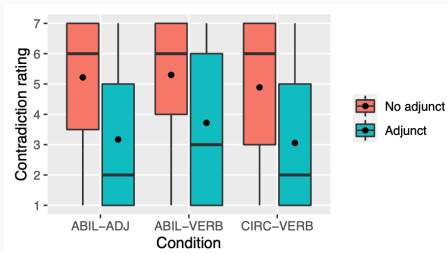
# Contradiction questionnaire: Results from low and high anchors



	Mean	SD
High anchor	6.54	1.10
Low anchor	1.82	1.60

- High and low anchor fillers showed expected results.
- High anchors fillers were used also as an exclusion criterion: 7 participants with High anchor ratings more than 2 SDs from the mean were excluded from further analyses.

# Contradiction questionnaire: results with vs. without adjuncts

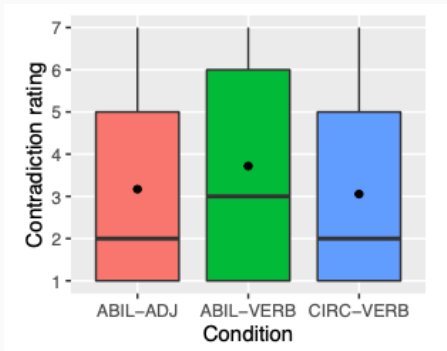


	No adjunct	With adjunct
Abil-Adj	5.20	3.14
Abil-Verb	5.25	3.73
Opport-Verb	4.86	3.0

- For all analyses, we used Generalized linear models (GLM)
- Significant main effect of ADJUNCT ( $p < 0.001$ )
- Trending interaction of CONDITION and ADJUNCT: **Abil-Verb** was rated higher than both **Abil-Adj** and **Opport-Verb**, only with ADJUNCT ( $p = 0.089$ )



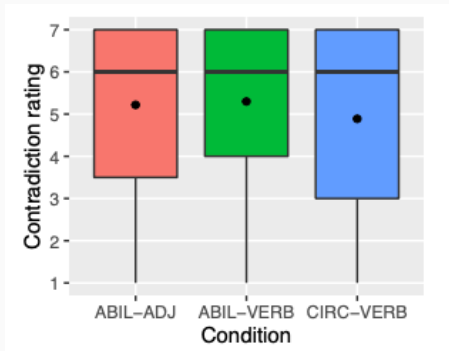
# Contradiction questionnaire: results with adjuncts



With adjunct	Mean	SD
Abil-Adj	3.14	2.25
Abil-Verb	3.73	2.31
Opport-Verb	3.03	2.28

- GLM with CONDITION as predictor
- **Abil-Verb** was significantly rated higher than both **Abil-Adj** and **Opport-Verb** ( $p=0.006$ ).

# Contradiction questionnaire: results without adjuncts



With adjunct	Mean	SD
Abil-Adj	5.20	2.12
Abil-Verb	5.25	2.17
Opport-Verb	4.86	2.18

- GLM with CONDITION as predictor
- No significant effect

# Contradiction questionnaire: high anchors vs. target items

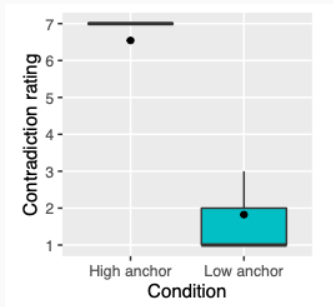


Figure 1: High vs. Low anchors

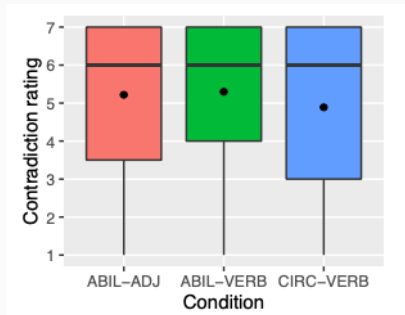


Figure 2: Test items without adjunct

- High anchors are all significantly different ( $p < 0.001$ ) from all of the target items in the NO-ADJUNCT condition.
- This goes against the analysis of AI as i) entailment and/or ii) modal suppression.





# Contradiction questionnaire: summary of results

- The robust effect of ADJUNCT strongly supports the view that the AI is not always entailed in the perfective.
- Abil-Verbs items are those that are rated as the most contradictory (observable in the Adjunct condition).
- No significant difference between Opport-Verb and Abil-Adj.
- Target items are rated significantly lower than high anchors (baseline implicatives entailing their prejacent) even in the NO ADJUNCT condition

## Explaining the adjunct effect

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# Piñón 2011: AI *qua* abductive inference

The experimental results call for a pragmatic rather than semantic account of the AI.

Piñón 2009; Piñón 2011: **AI = abductive inference** (no covert operator *à la* Homer 2021).

Surprising observation to explain:

(12) a. Olga **a été** capable de soulever un frigo.

‘Olga be-PFV able to lift a fridge.’

b.  $\sim$  NOT(Olga **était** capable de soulever un frigo).

‘NOT(Olga be-IMP able to lift a fridge).’

(13)  $\llbracket \text{PFV capable-de VP} \rrbracket^{M,g} = 1$  &  $\llbracket \text{IMP capable-de VP} \rrbracket^{M,g} = 0$

(14) a.  $\text{PFV VP} \rightarrow \text{PFV capable-de VP}$  (axiom)

b.  $\text{PFV capable-de VP}$  (observation)

c.  $\therefore \text{PFV VP}$  (via abductive reasoning)



# Explaining the adjunct effect via an account of the AI as an abductive inference

- (15) **A un moment donné** j'ai vraiment été capable de l'écrire, mon roman. Et pourtant je n'ai pas écrit une ligne. Paralysée.

'At a certain moment I really be-PFV able to write it, my novel. And nevertheless I didn't write a line. Paralysed.'

- An AI-avoider adjunct performs one of two jobs (and the super good AI-avoiders manage to do both):
  - **Job 1** (✓ in (15)): go against the abductive inference by undermining the explanation of the 'surprising' observation in terms of actualization (in (15): writing a novel does not happen in a 'moment')
  - **Job 2** (✗ in (15)): trigger an obvious alternative explanation of it (e.g., a fluctuation in the internal dispositions of the subject).
- Participants may differ in their ability to find an alternative rationalization of the choice of the perfective by the speaker.



## Explaining the lexicalization and flavour effects

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# Perfective statives in French

Schaden (2015):

- (16) Il y     a eu        un bar au        coin,    #et    il y     est  
      There be.PC.3SG a    bar at-the corner    and there is  
      toujours.  
      still.

Intended: 'There was a bar at the corner, and it is still there.'

Martin and Gyarmathy (2019): the French perfective is associated with a **maximality requirement** that is satisfied when an eventuality ceases to develop further towards a VP-eventuality in the actual world.

- (17)  $\llbracket \text{PFV}_{C+M} \rrbracket = \lambda P \exists e [\tau(e) \subseteq t_T \wedge \text{MAX}(e, P) \wedge P(e)]$ .

↪ States described by a perfective sentence must be temporally bounded. (see also Mari and Martin 2007)



# Explaining the lexicalization and flavour effects

(18) a. **ABILITATIVE** *capable*

A un moment donné j'ai vraiment **été capable de-** l'écrire,  
mon roman. Et pourtant je n'ai pas écrit une ligne.

'At a certain moment I really be-PFV able to write my novel.  
And nevertheless, I haven't written a line yet.'

b. **OPPORTUNITY** *pouvoir*

Jean a **pu-** prendre le train pour Londres, et cet imbécile  
ne l'a pas fait.

'Jean can-PFV take the train to London. And this idiot didn't  
do it.' (Mari and Martin 2008)

- In order to avoid the AI, the speaker must find a reason why **the ability** is temporally bounded (in (18a))
- ...OR why the **opportunity** is temporally bounded (in (18b))



# Explaining the lexicalization and flavour effects

(19) **ALL-IN/MIXED** CIRCUMSTANTIAL *pouvoir*

A un moment donné j'ai vraiment **pu**-- l'écrire, mon roman.

Et pourtant je n'ai pas écrit une ligne.

'At a certain moment I really can-PFV able to write my novel.

And nevertheless, I haven't written a line of it.'

- (19) temporally bounds a state during which **an ability** *and* an **opportunity** are verified.
- The interpreter must assume that the subject's ability *and* the opportunity have *exactly the same temporal boundaries*
  - This temporal coincidence is plausible if we deal with the specific circumstances *taking place during an act*.
  - Hard to explain if not





# Conclusions

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# Conclusions

Experimental confirmation that

- temporal adjuncts weaken the AI
- subtype of root modality and lexicalization play a role

Following Austin 1967 and Hackl 1998, we distinguish three different brands of root modality, involving:

- i. ability
- ii. opportunity
- iii. all-in

French *pouvoir*

- is not a good fit to express ‘pure’ ability
- tends to express either opportunity or all-in circumstantial modality, which is harder to construe under non-actualistic interpretation.



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Sam Alxatib, Bridget Copley, Elena Castroviejo, Chris Piñón, Florian Schäfer, the Sensus 2 audience and reviewers and Going Romance 2021 reviewers for discussion and feedback

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