Prosodic cues for expressivity and questioning force in a French reason question

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(1) Q: Comment peut-il lire le courrier de Marie?
   
   how can he read the email of Marie
   
   A1: Furtively. (manner)
   
   A2: With a remote login. (means)
   
   A3: He is a nosy person. (reason)

   The question with the reading compatible with A3:

   shifted meaning of comment from ‘standard’ manner to reason.
reason comment-questions

prejacent (Fleury & Tovena 2018)

(1) Q: Comment peut-il lire le courrier de Marie?

A1: Furtively. (manner)
A2: With a remote login. (means)

A3: He is a nosy person. (reason)

The question with the reading compatible with A3:

shifted meaning of comment from ‘standard’ manner to reason.
Another possible formulation of this question (with the same reading?):

\[(1') \text{ Q: Comment ça (se fait que) il lit le courrier de Marie?} \]
\[\text{how that is-done that il reads the email of Marie} \]
reason *comment*-questions and *pourquoi*-questions

- ‘how’ and ‘why’ are said to alternate in various languages (Collins, 1991; Tsai, 2008; Hsiao, 2017).

(1’’) Q: *Pourquoi* est-ce qu’il lit le courrier de Marie?
   ‘Why does he read Marie’s email?’
   A: He is a nosy person.

BUT:

- **Comment** Qs **cannot be used to inquire about the goal/purpose** of the initiator of the event or the situation that would ensue (result).
A reason-comment question is the expression of an attributional search, namely a search for explanation in reaction to an expectation disconfirmation. (Fleury and Tovena 2018)

The speaker's expectations are inconsistent with the possibility of the existence of the event described by the prejacent (=> effect of surprise)

(2) Anne: Did you read, Mrs Catherine? They want to build a highway in the middle of our village
   Catherine: I think I just heard about it on the radio
   Anne: C’est incroyable, comment peut-on faire une chose pareille?
      ‘It is unbelievable, how can one do such a thing?’

• A reason-comment question is the expression of an attributional search, namely a search for explanation in reaction to an expectation disconfirmation. (Fleury and Tovena 2018)

• The speaker's expectations are inconsistent with the possibility of the existence of the event described by the prejacent (=> effect of surprise)
morphosyntactic and semantic properties
The presence of modals (mostly epistemic) or semi-modals facilitates reason readings.

(3) a. Comment pouvez-vous vivre ainsi? Desmets and Gautier 2009
   ‘How can you live like this?’

b. Comment veux-tu qu’une femme soit amoureuse du meurtrier de son père? how want-you that a woman be in-love of-the murder of her father
   ‘How can a woman be in love with her father’s murder?’

(4) Comment Léa ose lire le courrier de Tom?
   ‘How dares Léa read Tom’s email?’
morphosyntactic and semantic properties

The reason reading is often facilitated by a special morpho-syntax.

- The **conditional** affects the committment to the truth of the prejacent.

(5) Mais comment tu **pourrais** le quitter?! C'est l'amour de ta vie!
    but how you could him leave
   ‘How can you break up with him? He is the love of your life!’
morphosyntactactic and semantic properties

The reason reading is often facilitated by a special morpho-syntax.

- The absence of subj-aux inversion facilitates the reason reading

(6) Mais comment tu voudrais la vendre?  
    but how you would-like-to it sell
    ‘But how could you be willing to sell it?’
morphosyntactic and semantic properties

The reason reading is often facilitated by a special morpho-syntax.

- **Negation** is a factor facilitating reason readings

  (5) Comment *n’avez-vous pas* reçu ma lettre ?
  how have-you not received my letter
  ‘How come you did not receive my letter?’
morphosyntactic and semantic properties

The reason reading is often facilitated by a special morpho-syntax.

- **High degree expressions** (*un tel, aussi...etc.*)

(9) Comment peux-tu quitter un homme **aussi adorable**?
   how can you leave a man so sweet
   ‘How can you break up with such a sweet man?’
Rhetorical questions

i) are assertions of opposite polarity (Sadock, 1971; Han, 2002);

ii) have biased answers that belong in the Common Ground (Caponigro and Sprouse, 2007);

iii) The answer is, in the speaker’s mind, either perfectly obvious or perfectly obviously unknowable (Banuazizi & Creswell 1999:10).
reason *comment*-questions and rhetorical questions

Reason-comment Qs are defined as “*biased questions*” by Desmets & Gautier 2009:

(12) - Comment peut-on *dire une chose pareille* ?
‘How can one say such a thing?’
- (biased ‘answer’:) One cannot say such a thing.

The possibility of saying such a thing is for the speaker beyond a tolerance threshold, which is suggested to be shared in (12). This favours a negative interpretation.
• **Reason-comment** does not bind a variable linked to a position inside the clause. (Indeed, the reasons for an event to occur are not part of the description of the event itself).

• We suggest that **Reason-comment** binds a variable of the semantic type of a proposition.

(13) a. Comment [he reads Mary’s email x] ?

   ↓

b. Comment x [he reads Mary’s email] ?

   ↓

See Fleury and Tovena 2019 for arguments in favour of a high base generated position for **comment** (cf. Shlonsky and Soare 2011).
Research questions of our study
Research questions of our study

• Is the prosody of a Manner-*comment* Q different from that of a Reason-*comment* Q?

• What can prosody tell us about the semantics of Reason-*comment* Qs?

Specifically:
- can prosody tell us about the presence of some questioning force?
- can prosody tell us about the presence of surprise (due to expectation disconfirmation)?
- can prosody tell us about the presence of other emotions?
The prosody of rhetorical questions

German (Wochner et al 2015):
- Higher initial peak
- Longer duration of wh-word and sentence-final noun
- A breathier voice quality

French (Delais & Beyssade 2019):
- Slower articulation rate
- Longer duration of wh-word?
- Falling final contour
- Wh-word often followed by a boundary
- Wh-word followed by pitch compression

Cf. Information Seeking Questions
- Both falling (Delattre 1966) and rising contours (Delais et al 2015, Beyssade et al 2006)
- Higher pitch range than statements (Caelen-Haumont 2005)
- Shorter duration than statements (Beyssade et al 2007)
Predictions

Prosodic cues differentiate *comment*-questions with **manner vs reason** interpretation.

1. Speech rate is longer for Reason interpretation

2. The duration of *comment* is longer for Reason interpretation

3. f0 contours present more variability in Reason interpretation because they express more expressivity (expectation disconfirmation/surprise).

4. The end of the utterance is (more often) associated to a falling contour (rhetorical intonation -> assertion)
Production experiment
Production experiment

Method:

Stimuli:
A total of 28 items:

14 ambiguous comment-questions and
14 NON-ambiguous comment-questions
each presented in a manner-reading or in a reason-reading context
  x 2 different blocs (so that participants do not see the purpose of the study)
  x 15 participants per bloc (French native-speakers with no reported speech disorder)
  x 3 repetitions  => 2520 items

50 fillers

Task: read the written context then produce the target question, taking the context into account.
example of Ambiguous pair

Context

A friend of yours tells you that she is going to break up with her German boyfriend. You want to know in what manner she is going to do it, since he is in Germany at the moment. You tell her:

Manner

Et comment tu pourrais le quitter? and how you could him leave ‘And how could you break up with him?’ (C’est mieux si tu le lui dis en face) ‘It’s better if you tell him face to face’

Reason

Mais comment tu pourrais le quitter?! but how you could him leave ‘But how could you break up with him?!’ (C’est l’amour de ta vie!) ‘He is the love of your life!’
example of NON-Ambiguous pair

Context

A friend of yours tells you that she is going to break up with her German boyfriend. You want to know in what manner she is going to do it, since he is in Germany at the moment. You tell her:

Manner

Comment *vas-tu faire pour le quitter?*
how *go-you to-do for him leave*
‘How *are you going to do in order to break up with him?’

Reason

Comment *peux-tu quitter un homme aussi adorable?!*
how *can-you leave a man so sweet*
‘How *can you break up with such a sweet man?’
quantitative results on overall prosodic cues

12 speakers
quantitative results on overall prosodic cues

12 speakers

R (R Core Team, 2012) and lme4 (Bates, Maechler & Bolker, 2012) to perform a generalized mixed effects analysis of the relationship between reading interpretation (Manner~Reason) and prosodic cues separately for ambiguous and non ambiguous sentences.

**Fixed effects** : speech rate, Ratio of the WH-word in the sentence, Duration ratio between the two syll of comment, f0 difference between the two syllables of comment, F0Max-F0Min

**Random effects**: intercepts for participants and items.
quantitative results on overall prosodic cues

Ambiguous sentences
quantitative results on overall prosodic cues

Ambiguous sentences

Speech rate (syll/sec) ***

Significantly slower for Reason interpretation

Fixed effects:

|                                           | Estimate | Std. Error | z value | Pr(>|z|) |
|------------------------------------------|----------|------------|---------|----------|
| (Intercept)                              | -0.95199 | 1.54080    | -0.618  | 0.5367   |
| SpeechRate                               | -1.931655| 0.346126   | -5.581  | 2.39e-08 | ***    |
quantitative results on overall prosodic cues

Ambiguous sentences

Total duration ***

Significantly longer for reason interpretation

Fixed effects:

|                | Estimate | Std. Error | z value | Pr(>|z|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | -0.95199 | 1.54080    | -0.618  | 0.5367   |
| Total_Dur      | 21.410695| 3.723471   | 5.750   | 8.91e-09 *** |

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quantitative results on overall prosodic cues

Ambiguous sentences

Ratio *wh*-word—sentence

The WH-word is present in both interpretations with the same proportions. There is no significant difference.

Fixed effects:

|                     | Estimate | Std. Error | z     | Pr(>|z|) |
|---------------------|----------|------------|-------|----------|
| (Intercept)         | -0.95199 | 1.54080    | -0.618| 0.5367   |
| RatioComment        | 0.04196  | 0.05566    | 0.754 | 0.4509   |

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Ambiguous sentences

**Duration ratio between the two syllables of comment**

For Reason interpretation, the first syllable is significantly longer, compared to the ratio found in Manner interpretation.

Fixed effects:

| Estimate  | Std. Error | z value | Pr(>|z|) |
|-----------|------------|---------|----------|
| (Intercept) | -0.95199 | 1.54080 | -0.618   | 0.5367 |
| Ratio_syll | 1.11476   | 0.51796 | 2.152    | 0.0314 * |
quantitative results on overall prosodic cues

Ambiguous sentences

Duration ratio between the two syllables of comment *

This result is more significant for some items
quantitative results on overall prosodic cues

Ambiguous sentences

F0 span (F0 Max - F0 Min)

No significant results

Fixed effects:

|                | Estimate | Std. Error | z value | Pr(>|z|) |
|----------------|----------|------------|---------|----------|
| (Intercept)    | -0.95199 | 1.54080    | -0.618  | 0.5367   |
| span           | 0.05020  | 0.03751    | 1.338   | 0.1808   |

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Ambiguous sentence

F0 span / item

in some items (2, 4, 6, 8, 14) the f0 span seems larger for Reason interpretation.

More variability for Reason interpretation
quantitative results on overall prosodic cues

Ambiguous sentence

F0 span / subject

Much variability, with speakers that differentiate
quantitative results on overall prosodic cues

Non-Ambiguous sentences
quantitative results on overall prosodic cues

Non-Ambiguous sentences

Speech rate (syll/seconde)

slower for Reason interpretation

Fixed effects:

| Estimate | Std. Error | z value | Pr(>|z|) |
|----------|------------|---------|----------|
| (Intercept) | 12.093283 | 2.073763 | 5.832 | 5.49e-09 |
| SpeechRate | -1.849728 | 0.382360 | -4.838 | 1.31e-06 *** |
quantitative results on overall prosodic cues

Non-Ambiguous sentences

• No difference for the ratio inside the wh-word
• No difference for f0 span
quantitative results on overall prosodic cues

Non-Ambiguous sentences

Ratio *wh*-word—sentence

Significantly different, BUT *comment* occupies more time in Manner interpretation than Reason interpretation!
Non-ambiguous Reason Q

- steep fall on *comment*
- F0 resetting
- “bell” contour
- plus final L% (absence of questioning)

Comment *peux-tu quitter un homme aussi adorable?*
‘How can you break up with such a sweet man?’

1R_NA (Noé)
Comment peux-tu croire que tu vas en trouver?
How can you believe that you are going to find any?

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NON-Ambiguous REASON Q

- falling comment + accent on the modal
- final rise expressing emphasis
summary of results

Tempo

- **Articulation rate** is longer for questions with Reason interpretation (cf. Delais & Beyssade 2019) but

- **Duration of wh-word in the sentence** is NOT longer (contrary to work on *qu’est-ce que / c’est quoi* by Agnèse Celle and Maud Pélissier)

\( f_0 \)

Overall \( f_0 \) analysis shows that \( f_0 \) is a prosodic cue presenting a lot of variation.

Different strategies linked to the speaker seem possible.

Results seem also to be affected by items.

The contour analysis will (we hope) explain better the role played by this cue.
Predictions

Prosodic cues differentiate *comment*-questions with *manner* vs *reason* interpretation. **YES**

1. Speech rate is longer for Reason interpretation **YES**

2. The duration of *comment* is longer for Reason interpretation **NO**

3. f0 contours present more variability in reason interpretation because they express more expressivity (expectation disconfirmation/surprise). **YES**

4. The end of the utterance is (more often) associated to a falling contour (rhetorical intonation -> assertion) => to do (contour analysis)
Qualitative analysis

A qualitative analysis shows that a **falling contour** on Reason (vs a rising one on Manner) is attested in our data. Manner and Reason realization of the same ambiguous sentence:

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Qualitative analysis

(Ambiguous) Reason Q

- steeper rise on comment and final lengthening
- overall high f0 values

Mais comment tu pourrais le quitter?
But how you could break up with him?

1R_A (Céc)
Qualitative analysis

Variation in the placement of focal stress.

Reason question with stress on the verb *faire*.
Strategy of “recreating” an information structure with focus on the verb, doubting the realisability of the action.
qualitative analysis

Variation in the placement of focal stress.

Reason question with stress on the verb *croire*

**NON-Ambiguous REASON Q**

- falling *comment* + accent on *croire*
- final rise expressing emphasis

Comment *peux-tu croire que tu vas en trouver*?
How can you believe that you are going to find any?

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qualitative analysis

Other factors other than the contour may play an important role.
Reason Q with overall pitch contour similar to Manner, but **laughing** is added.

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**summary of results**

**f0**

Overall f0 analysis shows that f0 is a prosodic cue presenting a lot of variation.

Different strategies linked to the **speaker** seem possible.

Results seem also to be affected by **items**.
Questionnaire on questioning force and expressivity
Questionnaire
on questioning force and expressivity

Manner and Reason contexts followed by ambiguous sentences were presented to different subjects than those involved in the production experiment.

Fillers (two times the number of target items)

Online questionnaire (google forms)

21 participants (14 female, 6 male)
Questionnaire on questioning force and expressivity

La personne qui dit cette phrase: *The person who says this sentence:*

cherche une information *is looking for some information*

1 2 3 4 5 6

pas vraiment *not really*

not at all surprised

tout à fait *absolutely*

very surprised

est surprise *is surprised*

1 2 3 4 5 6

pas du tout surprise *not at all surprised*

très surprise *very surprised*

éprouve une autre émotion. Si oui, laquelle?  *Feels another emotion. If yes, which one?*
Questionnaire on questioning force and expressivity

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Questionnaire on questioning force and expressivity

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Questionnaire on questioning force and expressivity

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Questionnaire on questioning force and expressivity

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Conclusions and future work

• Prosody can distinguish a Manner from a Reason interpretation

• A contour analysis is needed to better understand whether and to what extent Reason Qs have questioning force

• Prosodic cues of surprise are present at a qualitative analysis (bell contour, final high plateau...)

• Variability may account for the presence of expression of other emotions
Conclusions and future work

Variability is due to:

- variation in the strength of the speaker’s belief in the possibility of existence of the event described by the prejacent (=> different expression of questioning force)

- variation in how great the incongruency is between the speaker’s expectations and the existence of the event described by the prejacent (=> different expression of surprise)

- variation in some sort of performative act(s) coming with the illocutionary act as a consequence of the speaker’s being affected by the expectation disconfirmation: indignation, disapproval, anger, concern, etc. (=> variation in expressivity)
Conclusions and future work

Future work:

• Contour analysis

• Matching the results of the questionnaire with the prosodic results

• Perception study
References

• Han, C-H. 2002. ‘Interpreting interrogatives as rhetorical questions’ Lingua, 112(3):201–229.
Thank YOU!
Danke!
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