Agnès Celle* and Maud Pélissier

Surprise questions in spoken French

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Abstract: This paper offers a pragmatic account of two *wh*-questions in French used non-canonically - *c'est quoi, ce N* and *qu'est-ce que* constructions. It is claimed that in this non-canonical use, both constructions express surprise. As these constructions may be syntactically ambiguous between an information-seeking reading and a surprise reading, it is expected that the two readings differ in terms of prosody. This hypothesis is supported by the results of a production experiment. Experimental evidence shows significant prosodic differences between syntactically similar information-seeking questions and surprise questions. Surprise questions exhibit an increase in lengthening, slower speech rate and less frequent rising final contours.

Keywords: dislocation; exclamation; French; questions; rhetoricity; surprise

1 Introduction

This paper focuses on two *wh*-questions used non-canonically in French - *c'est quoi, ce N* (*C'est quoi, ce délire?;* literally: `It is what, this delusion?', *What the hell is this mess?*) and *qu'est-ce que* questions (*Qu'est-ce que tu te plains?;* literally: `What you are complaining?', *Why the hell are you complaining?*). Previous studies by Dekhissi (2016, 2018) have shown that these questions are dedicated to expressing surprise. However, Coveney and Dekhissi (2017: 188) make a distinction between these two question types in terms of communicative function. They argue that *qu'est-ce que* questions are "conflictual rhetorical questions" that emphatically assert that there is no reason for *p* and express "a reproach, complaint or criticism". By contrast, *in situ* questions with a right dislocation (*c'est quoi ce N*) are reported to be "exclamatory questions" because they do not imply an assertion of opposite polarity and do not carry a conflictual overtone (Dekhissi and Coveney 2018). Their claim is that "exclamatory questions" have the same prosody as exclamatives. We argue that both structures convey a judgment of incongruity and have a similar communicative function. Building on Obenauer (2004, 2005, 2006), we regard these two structures as surprise questions (SQs). This claim is substantiated by the results of a production experiment that show that prosodically (i) both constructions significantly differ from string-identical information-seeking questions (ISQs) (ii) in the surprise reading the two constructions share similar features with respect to lengthening, speech rate and final contour. This suggests that in French, SQs can be defined as a question type alongside ISQs on the basis of a mapping between syntactic-prosodic features and functional meaning.

2 Surprise questions based on previous accounts

Our definition of surprise questions relies on two previous approaches that concur in acknowledging the non-canonical nature of these questions. In a constructional approach to "What's X doing Y", Kay and Fillmore (1999) have argued that the function of this construction is to attribute "a judgment of incongruity" to a state of affairs:

***Corresponding author: Agnès Celle**, Université de Paris LLF, Paris, France, E-mail: agnes.celle@u-paris.fr. https://orcid.org/0000-0002-7604-2659
Maud Pélissier, Université de Paris, CLILLAC-ARP, Paris, France, E-mail: mpelissier.pro@gmail.com

(1) Diner: *Waiter, what's this fly doing in my soup?*
Waiter: *Madam, I believe that's the backstroke*.
(Kay and Fillmore 1999: 4)

In and of itself, the question in (1) is ambiguous between an information-seeking question and a surprise question. However, in the scenario suggested in (1), no information concerning the fly's activity is expected from the addressee, hence the joke resulting from the informative answer provided by the waiter, as pointed out by Kay and Fillmore. In its intended meaning, the surprise question in (1) is semantically non-canonical as the *wh*-word is not referential.

In a syntactic approach, Munaro and Obenauer (2002) and Obenauer (2006, 2005, 2004) have identified "surprise-disapproval questions" as a special type of question in Bellunese dialects. They argue that these questions differ syntactically from ISQs, and also from rhetorical questions (RQs) and *wh*-exclamatives. They express the speaker's attitude towards the propositional content. This attitude is one of "surprise with a negative orientation (disapproval)" (Obenauer 2005: 58). Obenauer points out that the surprise-disapproval meaning weakens the information-seeking value. In Bellunese, the form of this question indicates that it can only be understood as a SQ, not as an ISQ. Obenauer further notes that *cossa* (*what*), as opposed to *che* (*what*), can be used non-argumentally meaning *why*:

(2) *Cossa zìghe-lo?!*
what shouts-he
'Why on earth is he shouting?!'
(Obenauer 2006: 4)

In French, non-argumental *qu'est-ce que* encodes a SQ in a similar way:

(3) *Qu'est-ce qu'il crie ?!*
what he shouts
'Why on earth is he shouting?'

However, there is no clear-cut syntactic difference between an information-seeking and a surprise interpretation in argumental *qu'est-ce que* questions in French. As *what* in (1), argumental *qu'est-ce que* is ambiguous between a referential information-seeking reading and a non-referential surprise reading:

(4) *Qu'est-ce que tu fais dans cette classe ?*
'What are you doing in this class(room)?'

We assume that prosodic cues allow differentiating between the two meanings in French and present the results of a production experiment in Section 5. The surprise question arises from a conflict between an expectation and a state of affairs that disconfirms this expectation. It encodes a judgment of incongruity and requests an explanation to resolve an epistemic conflict.

Adopting a sociolinguistic perspective, Dekhissi (2016) and Coveney and Dekhissi (2017) have argued that non-argumental *qu'est-ce que* questions (3) are "conflictual rhetorical questions". In these questions, *qu'est-ce que* is not a direct object. Its meaning is close to *why*, except that *qu'est-ce que* "implicates (emphatically) an assertion of the opposite polarity" (Coveney and Dekhissi 2017: 189), which can be paraphrased as "there is no reason or purpose for p". While *pourquoi* asks a question about the cause for *p*, non-argumental *qu'est-ce que* also expresses the speaker's negative attitude to the content. This negative attitude may account for a rhetorical flavor, as noted by Coveney and Dekhissi (2017). Yet, the question requests an explanation. This suggests that this type of question is different from RQs:

(5) *Qu'est-ce que ça change ?*
'What difference does it make?'

The RQ in (5) implies an assertion of the opposite polarity (*ça ne change rien/It does not make any difference*). No conflict arises between the speaker's prior expectations and the situation. The variable is bound by the *wh*-

interrogative as in other canonical questions. RQs are defined by Rohde (2006) as redundant interrogatives that rely on common ground. As pointed out by Alcázar (2017) and Celle (2018), SQs are a distinct category since the incongruity judgment is not shared by speaker and addressee. SQs convey the speaker's reaction to a situation that runs counter to expectations. Therefore, we view these questions as biased rather than rhetorical. "Surprise question" is a label we choose for the sake of convenience. The negative bias associated with thwarted expectations accounts for the sense of disapproval and indignation that is often carried by these questions. We argue that the non-referentiality of the *wh*-interrogative is evidence of the non-canonicity of SQs.

3 Non-canonical *c'est quoi, ce N ?!* - a surprise question

In addition to non-argumental *qu'est-ce que* questions, Dekhissi (2018) has identified another pattern dedicated to expressing surprise: *c'est quoi/qui, ce N (it is what/who, this N)*, i.e. an *in situ* question followed by a right dislocation.

(6) *C'est quoi, cette robe de barmitsva ?!*
it is what, this dress of bar-mitzvah
'What is this bar-mitzvah dress doing here?!'
(Dekhissi 2018: 222)

Dekhissi (2018) labels this pattern "exclamatory question" because it is supposedly closer to exclamatives in terms of meaning. She claims this structure can be associated with a positive emotion:

(7) *C'est quoi, cette chance de malade, là ?!*
it is what, this luck of sick, there
'How can you be so lucky?!'
(Dekhissi 2018: 223)

As stressed by Dekhissi (2018), both non-argumental *qu'est-ce que* questions and *c'est quoi ce N* questions are expressive questions. Based on prosodic cues, we suggest in Section 5 that these questions form a paradigm of SQs that is functionally different from ISQs.

As such, *C'est quoi, ce N* is an *in situ* question about the definition of the subject complement.[1] The nominal referent is designated by the demonstrative *ce* in the right dislocation and coindexed with the clitic pronoun *c'*. Two ingredients are necessary for the detachment construction to take on a surprise meaning: a right dislocation and a demonstrative. In (8), the right-dislocated phrase contains a noun that is unambiguously interpreted figuratively in that syntactic position:

(8) *C'est quoi ce délire ?*
It is what this delusion
'What the hell is this mess?'

The demonstrative designates a state of affairs the speaker has direct experience of. This state of affairs is judged to be incongruous because it violates the speaker's expectations. In the right dislocation, the noun *délire* (*delusion*) cannot be interpreted in its literary sense. The following answer would not be felicitous:

(8′) # *Ce délire est un symptôme de maladie mentale*.
'This delusion is a symptom of some mental disorder.'

1 For lack of space, we cannot go into the morpho-syntactic constraints on interrogatives in French. We refer the reader to Blanche-Benveniste (1997), Munaro and Pollock (2005) and Druetta (2018). Suffice it to say that it is not possible to ask a straightforward question about the identity of an inanimate entity without resorting to a complex syntax. The French rendition of 'What fell?' may be either *Qu'est-ce qui est tombé ?* or *C'est quoi qui est tombé ?*. Neither *Qu'est tombé ?* nor *Quoi est tombé ?* are grammatical. As for *in situ* questions in French, a detailed account is offered by Larrivée (2019).

The construction in (8) conventionally expresses the speaker's surprise and her negative evaluation of the state of affairs. As argued by Stefani and Horlacher (2017), the right dislocation has become a routinized structure to express evaluation grounded in immediate sensory evidence. The right dislocation blocks the information-seeking reading of the *in situ* question. In other words, *quoi* cannot be interpreted referentially. The question will request an *explanation* if the nominal lexeme can be taken to designate an odd situation (8) or if the noun is postmodified by a PP as in (6), (7) and (9):

(9) ***c'est c'est quoi cette euh cette pratique de d'arraser les taupinières d'un coup de pied.*** *[…] Pis pis il m'a expliqué que mh euh lui il était euh il était archéologue et son son projet durant […] les vacances c'était de d'arraser les taupinières …*
It is what this practice to flatten the molehills with a kick of foot
(OFROM)
'what are you doing kicking away molehills. […] then he explained to me that he was an archeologist and his project during the holidays was to plane down molehills.'

In (9), the addressee's activity is judged to be incongruous. It follows from the incongruity judgment that the evaluation is a negative one.[2] Even in contexts that might look positive at first sight, such as a surprisingly fortunate situation (7), this construction is pragmatically different from an exclamation.[3] In (7), the speaker expresses bafflement at her friend's good fortune, which induces a search for an explanation. Similarly in (9), surprise arises as a result of a belief discrepancy between the perceived event (i.e. someone kicking molehills in a high-mountain Swiss pasture) and the speaker's background knowledge. The question indicates both this inconsistency and the speaker's request for an explanation. Once an explanation has been provided, the unanticipated perceived event can become part of the speaker's expectation sets and induce belief revision in an adaptive process (Meyer et al. 1997).[4]

4 Prosody in non-canonical questions

Although no studies to our knowledge have specifically examined the prosody of surprise questions, several papers have been published on rhetorical questions in a variety of languages – English (Dehé and Braun 2019), German (Braun et al. 2019; Wochner et al. 2015), Icelandic (Dehé et al. 2018), and French (Delais-Roussarie and Beyssade 2019). They all followed the same protocol, and consistently found prosodic differences between ISQs and RQs. The *wh*-word is pronounced with a softer voice quality (Dehé and Braun 2019; Wochner et al. 2015) and with a lower pitch (Delais-Roussarie and Beyssade 2019; Wochner et al. 2015) in RQs than in ISQs. ISQs are uttered with a higher F0 key and a greater pitch range than RQs (Delais-Roussarie and Beyssade 2019). In French, ISQs are realized with a rising contour most of the time, while more different final contours are observed for RQs (Delais-Roussarie and Beyssade 2019). Duration seems to be a particularly reliable indicator as well: RQs have longer utterance durations (Dehé and Braun 2019; Wochner et al. 2015) and a slower speech rate (Delais-Roussarie and Beyssade 2019), and several constituents are longer: the first word and nuclear

2 According to Ortony et al. (1988: 127) surprise can be either positively- or negatively-valenced. However, Miceli and Castelfranchi (2015: 49) stress that surprise is not hedonically-neutral: "surprise is a *negative* feeling of uneasiness, disturbance, or bewilderment." They further suggest that the negative connotation of surprise is caused by some incongruence between predictive pseudo-goals and the surprising event.

3 As pointed out by Zanuttini and Portner (2003: 58), exclamatives can be used to make compliments, the latter implying no sense of surprise. If exclamatives refer to a high degree that violates the speaker's expectations, they can still be neutral as to the speaker's emotive reaction, as pointed out by Obenauer (2005: 60). Along the same line, Marandin (2008, 2010) argues that exclamatives are not necessarily associated with an emotive attitude.

4 According to Meyer et al. (1997: 254), events that are incongruent with background knowledge, i.e. schema-discrepant events, trigger an analysis of the surprising event that induces a search for a causal explanation and ends with the revision of the event-related expectation. See also Fleury and Tovena (2018a, 2018b), Tovena (this issue) and Brunetti, Tovena, and Yoo (this issue) for an analysis of reason *comment* questions along similar lines.

syllable (Dehé et al. 2018), and the questioned part (Delais-Roussarie and Beyssade 2019). Although no study has yet compared string-identical ISQs and SQs, Lai (2009) found that *right* and *really* are realized with a larger pitch range when they express surprise in isolation, although, in the case of *really*, surprise cannot be dissociated from the questioning semantics. A study directly comparing the realization of ISQs and SQs is therefore of particular interest.

5 Experiment

We conducted an experiment to test whether the surprise and the information-seeking readings of string-identical questions with *C'est quoi* and *Qu'est-ce que* would differ in terms of prosodic features. We also wanted to determine whether the surprise reading of the two constructions exhibits similar prosodic cues. In the surprise condition, we expected surprise to be realized through expanded pitch range (Lai 2009) in both constructions, and possibly through lengthening, in a way similar to RQs.

5.1 Methods

5.1.1 Participants

20 native French speakers (15 females, five males) living in or around Paris were recorded (mean age 22.6 years; range 20–35).

5.1.2 Material

For each of the two selected question words (*'C'est quoi'* and *'Qu'est-ce que'*), we created 12 ambiguous sentences that could have either an information-seeking or a surprise reading depending on context. Several of our stimuli were adapted from naturally-occurring surprise questions drawn from ESLO and OFROM. In order to make the sentences ambiguous, we removed all the items that induce a surprise reading even out of context. In (4), for instance, we substituted the neutral verb *faire* for its negative polarity[5] version *foutre* in the original utterance. In the case of *C'est quoi ce N*, we made sure the noun was neither figurative nor postmodified.[6] Paired contexts were added to trigger one or the other interpretation. Sentences with *C'est quoi* all included the question word followed by a demonstrative determiner (*ce*) and a noun (e.g., *C'est quoi ce truc ?, 'What is that thing?'*). Sentences with *Qu'est-ce que* were more variable, due to the difficulty of creating natural ambiguous pairs. The question word was followed by a personal pronoun or a VP that varied in complexity (e.g., *Qu'est-ce qui t'arrive ?* or *Qu'est-ce que tu es venue faire en Provence ?*). A full list of stimuli is available in Appendix 1. Sentences were divided into two lists so that participants would only read one version of each sentence. 12 fillers consisting of simpler questions (*Quel temps il fait aujourd'hui ?*) or exclamatives (*Quel chapeau elle portait !*) were added to each list.

5.1.3 Procedure

The sentences were recorded with a USB AT2020 microphone and ROCme! (Ferragne et al. 2012) software in a soundproof room. The contexts were presented on the screen, followed by an indication of tone ('You are surprised'/'You need information') to maximize the chance of eliciting the expected reading, and by the critical

5 It is argued in Celle et al. (in press) that *foutre* is a negative polarity variant of *faire ('to do, to make')*. This variant is typically found in the argumental uses of expressive *qu'est-ce que* questions.

6 One of our stimuli does include a postmodified noun: *C'est quoi ce vin rouge ?* What is this red wine?'. Note, however, that *rouge* is a classifying adjective that serves to define a subcategory of wine. Unlike a qualitative adjective, it does not enable an evaluative reading.

sentence which participants were asked to record. Participants recorded three repetitions of each sentence in three different blocks separated by a short break. The order of sentences was randomized within each block. The recording session took about 45 min.

5.1.4 Analyses

The recorded sentences were transcribed and segmented at the level of the word, the syllable and the phoneme in Praat (Boersma and Weenink 2016) with help of the EasyAlign plugin (Goldman 2011). The duration, mean intensity, as well as the mean, minimal and maximal F0 values were extracted for each syllable and the sentence as a whole. The average of the three repetitions was used for each measure. Analyses were only conducted on syllables that were comparable across items: the first and second syllables of the *C'est quoi* marker as well as the first syllable of the *Qu'est-ce que* marker.[7] Analyses were conducted with linear mixed-effect models in R (R Core Team 2019) with the lme4 package (Bates et al. 2015), with Condition (ISQs/SQs) and Question word (*C'est quoi/Qu'est-ce que*) or its Syllable (*C'est/Quoi*) as fixed effects, a random intercept by Participant and by Item, random slopes for Condition and Question word by Subject and for Condition by item. Duration was log-transformed for analyses. Final contours were binarily annotated as Rising (1) or Non-rising (0) and analyzed with a logit model with the glmer() function. False discovery rate was controlled with a Benjamini–Hochberg procedure (Benjamini and Hochberg 1995) with a false discovery rate of 5%. Only *p*-values significant after application of the correction are reported. Adjusted *p* values are reported with the mention p_{adj}. Significance of main effects and interactions were analyzed by log-likelihood model comparisons with the R function Anova(). Interactions were followed up by running nested models to make use of lmer contrasts rather than running two submodels, as we were only interested in the effect of Condition for different levels of Question Word (Schad et al. 2020). Details of the final models and statistical results are available in Appendix 2.

5.2 Results

5.2.1 Whole sentences

Duration (see Table 1; Figure 1a; Appendix 2.1.1): There was a significant Condition:Question word interaction (χ^2 (1, 14) = 11.65, p = 0.0006, p_{adj} = 0.002): with *C'est quoi*, the utterance lasted longer for SQs than ISQs (β = 0.15[8], SE = 0.03, t (30) = 5.81, $p/p_{adj} < 0.0001$).

Speech rate (see Table 1; Appendix 2.1.2): There was a significant Condition:Question word interaction (χ^2 (1, 14) = 11.63, $p < 0.001$, p_{adj} = 0.002): The effect of Condition was only significant with *C'est quoi* (β = –0.15, SE = 0.03, t (30) = –5.80, $p/p_{adj} < 0.0001$): The speech rate was faster for ISQs (5.19 syllables/s) than SQs (4.48 syllables/s).

Pitch (see Figure 1b, Appendices 2.1.3 and 2.1.4): There was no effect of Condition on the mean pitch or the pitch range.

Table 1: Mean duration and speech rate for the whole sentences with each of the question words (standard deviation in parentheses).

	Duration (ms)		Speech rate (syllables/second)	
	C'est quoi	*Qu'est-ce que*	*C'est quoi*	*Qu'est-ce que*
Information-seeking	928 (205)	1,177 (475)	5.19 (1.11)	5.54 (1.01)
Surprise	1,084 (234)	1,211 (426)	4.48 (1.12)	5.35 (1.05
Difference	156***	34	0.71***	0.19

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, $p < 0.1$.

7 Only the first syllable was analyzed as the second was often either not pronounced or co-articulated with the following pronoun.
8 Note that estimates for the Duration models are expressed on the logarithm scale.

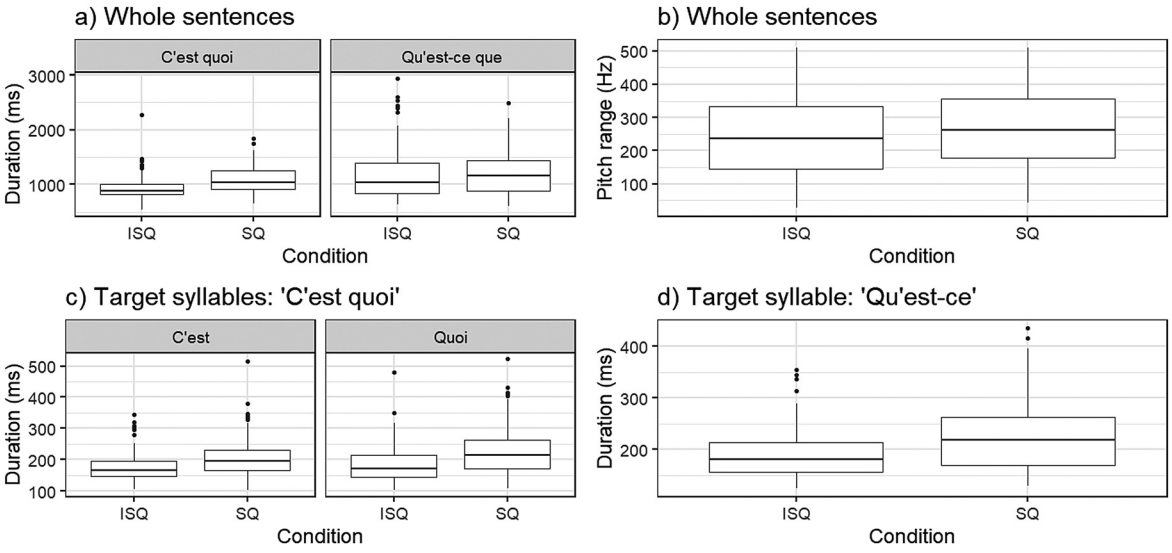

Figure 1: Duration and pitch range differences between the two question conditions for the whole sentences and the target syllables of each question word.

Table 2: Mean duration in ms for each target syllable (SD in parentheses).

	C'est	*Quoi*	*Qu'est-ce*
Information-seeking	174 (55)	180 (58)	191 (54)
Surprise	202 (67)	229 (92)	225 (79)
Difference	28***	49***	34***

***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, $p < 0.1$.

Rising final contour (see Appendix 2.1.4): There was a significant main effect of Condition (χ^2 (2, 13) = 14.85, $p < 0.001$, $p_{adj} = 0.002$) on the proportion of rising final contours: They were more common for ISQs (39.17%) than SQs (13.47%).

5.2.2 Target syllables

Duration (see Table 2; Figure 1c and d, Appendix 2.2.1): There was a significant interaction between Condition and Syllable with *C'est quoi* (χ^2 (1, 14) = 9.52, $p = 0.002$, $p_{adj} = 0.005$). SQs were characterized by a longer duration of the first ($\beta = 0.14$, SE = 0.035, t (28) = 3.95, $p = 0.0005$, $p_{adj} = 0.002$) and second syllable ($\beta = 0.24$, SE = 0.04, t (28) = 6.68, $p/p_{adj} < 0.0001$) of the question word. The syllable *Qu'est-ce* was also longer in SQs than ISQs (χ^2 (1, 9) = 7.72, $p = 0.005$, $p_{adj} = 0.017$).

Mean Pitch (see Appendix 2.2.2): There was no effect of Condition for sentences with *C'est quoi* ($p > 0.1$) or with *Qu'est-ce que* ($p > 0.1$).

5.3 Discussion

We recorded French native speakers producing ambiguous questions in contexts triggering either a surprise or an information-seeking interpretation. We found significant differences between the two conditions, both at the level of the sentence and of the question words. ISQs were shorter and pronounced with a faster speech rate than SQs, although this result was limited to *C'est quoi* questions. We return below to why no differences appear with *Qu'est-ce que*. Both question words, however, were shorter in ISQs than SQs. There was also a greater proportion of rising final contours for ISQs than SQs. These results are similar to those obtained by

previous studies comparing ISQs with RQs (Braun et al. 2019; Dehé and Braun 2019; Dehé et al. 2018; Delais-Roussarie and Beyssade 2019; Wochner et al. 2015). Interestingly, exclamatives have also been found to be longer than ISQs in German (Repp 2020), and so have emotional echo *wh*-questions compared to non-emotional echo *wh*-questions (Repp and Rosin 2015). Lengthening thus seems to be a correlate of non-neutral emotions or negative bias expressed in the utterance.

Contrary to Delais-Roussarie and Beyssade (2019) and to Lai (2009), however, we observed no difference in pitch or pitch range, neither on complete sentences nor on the question words themselves. Results from Lai (2009) and Delais-Roussarie and Beyssade (2019a) make it difficult to determine whether a larger pitch range signals surprise or questioning, as both seem to be closely linked in perception, as Lai claims concerning the adverb *really* in English. Unlike *really*, our SQs are not, however, associated with a request for clarification or confirmation, and are therefore less intertwined with questioning than Lai's items. Contrary to RQs, the pitch range in our SQs is however not smaller than in ISQs. They might therefore still retain a more questioning quality than RQs do. A direct comparison of SQs and RQs would be interesting to find out whether SQs are also consistently realized with a larger pitch range than RQs.

A possible reason for the lack of duration difference between ISQs and SQs with *Qu'est ce que* is the larger individual variability in the realization of these items. This structure is more complex than *C'est quoi ce N* and may have been more difficult to interpret for some participants. One item in particular seems to have been particularly problematic (item QQ3 adapted from OFROM, *Qu'est-ce qu'ils veulent faire un RER fribourgeois?,* (ISQ) 'What do they want to make, a suburban train in Fribourg?'/(SQ) 'Why do they want to make a suburban train in Fribourg?') as several participants failed to understand the surprise interpretation of the sentence. This non-argumental structure generally seems to have been less familiar to our speakers, which may explain why they were less consistent in their prosodic realizations. The *Qu'est ce que* questions were also much more variable in length and content than the *C'est quoi* ones, possibly making the extraction of a pattern more difficult. The difference in duration of *Qu'est-ce* is however perceptively salient, suggesting that this is a robust way of distinguishing between the two interpretations, even when participants are unsure about the intent of the question.

The question words themselves seem to be the locus of important differences between the two interpretations, as the duration contrast between SQs and ISQs was robustly observed for both question words. This prosodic difference maps the semantic difference between the referential and the non-referential reading of the interrogative words in both constructions. The surprise interpretation of the question is therefore marked early in the sentence, as the question words in those cases appear as the initial segment in the sentence. This experiment thus shows that a distinction is made between the two readings of the question, and that prosody compensates the absence of syntactic marking. Further research will determine whether the differences on the question words are enough to trigger the change in the interpretation.

6 Conclusion and perspectives

We have established that SQs differ from ISQs with respect to lengthening, speech rate and final contour. Our next step will be to conduct a perception experiment to check whether these prosodic features are necessary and sufficient for a listener to make the distinction between ISQs and SQs. We will also compare our spoken data from ESLO and OFROM with our production data.

More detailed prosodic annotations would be of interest in our data for a more fine-grained analysis of prosodic contour. It would be relevant to compare the prosodic realization of SQs with that of RQs and exclamatives to determine whether they share prosodic features. Lengthening in SQs is reminiscent of rhetorical questions. As noted by Delais-Roussarie and Beyssade (2019a), lengthening is a distinctive feature of RQs in French. In German, recent studies (Braun et al. 2019; Wochner et al. 2015) have also shown that RQs have longer duration than ISQs. We might speculate that lengthening characterizes both SQs and RQs, which differ with respect to pitch range. However, in order to ascertain whether lengthening is a correlate of both expressivity and rhetoricity, RQs would have to be included in the experimentation.

Corpora

ESLO: Enquêtes Sociolinguistiques à Orléans
(Abouda and Skrovec 2018)
OFROM: Corpus Oral de Français de Suisse Romande
(Avanzi et al. 2012–2020)

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Appendix 1: Complete list of stimuli

C'est quoi	It is what	'What is it'
C'est quoi ce vin rouge ?		'What is this red wine?'
C'est quoi ce truc ?		'… thing?'
C'est quoi ce style ?		'… style?'
C'est quoi ce film ?		'… film?'
C'est quoi ce club ?		'… club?
C'est quoi ce site ?		'… website?'
C'est quoi ce régime ?		'… diet?'
C'est quoi ce projet ?		'… project?'
C'est quoi ce poisson ?		'… fish?'
C'est quoi cet appareil ?		'… device?'
C'est quoi ce message ?		'… message?'
C'est quoi ce chapeau ?		'… hat?'

Qu-est-ce que	What is-it that	'What'
Qu'est-ce que tu racontes?		'What are you talking about?'
Qu'est-ce qui t'arrive?		'What is happening to you?'
Qu'est-ce qu'ils veulent faire un RER fribourgeois?		'What do they want to build, a suburban railway in Fribourg?' or 'Why do they want to build a suburban railway in Fribourg?'
Qu'est-ce que tu racontes ce soir?		'What will you be talking about tonight?' or 'What the hell are you talking about this evening?'
Qu'est-ce que tu fais dans cette classe?		'What are you doing in this class(room)?'
Qu'est-ce que tu regardes?		'What are you looking at?'
Qu'est-ce que je fais?		'What am I doing?' or 'What shall I do?'

Qu'est-ce que tu attends?	'What are you waiting for?'
Qu'est-ce que tu chantes là ?	'What are you singing there?' or 'What are you talking about?'
Qu'est-ce que tu es venue faire en Provence ?	'What have you come to do in Provence?' or 'What are you doing in Provence?'
Qu'est-ce que tu fabriques ?	'What (the hell) are you doing?'
Qu'est-ce que je suis en train de faire ?	'What (the hell) am I doing?'

Appendix 2: Final models

2.1.1 Whole sentences – duration

Number of observations: 520, Participants: 20, Items: 24
Model equation: log(Duration) ~ Condition * Question word + (Condition + Question word | Participant) + (Condition | Item)
Both factors were coded as sum contrasts (−0.5, 0.5)

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	6.81	0.08	34	89.86	< 0.0001	
Condition	0.15	0.03	30	5.81	< 0.0001	< 0.0001
Question Word	0.20	0.10	25	2.04	0.052	0.094
Condition:Question Word	−0.12	0.03	22	−3.91	0.0008	0.002
	Variance		**S.D.**		**Correlation**	
Random effects						
Participant (Intercept)	0.024		0.15			
Participant:Condition	0.005		0.07		−0.11	
Participant:Marqueur	0.004		0.06		−0.70	−0.08
Item (Intercept)	0.05		0.23			
Item:Condition	0.003		0.05		−0.43	

2.1.2 Whole Sentences – speech rate

Number of observations: 520, Participants: 20, Items: 24
Model equation: log(Speech rate) ~ Condition * Question word + (Condition + Question word | Participant) + (Condition | Item)
Both factors were coded as sum contrasts (−0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	−5.29	0.04	39	−137.12	<0.0001	
Condition	−0.10	0.02	26	−4.31	0.0002	0.0009
Question word	0.12	0.05	27	2.34	0.027	0.052
Condition:Question Word	−0.12	0.03	22	3.91	0.0008	0.002
	Variance		**S.D.**		**Correlation**	
Random effects						
Participant (Intercept)	0.02		0.13			
Participant:Condition	0.005		0.07		0.14	
Participant:Marqueur	0.004		0.06		−0.59	−0.08
Item (Intercept)	0.01		0.12			
Item:Condition	0.003		0.05		0.31	

2.1.3 Whole sentences – mean pitch

Number of observations: 520, Participants: 20, Items: 24
Model equation: log(Mean pitch) ~ Condition * Question word + (Condition + Question word | Participant) + (Condition | Item)
Both factors were coded as sum contrasts (−0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	5.32	0.05	21	114	<0.0001	
Condition	−0.03	0.02	18	−1.48	0.16	0.22
Question Word	−0.07	0.03	27	−2.40	0.02	0.041
Condition:Question Word	0.05	0.03	20	1.45	0.16	0.22
	Variance		**S.D.**		**Correlation**	
Random effects						
Participant (Intercept)	0.04		0.20			
Participant:Condition	0.003		0.06		−0.51	
Participant:Marqueur	0.006		0.08		−0.42	0.55
Item (Intercept)	0.002		0.04			
Item:Condition	0.002		0.05		0.12	

2.1.4 Whole sentences – pitch range

Number of observations: 520, Participants: 20, Items: 24
Model equation: Pitch range ~ Condition * Question word + (Condition + Question word | Participant) + (1[a] | Item)
Both factors were coded as sum contrasts (−0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	241	17.92	38	13.47	<0.0001	
Condition	23.65	14.19	41	1.67	0.10	0.16
Question Word	12.72	22.43	38	0.57	0.57	0.64
Condition:Question Word	−4.62	17.39	438	−0.27	0.79	0.82
	Variance		**S.D.**		**Correlation**	
Random effects						
Participant (Intercept)	2,258		47.52			
Participant:Condition	1,235		35.14		−0.53	
Participant:Marqueur	1,534		39.17		0.08	−0.04
Item (Intercept)	1,638		40.47			

[a]The random slope for Condition was removed because it made the model singular.

2.1.5 Whole sentences – rising final contours

Number of observations: 520, Participants: 20, Items: 24
Model equation: Rising ~ Condition * Question word + (Condition + Question word | Participant) + (Condition | Item), family = binomial(link = "logit")
Both factors were coded as sum contrasts (−0.5, 0.5). Df residual: 1,427

	β	SE	*z*	*p*	p_{adj}
Fixed effects					
Intercept	−1.05	0.27	−3.96	<0.0001	
Condition	−1.73	0.52	−3.35	0.0008	0.002
Question Word	−0.86	0.32	−2.66	0.008	0.018
Condition:Question Word	−0.10	0.68	−0.15	0.88	0.88
	Variance		**S.D.**	**Correlation**	
Random effects					
Participant (Intercept)	0.53		0.73		
Participant:Condition	0.95		0.97	0.06	
Participant:Marqueur	0.26		0.51	−0.54	0.22
Item (Intercept)	0.39		0.62		
Item:Condition	2.09		1.44	−0.27	

2.2.1 Target syllables – duration

– *C'est quoi*

Number of observations: 560, Participants: 20, Items: 12
Model equation: Log(Duration) ~ Condition * Syllabe + (Condition + Syllabe | Participant) + (Condition | Item)
Both factors were coded as sum contrasts (−0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	5.24	0.04	27	130.34	<0.0001	
Condition	0.19	0.03	18	5.92	<0.0001	0.0006
Syllable	0.07	0.05	20	1.54	0.14	0.21
Condition:Syllable	0.10	0.03	394	3.10	0.002	0.005
	Variance		**S.D.**		**Correlation**	
Random effects						
Participant (Intercept)	0.02		0.16			
Participant:Condition	0.01		0.12		0.54	
Participant:Syllable	0.04		0.20		−0.16	0.03
Item (Intercept)	0.004		0.06			
Item:Condition	0.0006		0.02		0.93	

– *Qu'est-ce que*

Number of observations: 240, Participants: 20, Items: 12
Model equation: log(Duration) ~ Condition + (Condition | Participant) + (Condition | Item)
Both factors were coded as sum contrasts (–0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	5.30	0.05	22	104.93	<0.0001	
Condition	0.15	0.05	20	2.98	0.007	0.017
	Variance			**S.D.**		**Correlation**
Random effects						
Participant (Intercept)	0.02			0.14		
Participant:Condition	0.02			0.15		0.39
Item (Intercept)	0.02			0.13		
Item:Condition	0.02			0.15		0.03

2.2.2 Target syllables – mean pitch

– *C'est quoi*

Number of observations: 479, Participants: 20, Items: 12
Model equation: log(Mean pitch) ~ Condition * Syllabe + (Condition + Syllabe | Participant) + (1[a] | Item)
Both factors were coded as sum contrasts (–0.5, 0.5).

	β	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	5.45	0.04	20	122.95	<0.0001	
Condition	–0.01	0.02	20	–0.44	0.67	0.72
Syllable	0.09	0.05	20	1.80	0.09	0.15
Condition:Syllable	0.02	0.04	408	0.65	0.51	0.60
	Variance			**S.D.**	**Correlation**	
Random effects						
Participant (Intercept)	0.04			0.19		
Participant:Condition	0.005			0.07	–0.39	
Participant:Syllable	0.04			0.21	0.21	–0.51
Item (Intercept)	0.0002			0.01		

[a]The random slope for Condition was removed as it made the model singular.

– *Qu'est-ce que*

Number of observations: 240, Participants: 20, Items: 12
Model equation: Mean pitch[a] ~ Condition + (1 | Participant) + (Condition | Item)[b]
Both factors were coded as sum contrasts (–0.5, 0.5).

	B	SE	*df*	*t*	*p*	p_{adj}
Fixed effects						
Intercept	250	11.59	21	21.55	<0.0001	
Condition	8.06	10.60	11	0.76	0.46	0.56
	Variance		**S.D.**			**Correlation**
Random effects						
Participant (Intercept)	2,333		48.30			
Item (Intercept)	80.65		8.98			
Item:Condition	823.28		28.69			–0.87

[a]The data were not log-transformed here as the non-transformed data yielded more normally-distributed model residuals.
[b]This was the maximal random effects structure that allowed the model to converge without being singular.

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