French wh in-situ: Where are we and where do we go from here?

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Abstract

This paper investigates the acceptability of wh in-situ expressions in embedded contexts in French. We report on two experiments that tested the acceptability of wh in-situ and ex-situ in embedded clauses of biclausal direct wh-questions and in indirect questions, and how their acceptability is modulated by the presence of the negation in the embedded clause. In Experiment 1, the contexts favored a D-linked interpretation of the wh-element (in the sense of Pesetsky 1987), while the contexts in Experiment 2 disfavored it. Our results show that the in-situ strategy is generally more acceptable (or at least equally acceptable) than the ex-situ strategy in direct questions with long construal, regardless of D-linking and negation. By contrast, the in-situ strategy is significantly less acceptable than the ex-situ one in indirect questions, regardless of D-linking and negation. Our findings indicate that in long construal direct wh-questions, negation fails to selectively block wh in-situ. In this respect, French differs from many other languages (see e.g., Beck & Kim 1997, a.o.). We show that D-linking is not a necessary condition for in-situ in French. We discuss how our findings relate to the current debate between alternative formal analyses of wh in-situ in French.

1. Introduction: The empirical issues

French stands apart from many Romance languages in possessing a productive strategy of wh in-situ interrogatives. Although this property of French grammar has attracted substantial interest in the generative literature, a perusal of extant studies shows that there are vast empirical disagreements among scholars. Given the dubiousness of the empirical base, it is difficult to evaluate and judge theoretical proposals and analyses of French wh in-situ. Resolution of these disagreements and the establishment of a solid empirical base is therefore a necessary condition for advancing our theoretical understanding of this phenomenon.

There is little or no disagreement among scholars that wh in-situ in French, (1a), differs from wh ex-situ, (1b), in being incompatible with (pronominal) subject inversion, (2b), and with the occurrence of the interrogative element *est-ce que*, (3b).

(1)   a.   T'   as   invité qui?
             you   have   invited whom
             'Whom did you invite?'
       b.   Qui t'-as   invité?
             who you-have invited
             'Whom did you invite?'

(2)   a.   Qui as-tu   invité?
             who have-you invited
             'Whom did you invite ?'
       b.   *As-tu invité qui ?

(3)   a.   Qui est-ce   que t'   as invité?
             who EST-CE QUE you have invited
             'Whom did you invite ?'
       b.   *Est-ce que t'as invité qui ?

However, many other properties of wh in-situ, both syntactic and interpretative, have been sources of continuous disagreement among scholars. Our purpose in this paper is to contribute to clearing up this research terrain. We propose to do this by considering a number of empirical questions on which there is less or no consensus in the research community. These questions are:

(4)   a.   Is wh in-situ grammatical in the embedded clause of biclausal direct
             questions?
       b.   If it is, does it have to be D-linked?
       c.   If the answer to (4a) is positive, does negation in the embedded clause
             give rise to intervention effects, selectively targeting wh in-situ?
       d.   How does the acceptability of the wh in-situ strategy in direct questions
             with long construal compare to that in indirect questions?

The first question concerns the status of sentences such as (5), where the wh-word *qui* 'who' is interpreted with long construal, as is clear from the translation. Cheng and Rooryck (2000), Bošković (1998, 2000), Boeckx (1999, 2003) and Mathieu (1999) claim that wh in-situ is ungrammatical in this environment, while Starke (2001), Baunaz (2011), Etxepare & Uribe-Etxebarria (2005), Oiry (2011), Delaveau et al. (2021), Adli (2006) and Shlonsky (2012) argue that it is perfectly fine.

(5)   Giuliano pense   que Lena a   vu   qui hier?
        Giuliano thinks   that Lena has seen who yesterday
        'Who does Giuliano think that Lena saw yesterday?'

Experimental results support the latter view: in an elicited production experiment, Oiry (2011) found that long-construal wh in-situ is possible in adult French (used as a control condition in her experiment). Tual's (2017) acceptability judgment experiment shows that long construal in-situ questions are at least as acceptable as their long-moved ex-situ counterparts and that D-linking plays no role in their acceptability. The results from Glasbergen-Plas' (2021) experiments point to the same conclusion.

The second question concerns constraints on the interpretation of wh in-situ. For some authors, wh in-situ is only possible in contexts where it is D-linked (though not necessarily lexically restricted). A wh-expression is D-linked when it solicits an answer from a set presumed to be salient to both speaker and hearer (Pesetsky 1987). This notion of D-linking corresponds to Enç's (1991) *familiarity* and to Starke's (2001) *specificity*. See Donkers et al. (2013) and Frazier and Clifton (2002) for discussion of D-linking in the processing literature.

Which N phrases are more naturally disposed to be interpreted as D-linked, because they require a salient set of possible answers. But, as Pesetsky (1987) pointed out, bare wh-phrases can also be D-linked, given an appropriate context.[1] In order to distinguish between D-linking and non-D-linking, it is therefore not sufficient to contrast *which N* and bare wh. This is the reason for which our experiments distinguish wh questions on the basis of the contexts in which they appear. We tested wh-questions to which a set of possible answers is contextually supplied, thus encouraging a D-linked interpretation (Experiment 1), as well as wh questions in which a set of possible answers is not contextually supplied (Experiment 2). The latter type of questions tend towards a non D-linked interpretation.

Many researchers have claimed that D-linking is a general condition on the acceptability of wh in-situ. Others argue that only long–construed wh (i.e. in embedded declaratives) is subject to a D-linking constraint, see e.g., Boeckx (1999, 2003); Boucher (2010); Cheng and Rooryck (2000), Coveney (1989, 1995, 1996), Obenauer (1994) and Zubizaretta (2003).

For Chang (1997), wh words in-situ carry an existential presupposition, much like clefts (see also Boeckx 1999, 2003). This is the reason for which questions with wh in-situ cannot, according to her, be felicitously answered with a negative word like

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[1]   Chesi et al. (2023) compared the effect of D-linking and the presence of a lexical restriction, by contrasting *which N* phrases, which are both D-linked and lexically-restricted, with *what N* phrases, which are non D-linked yet lexically restricted. In French, it is not possible to reproduce this distinction since both *which N* and *what N* are rendered by *quel N*.

personne 'nobody' or *rien* 'nothing', i.e., an event. Using a wh in-situ question aims at investigating "details on an already established (or presupposed) situation" (Chang 1997: 45). A similar claim is made by Boeckx (1999: 69). According to their description, , fronted wh words, unlike in-situ wh, are not obligatorily associated with an existential presupposition so that they can be used both in 'strongly presupposed' situations, and in non-presupposed situations. Thus, answering *rien*, or *personne* to such questions is totally fine.

Building on Starke (2001), Baunaz (2011), however, showed that wh in-situ can appear in both D-linked/presuppositional and non-D-linked/non-presuppositional contexts and that its interpretation correlates with their prosody (see, in particular, Baunaz & Patin 2011, 2012). From the pragmatic angle, Pires and Taylor (2009) argued that the in-situ version is preferred when the speaker expects the requested information to be part of the Common Ground, while Tieu (2012) claims that wh in-situ displays the semantics of both Verum focus and questions. Beyssade (2006: 188-189) rejects the idea that wh in-situ questions are associated with an existential presupposition (contra Cheng & Rooryck 2000). Still she argues that in contrast to wh ex-situ questions, wh in-situ questions cannot introduce new discourse topics.

The relation between information structure, prosody and wh in-situ is studied in Hamlaoui's (2009, 2011). According to her analysis, the wh-phrase in-situ is prosodically highly prominent and focused (new information), while the remainder of the question is given information. See also Déprez et al. (2013).

In this context, mention should also be made of Larrivée's (2019) diachronic study. Larrivée observes that wh in-situ can first be spotted in corpora only in strongly presupposed contexts (called by the author 'explicitly activated', following Dryer 1996), and then the contexts get diversified over time. Baunaz & Bonan (2023) reach a similar conclusion, namely, that wh in-situ is no longer restricted to presupposed contexts in contemporary French.

Question (4c) arises with respect to the status of sentences such as (6), in which negation c-commands the wh in-situ and thus potentially intervenes in the establishment of the (long construal) wh dependency.

(6)   Giuliano pense que Lena n'-a   pas vu   qui hier?
        Giuliano thinks that Lena NEG-has   not seen who yesterday
        'Who does Giuliano think that Lena didn't see yesterday?'

A significant body of literature claims that negation cannot c-command the wh in-situ even in short (single-clause) interrogatives. Chang (1997); Bošković (1998, 2000); Mathieu (1999, 2002, 2004, 2009); Cheng & Rooryck (2000); Zubizarreta (2003); Shlonsky (2012) and Zimmermann & Kaiser (2019) have expressed this view. Others have claimed that in presuppositional contexts, in which the wh is interpreted as D-linked, wh in-situ is possible under a negative operator: Starke (2001), Baunaz (2005, 2011, 2016); Etxepare & Uribe-Etxebarria (2005); Adli (2006). Disentangling the status of intervention by negation and D-linkedness is, clearly, necessary here as well (the issue is taken up in detail in Glasbergen-Plas 2021).

The fourth question, namely (4d), concerns the status of sentences such as (7), in which the matrix predicate *se demander* 'wonder' selects an interrogative clause.

(7)   Giuliano se-demande   Lena a   vu   qui   hier.
        Giuliano REFL-wonders   Lena has seen who   yesterday
        'Giuliano wonders who Lena saw yesterday.'

    Although Shlonsky (2012) argued that (7) is ungrammatical, a claim supported by the experimental results of Tual (2017) and Glasbergen-Plas (2021), some recent, corpus-based research seems to suggest otherwise (see Ledegen (2016); Ledegen & Martin (2020); Marchessou (2018); Garnder-Chloros & Secova (2018)).

    Our paper is structured as follows. Section 2 discusses the theoretical consequences of the different answers that have been given to the questions listed in (4). In section 3, we report on two acceptability judgment experiments (with written stimuli) that we designed in order to answer these questions. We tested the acceptability of wh-elements, with and without a D-linked interpretation, as a function of their surface position (in-situ vs ex-situ), their syntactic context (direct questions with long construal vs indirect questions), and the presence of negation (presence vs absence of negation in the embedded clause). Section 4 is a more general discussion, in which we return to the issues raised in section 2 and conclude the paper.

2. Analyses of French wh in-situ in light of the empirical evidence

A common family of analyses holds that wh-phrases in-situ undergo covert (LF) movement. Bošković (2000), for instance, proposes that French C_{WH} always triggers movement, as the [wh] feature is strong in French. He develops a theory of late-insertion of C_{WH} that derives the patterns of overt movement for ex-situ and covert movement for in-situ. His analysis straightforwardly explains the impossibility of wh in-situ in indirect questions but it ties it to the general impossibility of wh in-situ in the embedded clause of biclausal wh-questions, a highly disputed generalization, as we have seen. His analysis also predicts that negation should intervene for covert movement (wh in-situ) but not for overt movement (wh ex-situ). Again, this last prediction is contested and needs to be established on a firm empirical basis in order for this approach to be evaluated.

    Another influential account is Cheng & Rooryck (2000), in which an "intonational morpheme Q" (a null operator) licenses wh-phrases in-situ. This null operator is underspecified [Q:] and comes to be specified [wh] by covert wh movement. The Q morpheme checks the Q features of C (rendering overt movement redundant). In wh ex-situ constructions, the Q morpheme is absent, and the wh-phrase moves overtly. The mechanism of [Q:] specification only applies to root interrogatives. The prediction then is that long (covert) wh movement ought to be impossible. As with Bošković's analysis, this prediction of Cheng & Rooryck's doesn't seem to be validated experimentally.

    Scholars with a more "permissive" view argue that the covert phrasal movement, characteristic of in-situ questions, is subject to the same restrictions as overt wh fronting. To account for apparent differences e.g., in the degree of sensitivity to intervention by negation, Starke (2001) and Baunaz (2011) claim that the wh in-situ

optionally encodes a D-linking feature.[2] A feature-based view of Relativized Minimality (Starke 2001, Rizzi 2004) predicts that negation would only intervene for strictly non D-linked wh. This is one of the empirical issues that needs to be determined. Note, moreover, that even the more permissive view says nothing about wh in-situ in indirect questions.

One fact that might be taken to militate in favor of a movement analysis is the subject-nonsubject asymmetry discussed in Koopman (1983), Plunkett (2000) and Shlonsky (2012, 2017): French wh in-situ is considerably less acceptable in (embedded) subject position than it is in object position. Whether this asymmetry is expressed in ECP terms or in terms of *Criterial Freezing* (Rizzi 2006), it constitutes diagnostic evidence for movement, whether covert (bringing in the set of problems and unverified predictions mentioned above) or overt, with the lowest copy spelled out, instead of the highest one. Under the "spellout the lowest copy" approach, the unavailability of wh in-situ in indirect questions does not directly follow and requires a separate explanation. A further problem for "overt movement with low spellout" is that it incorrectly predicts that parasitic gaps should be acceptable in in-situ contexts (see e.g., Bošković 2015).

One proposal that predicts the impossibility of wh in-situ in indirect questions is sketched out in Bobaljik & Wurmbrand (2015). For them, questions with wh in-situ are not syntactic questions, but declarative sentences in which the wh -element is focalized in-situ and the clause containing it pragmatically interpreted as a question. Indirect questions, however, are not declaratives but (selected) interrogatives - in which an embedded C_{WH} is selected by a matrix predicate, and consequently, wh-movement must take place in the syntactic derivation. Bobaljik & Wurmbrand's (2015) analysis leads us to expect that negation should not intervene for wh in-situ, since the focalized wh-element does not undergo movement. Furthermore, their analysis explains the incompatibility of wh in-situ with inversion and with *est-ce que*, both of which do not occur in declaratives but only in syntactic interrogatives.

Bobaljik & Wurmbrand's proposal treats wh in-situ in French as part of a more general occurrence of wh in-situ in English, German and Spanish. It is clear, however, that the distribution and productivity of wh in-situ is much broader in French - Huková (2006), Adli (2015), Guryev (2017), Larrivée (2019), Thiberge (2020), Thiberge et al. (2021), Baunaz & Bonan (2023) - than in these other European languages - Etxepare & Uribe-Etxebarria (2005), Kaiser & Quaglia (2015). Bobaljik & Wurmbrand's (2015) theory would lead us to pin the differences down to pragmatics, but it is far from clear how the observed crosslinguistic differences in the availability of wh in situ could be explained in their theory. In fact, their proposal predicts that any language with focus in-situ should also have wh in-situ. This is too strong: in Italian, for example, wh in-situ is not a grammatical option, while focus in-situ is.

In summary, providing empirically verifiable answers to the questions in (4) is crucial, as the empirical generalizations have theoretical consequences for the place of wh in-situ in the grammar of French and beyond. Oiry's (2011) experimental results showed that long-distance wh in-situ is possible in French. This is corroborated in Tual

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[2]   To be more precise, Starke (2001) argues that there are two types of existentially presupposed wh-phrases in-situ (i.e. already introduced in the discourse): (i) 'range'-based presupposed wh in situ (which Baunaz 2011 and subsq. calls *partitive*) and (ii) 'specificity'-based presupposed wh in-situ. Range/Partitivity based presupposition refers to Enç's (1991) *specific partitivity*; specificity-based presupposition refers to *familiarity*.

(2017) and Glasbergen-Plas (2021), both of whom additionally demonstrate that long-distance wh in-situ questions are perceived as natural in 'out-of-the blue', i.e., non-D-linked contexts. Interestingly, Tual (2017) and Glasbergen-Plas (2021) also observed that in indirect questions, in-situ structures are not possible.

To our knowledge, what has not been studied experimentally is the status of wh in-situ in embedded clauses under negation (negation in root wh in-situ was explored in Baunaz 2011, Glasbergen-Plas 2021 and Starke 2001).

3. Experimental evidence

In this section, we present the results of two acceptability judgment experiments that we conducted. In Experiment 1, we examined the acceptability of questions with bare wh-elements without a lexical restriction. We presented the questions in contexts that explicitly introduced a set of alternatives, thus inducing a D-linked interpretation of the bare wh-pronoun. In Experiment 2, we tested bare wh-elements for which no set of alternatives was explicitly introduced, thus disfavoring a D-linked interpretation.

3.1. Materials and procedures

3.1.1. Experiment 1 (contexts favoring D-linking)
To address with controlled techniques the empirical questions raised in (4), we carried out a web-based acceptability judgment experiment with written stimuli, in which participants were asked to rate the acceptability of a target wh-question on a 7-point Likert scale. The experiment was implemented and hosted on PCIbex (Schwartz & Zehr 2021).

Each target question was presented as a fragment from a fictional dialogue. The exchange was preceded by a brief description of the scene that explicitly introduced the referents of the personal pronouns present in the target question. Furthermore, in Experiment 1, the description explicitly established in the discourse a closed set of possible felicitous answers to the wh-question, suggesting to the participants a D-linked interpretation for the bare wh-element in the target question.

We tested the acceptability of wh-questions in 8 conditions, obtained by crossing three binary factors. The first factor was the position of the wh-element (*situ*): either in-situ, or ex-situ. The second factor was the nature of the syntactic context (*syntactic.context*): either direct wh-questions with long construal or indirect questions. The last factor was the presence or absence of negation in the embedded clause (*polarity*): positive vs. negative. When present, the negative marker in the embedded clause c-commanded the external merge position of the wh-element. Given this design, each item consisted of 8 variants of the target question, introduced by the very same description. An example of an item is reported in (8) and (9).[3]

(8)   Suite au scandale de corruption du gouvernement, le juge a décidé d'inculper six députés sur huit. Pierre et Marie n'ont pas encore entendu le verdict de la juge Noirot. Ils discutent de la situation.

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[3]   To ensure the coherence of the exchanges, the target sentences were introduced by discourse markers and/or logical connectors.

'Following the government corruption scandal, the judge decided to charge six of the eight deputies. Pierre and Marie have yet to hear Judge Noirot's verdict. They discuss the situation.'

(9)   a.   Et donc, tu penses qu'elle a inculpé qui?
       b.   Et donc, qui tu penses qu'elle a inculpé?
       c.   Et donc, tu penses qu'elle n'a pas inculpé qui?
       d.   Et donc, qui tu penses qu'elle n'a pas inculpé?
             'And so, (who) do you think she charged/ didn't charge (who)?'
       e.   Et donc, je voudrais savoir elle a inculpé qui.
       f.   Et donc, je voudrais savoir qui elle a inculpé.
       g.   Et donc, je voudrais savoir elle n'a pas inculpé qui.
       h.   Et donc, je voudrais savoir qui elle n'a pas inculpé.
             'And so, I'd like to know (who) she charged/didn't charge (who)'

All the target questions were biclausal: direct wh-questions with long construal in 4 conditions, and indirect questions in the remaining 4 conditions. Both matrix and embedded subjects were always realized as personal pronouns. In all the conditions, the wh-element was always *qui* ("who") and corresponded to the direct object selected by the transitive verb in the embedded clause. In the ex-situ variants, the interrogative element *est-ce que* did not occur. This was intended to minimize the differences between the in-situ and the ex-situ variants. Following this pattern, we created experimental 32 items, for a total of 256 stimuli. As matrix verbs for the direct questions with long construal, we used the verb *penser* ('to think') in 16 items and the verb *croire* ('to believe') in the remaining 16 items. See the appendix "Experimental materials".

Using a Latin square procedure, we divided the 256 experimental stimuli into 8 lists, each containing 32 trials. In each list, an item appeared only once, under a single condition. Participants were randomly assigned to one of the 8 lists. In addition to the 32 experimental trials, each list included 32 filler trials, which were identical across lists. The format of the filler trials was similar to the format of the experimental trials, but the target sentences were declarative. The acceptability of these sentences was balanced to range from very bad (7 trials), difficult to judge (14 trials), to very natural (7 trials). The manipulation concerned the position of adverbs and clitic pronouns. The presentation order of the trials was pseudo-randomized for each participant, interspersing experimental and filler trials.

The experiment started with a quick description of the task, followed by a consent form. A short sociolinguistic questionnaire was then presented, to collect information concerning the participants: whether they were native speakers of French, their age, whether they were bilingual (and what other languages they speak), whether had experience with literacy difficulties or language-related issues, where they live (country, region/city), and where they grew up (country, region/city). At that point, detailed instructions were presented. Participants were instructed to think of ordinary conversations, in informal settings, and the language they use in everyday life. It was explicitly stated that they were free to read over the stimuli, imagining the prosody they found more natural. After a familiarization phase in which participants were given 5 practice trials featuring stimuli analogous to the filler trails, the experimental session

started. At the end of the experiment, a debriefing page was presented to the participants.

To express the evaluation of the target sentence, participants had to select a point on a 7-point Likert scale (ranging from 1 to 7), whose extreme values were labeled as *complètement inacceptable* (=1, totally unacceptable) to *complètement acceptable* (=7, totally acceptable). Numeric values were not displayed.

We recruited 64 participants via Prolific.com, each receiving a payment of 3.00 GBP for their participation. The total duration of Experiment 1 was approximately 15-20 minutes, with a median completion time of 18 minutes. The recruitment campaign on Prolific targeted participants aged between 18 and 40 years, born and residing in France, native French speakers, raised as monolinguals, and without any reported literacy difficulties or known language-related issues. Among the 64 participants, we excluded the responses of 4 participants whose sociolinguistic questionnaire data did not meet the specified profiling criteria.

3.1.2. Experiment 2 (contexts disfavoring D-linking)
Experiment 2 was identical to Experiment 1 in terms of design and procedure, the sole difference being the context that prefaced the experimental trials. Unlike the context in Experiment 1, the context in Experiment 2 did not explicitly introduce a salient set of possible entities for the wh-element. In the majority of items (n=25) in Experiment 2, nothing in the dialogue or context could lead the participants to expect that the speakers shared a possible set of values for the wh-element. (10) illustrates an item of this sort. In the residual items (n=7), a possible set of values could potentially be conjectured by the participants, as in (11). Independently of this difference, the set of possible values for the wh-word was not immediately available in the linguistic context in any of the items in Experiment 2. The items in Experiment 2 thus discouraged a D-linked interpretation of the wh-expression, in contrast to the items in Experiment 1 where a salient set was explicitly introduced. See the appendix "Experimental materials".

(10)   Anastasia, Anna et Nathalie sont dans un café. Soudainement Anastasia les quitte, pour un rencard sur un site de rencontre : depuis quelques mois, elle cherche à se marier. Anna et Nathalie entament une discussion au sujet de leur travail respectif. Anna se plaint beaucoup, car l'ambiance à son bureau est vraiment très négative. Après une bonne minute de silence, Nathalie dit, sur le ton du commérage :

Nathalie: Pour revenir sur le sujet "Anastasia" … ça me turlupine.

'Anastasia, Anna and Nathalie are in a café. Suddenly, Anastasia leaves them for a date on a dating site: she has been looking to get married for several months. Anna and Nathalie start talking about their respective jobs. Anna complains a lot, because the atmosphere in her office is really very negative. After a minute's silence, Nathalie says, in a gossipy tone

Nathalie: To return to the subject of "Anastasia" ... I'm puzzled.'

a.   Tu penses qu'elle épousera qui ?
b.   Qui tu penses qu'elle épousera ?
c.   Tu penses qu'elle n'épousera pas qui?
d.   Qui tu penses qu'elle n'épousera pas?
e.   J'aimerais savoir elle épousera qui.
f.   J'aimerais savoir qui elle épousera.
g.   J'aimerais savoir elle n'épousera pas qui.
h.   J'aimerais savoir qui elle n'épousera pas.
      Who do you think she'll marry

(11)   Le championnat de foot de Terrebonne s'est joué ce weekend. Max et Matt, deux supporters de la même équipe, n'ont pas pu suivre les matchs et ne connaissent pas les résultats, car ils sont partis ensemble à la pêche à la truite. Sorti de nulle part alors qu'ils évidaient leurs prises pour les faire griller, Max dit:

Max: A part ça, je ne sais pas comment tu fais, mais je suis très nerveux.

'The Terrebonne soccer championship was played this weekend. Max and Matt, two fans of the same team, couldn't follow the matches and don't know the results, because they went trout fishing together. Out of nowhere, as they were scooping out their catch for the grill, Max says:

Max: Apart from that, I don't know how you manage it, but I'm very nervous.'

a.   Tu penses qu'on a éliminé qui ?
b.   Qui tu penses qu'on a éliminé ?
c.   Tu penses qu'on n'a pas éliminé qui ?
d.   Qui tu penses qu'on n'a pas éliminé ?
      '(Who) do you think was/wasn't eliminated (who)?'
e.   Je veux savoir on a éliminé qui.
f.   Je veux savoir qui on a éliminé.
g.   Je veux savoir on n'a pas éliminé qui.
h.   Je veux savoir qui on n'a pas éliminé.
      'I want to know who was/n't eliminated (who)'

        In Experiment 2, we tested the same 8 conditions tested in Experiment 1. As for the materials, we used the same filler trials in both experiments. Besides the different nature of the context, the experimental items used in Experiment 2 differed lexically from the items tested in Experiment 1, since the target questions had to be marginally readjusted to ensure the plausibility of the scenarios and the exchanges with a non-D-linked interpretation of the wh-phrase.
        We recruited via Prolific.com 64 participants (different from Experiment 1) with the same criteria adopted in Experiment 1. The responses to the sociolinguistic questionnaire were not congruent with the selection criteria. As a result, only 59 participants were retained.
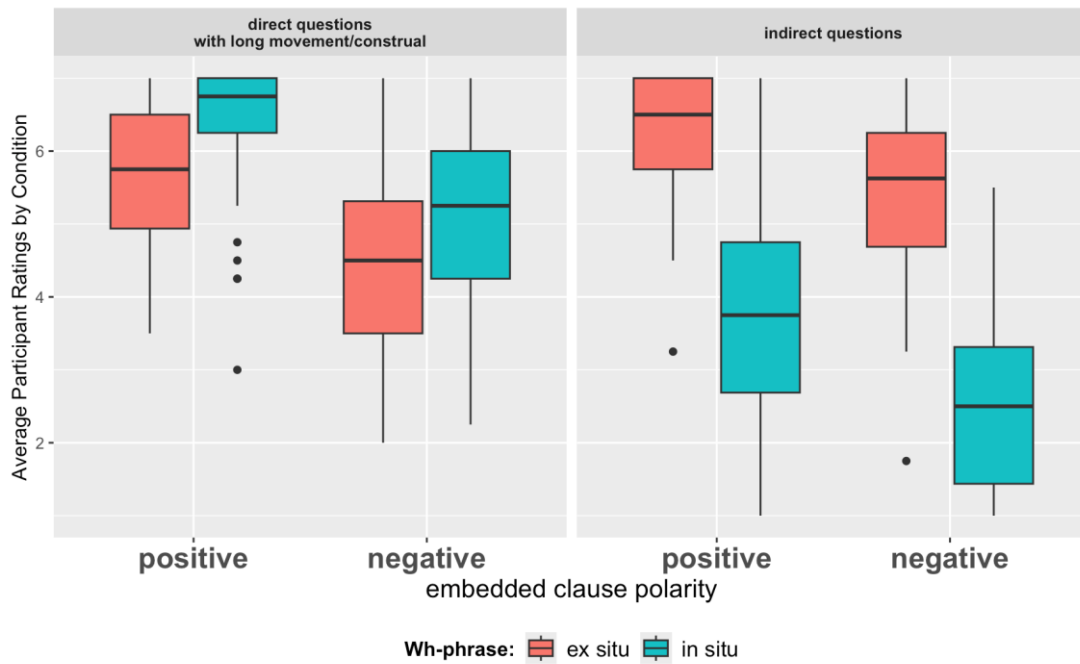
3.2. Results

3.2.1 Experiment 1
In Experiment 1, we tested contexts that favored a D-linked interpretation. The ratings (1-7 Likert scale, 1=totally unacceptable - 7 =totally acceptable) for the 59 participants who met the sampling criteria in Experiment 1 are summarized in Table 1 and Figure No. 1. The values were initially calculated by aggregating the responses of each participant for each condition (Figure N1) and then aggregating these values across all participants (Table 2).

Table 1. Experiment 1 (contexts favoring D-linking): Mean, Median, and Standard Error values (1-7 Likert scale) by condition

Syntactic.context	Polarity (in the embedded clause)	Situ	Mean rating	Std. Er.	Median rating
Direct questions with long movement/construal	Positive	ex situ	5.617	0.127	5.750
Direct questions with long movement/construal	positive	in situ	6.446	0.108	6.750
Direct questions with long movement/construal	negative	ex situ	4.588	0.169	4.500
Direct questions with long movement/construal	negative	in situ	5.017	0.162	5.250
Indirect questions	positive	ex situ	6.229	0.108	6.500
Indirect questions	positive	in situ	3.717	0.190	3.750
Indirect questions	negative	ex situ	5.392	0.143	5.625
Indirect questions	negative	in situ	2.571	0.161	2.500

Figure 1. Experiment 1 (contexts favoring D-linking): Boxplot of average participant ratings (1-7 Likert scale) across different conditions
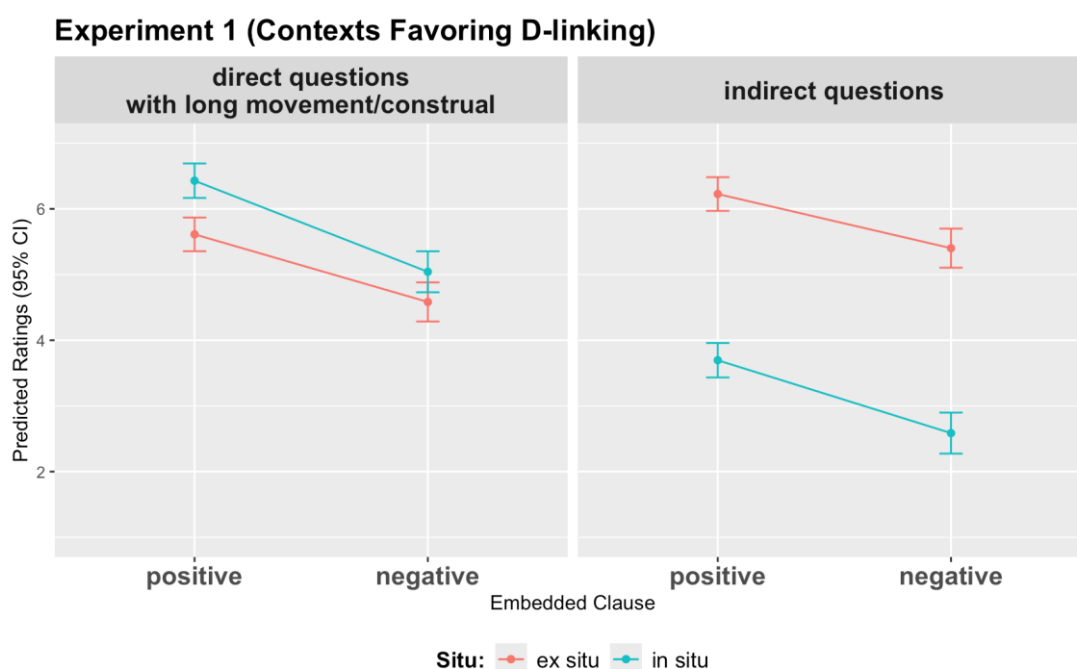

To analyze the responses, we built a linear mixed model with the package lme4 (Bates et al. 2015) in R ('R: A Language and Environment for Statistical Computing' 2020). In the model, ratings were predicted by *situ* (wh ex-situ vs. in-situ)*, polarity* (absence vs. presence of clausal negation in the embedded clause), *syntactic.context* (direct wh-questions with long construal vs. indirect questions), as well as their interaction. We adopted an Anova-like deviation coding (-.5, +.5) for the contrasts of the factors *situ* and *polarity*. Conversely, the contrast for the factor *syntactic.context* was specified with dummy coding in which the reference category was direct wh-questions with long construal. This contrast schema allowed us to address the research questions in an orderly way: first, we address the effects of *situ* and *polarity* in direct wh-questions with long construal only (cf. 4.a., 4.c), and subsequently, we compare direct questions with long construal to indirect questions (cf. 4.d).

The converging model with the most complex random effect structure justified by the data included by-item and by-participant intercepts and by-participant slopes for the effects of *situ* and *polarity: rating ~ polarity * situ * syntactic.context + (1 + situ + polarity / participant) + (1 / item).* The total explanatory power of the model was substantial (conditional R^2 = 0.54) and the component related to the fixed effects alone (marginal R^2) is of 0.37. The summary of the model is reported in Table 2. The rating values predicted by the model are plotted in Figure 2.

Table 2. Experiment 1 (contexts favoring D-linking). Summary of the statistical model: Ratings (1-7 Likert scale) predicted by *situ* (ex-situ vs. in-situ, contrasts -.5, +.5), *polarity* (absence vs. presence of negation in the embedded clause, contrasts -.5, +.5), and type of syntactic context (*syntactic.context*, direct questions with long construal vs. indirect questions, contrasts 0, 1)

*rating ~ polarity * situ * syntactic.context + (1 + situ + polarity / participant) + (1/ item)*	Estimate	Std. Er.	t value	P-value
(Intercept: reference cat. = direct questions with long construal)	5.4164	0.1135	47.7428	<0.001***
Situ (ex-situ vs. in-situ)	0.6379	0.1132	5.6371	<0.001***
Polarity (positive vs. negative)	-1.2076	0.1057	-11.428	<0.001***
Syntactic.context(vs. indirect questions)	-0.9391	0.0623	-15.0716	<0.001***
Situ:Polarity	-0.3576	0.1765	-2.0256	0.043*
Situ:Syntactic.Context	-3.3108	0.1247	-26.5491	<0.001***
Polarity:Syntactic.Context	0.2406	0.1246	1.931	0.0536 .
Situ:Polarity:Syntactic.Context	0.0725	0.2494	0.2908	0.7713

Figure 2. Experiment 1 (contexts favoring D-linking): Mean acceptability ratings (95% C.I.) predicted by the statistical model

In direct questions with long construal with a D-linked interpretation, i.e. the reference category for the factor *syntactic.context*, wh in-situ questions are rated significantly higher than their ex-situ counterparts (Est.= 0.6379, std. error = 0.1135, t value = 47.7428, p < .001). The presence of negation in the embedded clause induces a significant reduction of the acceptability (std. error = 0.1057, t value =-11.428, p < .001) with a pronounced effect size (Est. =-1.2076). The interaction between *polarity* and *situ* is significant (Est. =-0.3576, std. error = 0.1765, t value = -2.0256, p = .043), indicating that the higher acceptability for wh in-situ in direct questions with long construal, as compared to wh ex-situ, is less pronounced when the embedded clause is negated. In other words, we observe in questions with long construal that negation does not induce any selective degradation effect for wh in-situ elements that makes them less acceptable than wh ex-situ. On the contrary, the wh in-situ questions are rated overall as more acceptable than the wh ex-situ questions, even in the presence of negation, although in this configuration their superiority is less pronounced. This was assessed by computing the relevant mean values using the R packages *Afex* (Singmann et al. 2016) and *emmeans* (Lenth 2023). We adopted the conservative Bonferroni correction for p-value adjustment. The contrast between in-situ and ex-situ conditions in direct questions with a negative embedded clause was found to be significant and positive (Estimate = 0.459, SE = 0.144, t-ratio = 3.184, p = .0192).

Let us now also consider indirect wh-questions. The factor *syntactic.context*, specified using dummy coding, is significant (Est. = -0.9391, std. error = 0.0623, t value = -15.0716, p < .001). This indicates that, when averaging over both *situ* and *polarity*, indirect questions are overall less acceptable than direct questions with a long construal interpretation. This overall degradation observed for indirect questions stems from averaging over ex-situ and in situ-questions and from the considerably lower acceptability of in-situ wh-elements in indirect contexts. Indeed, *situ* and *syntactic.context* exhibit a highly significant interaction with a large effect size (Est. = -3.3108, std. error = 0.1247, t value = -26.549, p < .001). In other words, indirect questions with wh in-situ are rated significantly much lower than their ex-situ counterparts, while direct questions with wh in-situ are rated higher than their ex-situ counterparts.

Furthermore, the interaction between *polarity* and *syntactic.context* was marginally significant, indicating the overall degradation induced by the presence of the negation is milder in indirect questions as compared with direct questions (Est. = 0.2406, std. error = 0.1246, t value = 1.931, p = .0536). Finally, the three-way interaction between *situ*, *polarity*, and *syntactic.context* was not significant.

In conclusion, the results of Experiment 1, in which the context induced a D-linked interpretation of the wh-pronouns, show that wh in-situ elements are not only acceptable in direct questions with long construal but are also rated as more acceptable than their ex-situ counterparts (4.a). This holds true for positive direct questions with long construal, as well as for direct questions with long construal in which negation occurs in the embedded clause. These findings point to the conclusion that in direct questions with long construal, the presence of negation does not selectively rule out wh in-situ elements (4.c). Conversely, we observe that negation induces an overall effect of degradation, which is slightly stronger in direct questions than in indirect questions. While wh in-situ elements are significantly more acceptable than wh-ex-situ in direct questions, the scenario is reversed in indirect questions. In this latter

configuration, wh-in-situ elements are sharply degraded in comparison with ex-situ wh-elements (4.d).
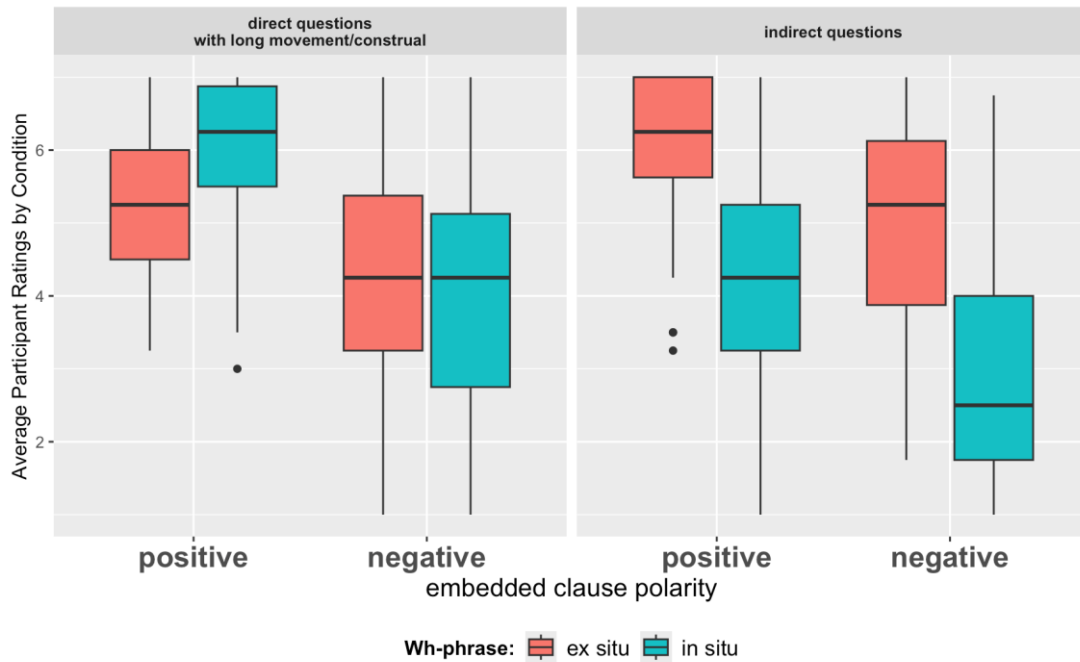
3.2.1 Experiment 2

The responses collected in Experiment 2 from the participants that met the inclusion criteria (N=59) are resumed in Table 3 and Figure 3. The values were calculated as described for Experiment 1.

Table 3. Experiment 2 (contexts disfavoring D-linking): Mean, Median, and Standard Error values (1-7 Likert scale) by condition

Syntactic.context	Polarity (in the embedded clause)	Situ	Mean rating	Std. Er.	Median rating
Direct questions with long movement/construal	positive	ex situ	5.220	0.120	5.250
Direct questions with long movement/construal	positive	in situ	5.996	0.128	6.250
Direct questions with long movement/construal	negative	ex situ	4.352	0.184	4.250
Direct questions with long movement/construal	negative	in situ	4.153	0.202	4.250
Indirect questions	positive	ex situ	6.097	0.131	6.250
Indirect questions	positive	in situ	4.343	0.188	4.250
Indirect questions	negative	ex situ	4.975	0.187	5.250
Indirect questions	negative	in situ	2.975	0.194	2.500

Figure 3. Experiment 2 (contexts disfavoring D-linking): Boxplot of average participant ratings (1-7 Likert scale) across different conditions

We built a linear mixed model analogous to Experiment 1, predicting the ratings as a function of *situ, polarity,* and *syntactic.context*, as well as their interaction. We adopted the same contrast coding scheme as in Experiment 1 to address the research questions: Anova-like deviation coding (-.5, +.5) for the contrasts of the *situ* and *polarity*, and dummy coding for *syntactic.structure* (0,1). As in Experiment 1, the most complex error structure justified by the data featured by-item and by-participant intercepts and by-participant slopes for the effects of *situ* and *polarity*: *situ: rating ~ polarity * situ * syntactic.context + (1 + situ + polarity | participant) + (1 + situ | item).*
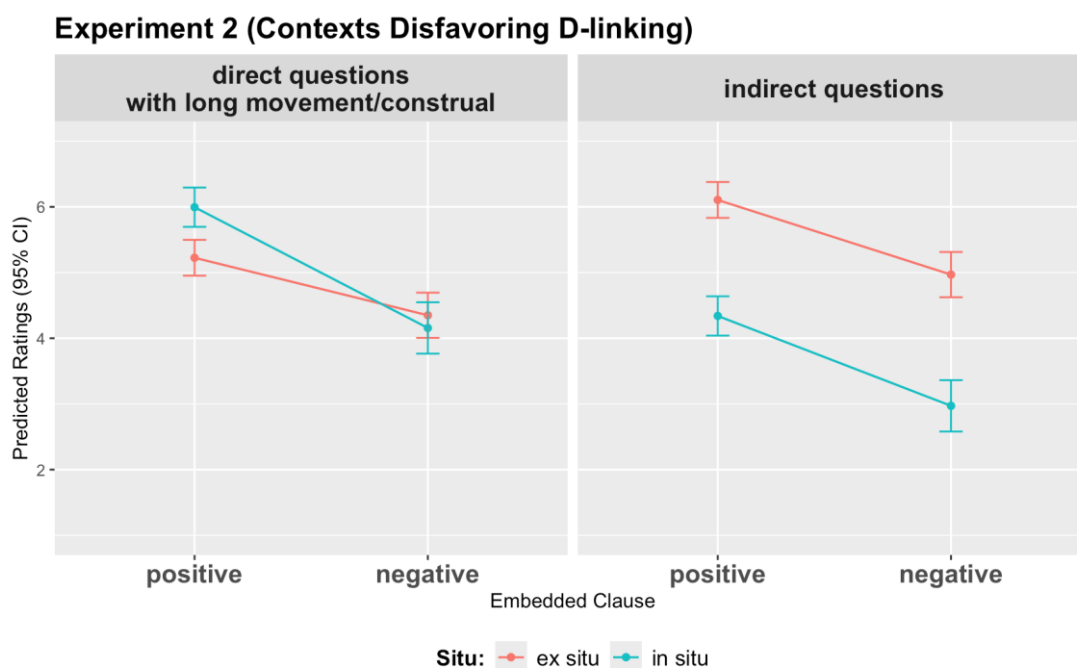
The model exhibited significant explanatory power, with a conditional R2 of 0.53, and a marginal R2 of 0.24 attributed solely to the fixed effects. Details of the model are provided in Table 2, while Figure 2 displays the predicted rating values predicted by the model.

Table 4. Experiment 2 (contexts disfavoring D-linking). Summary of the statistical model: Ratings (1-7 Likert scale) predicted by situ (ex-situ vs. in-situ, contrasts -.5, +.5), polarity (absence vs. presence of negation in the embedded clause, contrasts -.5, +.5), and type of syntactic context (syntactic.context, direct questions with long construal vs. indirect questions, contrasts 0, 1)

rating ~ polarity * situ * syntactic.context + (1 + situ + polarity / participant) + (1/ item)	Estimate	Std. Er.	t value	P-value
(Intercept: reference cat. = direct questions with long construal)	4.9315	0.136	36.2705	<0.001***
Situ (ex-situ vs. in-situ)	0.2883	0.1127	2.5583	0.0118**
Polarity (positive vs. negative)	-1.3568	0.1375	-9.869	<0.001***
Syntactic.context(vs. indirect questions)	-0.3354	0.0619	-5.4163	<0.001***
Situ:Polarity	-0.9629	0.1752	-5.4953	<0.001***
Situ:Syntactic.Context	-2.1703	0.1239	-17.5232	<0.001***
Polarity:Syntactic.Context	0.104	0.1239	0.84	0.401
Situ:Polarity:Syntactic.Context	0.7313	0.2477	2.9522	0.0032**

Figure 4. Experiment 2 (contexts disfavoring D-linking): Mean acceptability ratings (95% C.I.) predicted by the statistical model

In direct questions with long construal, wh in-situ questions are rated significantly higher than their ex-situ counterparts (Est.= 0.2883, std. error = 0.1127, t

value = 2.5583, p<.0118), similarly to what was observed in Experiment 1. Once more, the presence of negation in the embedded clause produces an overall significant reduction of the acceptability (Est. = -1.3568, std. error = 0.1375, t value = -9.869, p<.001). The interaction between *polarity* and *situ* is significant (Est. = -.9629, std. error = 0.1752, t value = -5.4953, p<.001). Indeed, the higher acceptability of in-situ questions is restricted only to the configuration in which the embedded clause does not contain negation: when negation is present, in-situ and ex-situ questions do not significantly differ, unlike in Experiment 1. This was shown by the analysis of the contrast between in situ and ex-situ questions in direct questions with negation in the embedded clause, which we computed using the R packages *Afex* (Singmann et al. 2016) and *emmeans* (Lenth 2023): Est. = -0.193, std.error = 0.143, t.ratio= -1.347, p = .805).

When considering indirect questions alongside direct questions with long construal, regardless of *polarity* and *syntactic.contexts*, indirect questions score overall lower than direct questions with long construal (Est.= -0.3354, std. error = 0.0619, t value = -5.4163, p < .001). Once more, this is related to the large effect size that characterizes the significant interaction between *Situ* and *Syntactic.Context* (Est. = -2.1703, std. error =0.1239, t value =-17.5232, p < .001). The interaction between *Polarity* and *Syntactic.Context* was not significant (Est. = 0.104, std. error = 0.1239, t value = 0.84, p=.401). Finally, we observe a three-way interaction between the three factors (Est.=0.7313, std. error = 0.2477, t value = 2.9522, p-value = 0.003). This result is linked to the presence of a significant 2-way interaction between *situ* and *polarity* in direct questions. As mentioned above, in these structures, the ratings for in-situ are significantly higher than for ex-situ when the embedded clause does not contain negation, while they do not differ from each other when negation occurs in the embedded clause. In contrast, in indirect questions, the ex-situ structures are systematically rated higher than their in-situ counterparts, both when negation occurs and when it does not.

3.3. Summary

The results of Experiment 1, in which the contexts favored a D-linked interpretation of the questions, show that in direct questions with long construal, the in-situ strategy is significantly more acceptable than the ex-situ one, and this holds true even when the embedded clause is negated. Furthermore, the presence of negation in the embedded clause induces an overall degradation, which is plausibly related to the complexity of the structures at issue. A partially similar result is obtained in Experiment 2, where the contents disfavored a D-linked interpretation. However, when the context disfavors D-linking, the higher acceptability of in-situ questions disappears if the embedded clause is negated: ex-situ and in-situ do not differ in this case.

A different pattern emerges for indirect questions. In this syntactic context, the in-situ strategy is significantly less acceptable than the ex-situ one, regardless of the presence of negation in the clause. This is observed in both Experiment 1 and Experiment 2.

In conclusion, our experimental results indicate that in-situ questions with long construal are at least as acceptable as their ex-situ counterparts. They are actually significantly more acceptable than their ex-situ counterparts, with the exception of the configuration in which the wh-element appears in situ in non-D-linked direct questions

where negation occurs in the embedded clause. These findings are in line with the results obtained by Oiry (2011) and Tual (2017). Furthermore, to the extent that our experiments manipulated the interpretation of wh-phrases, D-linking does not seem to be a necessary condition for wh in-situ in questions with long construal, although it may favor the in-situ strategy over the ex- situ one. Furthermore, the presence of negation in the embedded clause does not selectively block the in-situ strategy. As for indirect questions, we observe in both experiments that the ex-situ strategy is always more acceptable than the in-situ one.

4. Discussion

Our contribution investigates the questions presented in (4) and repeated in (12):

(12)   a.   Is wh in-situ grammatical in the embedded clause of biclausal direct
                questions?
        b.   If it is, does it have to be D-linked?
        c.   If the answer to (4a) is positive, does negation in the embedded clause
                give rise to intervention effects, selectively targeting wh in-situ?
        d.   How does the acceptability of the wh in-situ strategy in direct questions
                with long construal compare to that in indirect questions?

To the first question, our answer is yes, since wh in-situ in direct wh-questions with long construal is at least as acceptable as wh ex-situ. This conclusion accords with the experimental results of Tual (2017) and Glasbergen-Plas (2021), *contra* Bošković 1998, 2000, Cheng & Rooryck 2000, a.o.

      Concerning the second question, we show that both D-linked and non-D-linked wh in-situ are possible in long-construal wh-questions.

      With respect to the third question, we show that the deleterious impact of negation does not selectively target wh in-situ. Ex-situ questions are also degraded. Specifically, in direct questions with long construal, the appearance of negative *pas* in a position c-commanding the external merge position of the wh element fails to selectively block wh in-situ. In this respect, French wh in-situ is different from wh in-situ in Korean and Japanese (cf. Beck & Kim 1997). The absence of selective intervention effects by negation in French suggests that the derivational mechanism of wh in-situ in direct questions involves the same, or an analogous syntactic mechanism, to wh ex-situ (see Baunaz 2011 for a similar idea). Since wh ex-situ is derived via chain-formation, one can plausibly argue, on the basis of this empirical result, that in-situ wh is moved.

      Finally, regarding the last question, we saw that wh in-situ is significantly worse than wh ex-situ in indirect questions, which is the opposite pattern of what we observe in direct questions with long construal.

      We suggest that the pattern observed in indirect questions might be due to the fact that the selectional requirements of the matrix verb can only be satisfied by a wh that is present on the edge of the embedded phase at Spellout. Wh in-situ is too deeply embedded within the phase at the point at which the matrix verb is merged. In this we concur with Shlonsky 2012. Put differently, one might argue that the Q/wh head in the French left periphery can be optionally licensed by Agree without Move. But if the

option is taken in an embedded clause, the selectional requirements of the matrix verb are not satisfied at the interface.

Clearly, the analytical ideas we suggest here need to be further explored. Our hope is that any research agenda for future work in this area take into account the empirical generalizations that we have reached in this contribution.

Acknowledgments

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