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LICENSING *WH*-IN-SITU

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Abstract. This article examines French *wh*-in-situ. We argue that *wh*-in-situ in French is licensed by an intonation morpheme, which also licenses yes/no questions. Movement of a Q-feature of an in-situ *wh*-word is required to disambiguate the underspecified intonation morpheme. The underspecification nature of this intonation morpheme leads to limited distribution of French *wh*-in-situ. We further compare French *wh*-in-situ with Chinese and Portuguese, showing that *wh*-in-situ in different languages can in fact have different properties.

1. Introduction

Wh-in-situ has been a central topic of discussion in numerous papers in the literature since at least the 1970s. Typical questions that arise with *wh*-in-situ are: what allows the *wh*-words to remain in situ? do they undergo covert *wh*-movement? and how are the in-situ *wh*-phrases interpreted? In this paper, based on data from French, we reexamine the licensing environments of *wh*-in-situ. In particular, we defend two hypotheses: (a) there are two types of *wh*-in-situ, one involving *wh*-feature movement at LF and the other involving no movement; and (b) intonation, just like *wh*-particles and real *wh*-words, can play a central role in the licensing of *wh*-in-situ.

We begin our discussion by looking at the different types of *wh*-in-situ. We then examine *wh*-in-situ in French in detail (section 2). The role of intonation as well as its syntactic and semantic ramification will be analyzed. In section 3, we further examine a root constraint involved in French *wh*-in-situ questions. Finally, the issue of optionality involved in French *wh*-questions, as well as Bošković's (1998) account of *wh*-in-situ in French, will be addressed in section 4.

1.1. Types of *wh*-in-situ

One type of *wh*-in-situ commonly found in natural languages is the kind we find in multiple questions. In such questions, one *wh*-word is moved and another stays in situ, as in (1).

- (1) who bought *what*

* We would like to thank Vincent van Heuven for discussing and analyzing the intonation contours of French *wh*-in-situ questions with us, and João Costa for patient and careful responses to our queries about Portuguese. Thanks to Liliane Tasmowski and Francine Melka for their help in ascertaining that *wh-ça* questions in French are not echo questions. All remaining errors are our own.

In such cases, it can be said that the in-situ *wh*-word *what* is allowed to remain in situ because of the moved *wh*-word. Within the Minimalist framework (e.g., Chomsky 1995), the in-situ *what* in (1) does not need to move (and therefore cannot do so) because the strong Q-feature in the matrix C^0 is already checked by *who*. As a consequence, the *wh*-feature of *what* will not be attracted to C^0 . The in-situ *wh*-word is interpreted via a process of unselective binding or choice functions (Reinhart 1998; see Pesetsky 1998 for a different account). We will discuss the interpretation of in-situ *wh*-words further below.

Let's now turn to a second type of *wh*-in-situ, which occurs in languages such as Chinese and Japanese. *Wh*-in-situ in these languages is not limited to multiple questions. Such languages are different from English in that they typically have *wh*-particles. We assume here that insertion of the *wh*-particle (i.e., an overt or null Q-morpheme) checks the Q-feature in C^0 (see section 2.2), allowing the *wh*-words to stay in situ (see Cheng 1991; see also Tsai 1994b):

- (2) hufei mai-le shenme (ne)
 Hufei buy-PERF what PRT
 'What did Hufei buy?'

In other words, the Chinese/Japanese *wh*-particle plays the same role with respect to the in-situ *wh*-word as the moved *wh*-word does in English multiple questions. In both cases, a *wh*-word can stay in situ because of the presence of another *wh*-element, a *wh*-word, or a *wh*-particle. This *wh*-word or *wh*-particle checks the Q-feature in C^0 and thereby voids the need of the in-situ *wh*-words to undergo movement. Both types of *wh*-in-situ also illustrate that there is an asymmetry between in-situ questions and questions involving extraction: in-situ *wh*-arguments (i.e., those that are not adverbials, cf. Tsai 1994a and Reinhart 1998) can appear in islands:¹

- (3) a. Who likes the book that who wrote?
 b. hufei xihuan nei-ben shei xie de shu
 Hufei like that-CL who write DE book
 'Who is the person *x* such that Hufei likes the book that *x* wrote?'
 (Mandarin Chinese)

Though English and Chinese can be said to be similar with respect to *wh*-in-situ in the above sense, the two languages differ in that, in simple single questions, English *wh*-words must move whereas Chinese *wh*-words do not. This difference can be derived from the fact that English

¹ Whether *wh*-in-situ leads to subadjacency effects is not an entirely clear-cut matter. *Wh*-in-situ in Chinese and Imbabura Quechua, for example, does not induce subadjacency effects (see Huang 1982, Cole and Hermon 1994). However, Watanabe (1992) shows that *wh*-in-situ in Japanese may or may not induce subadjacency (depending on a couple of factors).

lacks Chinese-style *wh*-particles that can check the C^0 feature (see Cheng 1991). The Q-feature in English C^0 can only be checked by moving a *wh*-phrase to the checking domain of C^0 (e.g., [Spec,CP]), whereas the Q-feature in Chinese/Japanese C^0 is checked through the insertion of a *wh*-particle.

Aside from these two types of *wh-in-situ*, there is a third type, exemplified by French, which appears to allow both the in-situ and the movement options.² As is well-known, French allows *wh-in-situ* outside the context of multiple questions (Aoun, Hornstein & Sportiche 1981) (see (4a)). However, French *wh-in-situ* appears to be distinct from English/Chinese *wh-in-situ* in that (a) unlike Chinese/Japanese, there is no *wh*-particle that appears to check the Q-feature of C^0 ; and (b) in-situ *wh*-arguments appear in very restricted environments (see sections 2.2 and 3) and are certainly not allowed in islands (4b).

- (4) a. Jean a acheté quoi?
 Jean has bought what
 ‘What has Jean bought?’
 b. *Jean aime le livre que qui a écrit?
 Jean like the book that who has written
 ‘Who is the person *x* such that Jean likes the book that *x* wrote?’

The availability of an in-situ option in French thus raises interesting questions concerning the typology of *wh-in-situ*. In particular, what element in French checks the Q-feature of C^0 , therefore allowing the *wh*-word to stay in situ? Second, what leads to the restricted distribution of *wh-in-situ*? Bošković (1998) suggests that French *wh-in-situ* derives from the absence of an interrogative C^0 in overt syntax. With no interrogative C^0 , nothing needs to be checked in overt syntax. However, a closer look at in-situ *wh*-questions in French reveals that these *wh*-questions do have other properties that are crucial in legitimizing the in-situness. As Wachowicz (1978) suggests, languages have cues for marking *wh*-questions (see also Cheng 1991). It appears that the question cue in French *wh-in-situ* is provided by a special intonation that is absent in sentences with *wh*-movement. We discuss this in section 2.

2. French In-situ Questions

2.1. Intonation and interpretation

One distinct characteristic of French in-situ *wh*-questions is the intonation. Aside from in-situ *wh*-questions, French allows two other forms of *wh*-

² There are other languages which have been considered to have optional *wh*-movement—for example, Bahasa Indonesia and Malay (see Cheng 1991, Saddy 1991, and Cole & Hermon 1998). It should be noted that the “optionality” in these languages appears to be less restricted than in French.

questions, one involving *est-ce que* (5a) and one involving (complex) inversion (5b). The intonation in these *wh*-questions differs from an intonational yes/no question (6), which is a yes/no question solely marked by intonation (i.e., a yes/no question without inversion or *est-ce que*).

- (5) a. Quel livre est-ce que Jean a acheté?
 which book EST-CE QUE Jean has bought
 ‘Which book did Jean buy?’
 b. Quel livre Jean a-t-il acheté?
 which book Jean has-he bought
 ‘Which book did Jean buy?’
 (6) Jean a acheté un livre?
 ‘Jean has bought a book?’
 (rising intonation)

The questions in (5a) and (5b) involve a nonrising intonation. This differs clearly from the intonation in (6), which has a rising intonation. For ease of exposition, we call the intonation in (6) *yes/no intonation*.

Consider now in-situ *wh*-questions such as (4a), repeated here.

- (4a) Jean a acheté quoi?
 Jean has bought what

The intonation in (4a) is in fact comparable to the yes/no intonation in (6) in that there is a rising intonation, in contrast with the intonation exhibited in (5a,b). If we change the intonation of (4a) to the intonation in (5a) or (5b)—let’s call this *wh-intonation*—the sentence becomes ungrammatical. It thus appears that yes/no intonation plays a major role in licensing in-situ *wh*-questions in French.

A second significant property of in-situ *wh*-questions in French is pointed out by Chang (1997). Chang notes that negative answers such as the one in (8) are not legitimate answers to in-situ *wh*-questions. This contrasts with *wh*-questions involving movement, as in (7), which allows a negative answer.

- (7) Question: Qu’ est-ce que Marie a acheté?
 what EST-CE QUE Marie has bought
 Answer: Rien
 nothing
 (8) Question: Marie a acheté quoi?
 Marie has bought what
 Answer: ??Rien.
 nothing

Chang notes that in-situ *wh*-questions in French are associated with a “strongly presupposed context (i.e., event)” (in contrast with a presupposed

answer set). The interpretation of in-situ *wh*-questions in French seeks “details on an already established (or presupposed) situation” (Chang 1997:45).³ Consider (8) again. The question is only felicitous if the speaker assumes the event of Marie’s buying something. What the question pertains to is the detail of the purchase (i.e., what exactly did Marie buy?). The negative answer in (8) is thus odd since the speaker presupposes the purchase of something. The difference between (7) and (8) shows that *wh*-questions involving movement in French do not have the “strongly presupposed context”; they are neutral *wh*-questions.

This difference in presupposed contexts, we suggest, is directly linked to how in-situ *wh*-words are licensed in French—that is, by the yes/no intonation. In fact, yes/no questions which are marked only by intonation also require a presupposed context. Consider the questions in (9).

- (9) a. Are you cooking tonight?
b. You are cooking tonight?

Example (9a) can be uttered either as a neutral question or as a question presupposing that the hearer is going to cook tonight. In contrast, (9b) is not a neutral question. In uttering this question, the speaker presupposes that the hearer is cooking tonight. In other words, the speaker presupposes a positive “yes” answer. This property of the intonation question can be made explicit to the extent that (9b), but not (9a), can be followed by tags such as *I take it, I assume*. This question can be uttered when the speaker sees that the hearer is in the kitchen, apparently preparing for dinner.⁴

³ Chang (1997) also shows that the presuppositional constraint on *wh*-in-situ sentences is not reducible to the more commonly known notion of D-linking (Pesetsky 1987). In the dialog in (i), there is no salient element in the discourse that can “fill in” the *wh*-in-situ object. Rather, it appears that the presupposition crucial for *wh*-in-situ involves the entire VP: the birthday context leads to a presupposition of buying presents.

- (i) A: C’est l’anniversaire de Pierre la semaine prochaine.
it-is the-birthday of Pierre the week next
‘It’s Pierre’s birthday next week.’
B: Et tu vas lui acheter quoi?
and you will for-him buy what
‘And what will you buy for him?’

⁴ This of course does not prevent the hearer from answering “no.” However, the “no” answer is certainly not the expected answer. This suggests a distinction between neutral and nonneutral yes/no questions, which may be morphologically marked. French *est-ce que* and Chinese *ne* are root yes/no morphemes that mark neutral questions, whereas the intonation morpheme marks nonneutral, yes-biased questions. Such a distinction also exists for embedded questions in English: Bolinger (1977:96) observes that the embedded yes/no morphemes *if* and *whether* behave differently, as illustrated in (i):

- (i) John kept tossing so I asked him if / ?whether he was awake.

We take this difference to be the result of the positive presupposition carried by *if*, and the purely neutral yes/no interpretation associated with *whether*. *Whether* “seems to treat with equal

The *wh*-question in (8), *Marie a acheté quoi*, shows that in-situ *wh*-questions in French have similar presuppositional contexts as intonational yes/no questions. Example (8) presupposes that Marie bought something. This further shows that the licensing by the yes/no intonation plays a major role in French in-situ questions.

2.2. *Wh-feature movement and intonational morphemes*

To account for the role that intonation plays in licensing *wh*-in-situ in French, we propose that the intonation in the yes/no question in (6) is represented as a yes/no question morpheme in overt syntax, with a PF spell-out in the form of a rising yes/no intonation. We further suggest that question (Q-) morphemes can be specified or underspecified; they can either be specified as *wh*-question morphemes (specified with a [wh] feature), such as *-la* in Navajo, or as yes/no morphemes (specified with a [yes/no] feature), such as the Chinese yes/no particle *ma*. Underspecified Q-morphemes are thus compatible with both types of questions. We represent the specification of features as hierarchically structured pairs of attributes and values, in the sense of Scobbie's (1991) work on Attribute-Value Phonology. We take Q to be an attribute that can take either of two (unary) values, [Q : wh] or [Q : y/n]. The underspecified Q is represented as [Q :].

We have seen that the yes/no intonational Q-morpheme in French is not only used in yes/no questions but also in *wh*-questions. In this sense, the intonational Q-morpheme is like the overt complex Q-morpheme *est-ce que*, which can also occur both in yes/no and in *wh*-questions (for *est-ce que* as a complex Q-morpheme, see Blanche-Benveniste et al. 1984, Rooryck 1994).⁵

- (10) *Est-ce que* Jean a acheté un livre?
 EST-CE QUE Jean has bought a book
 'Did Jean buy a book?'

seriousness the possibility of a *yes* and the possibility of a *no*" (Bolinger 1977:96). By contrast, we analyze the more felicitous *if* in this context as the result of the positive presupposition associated with it: *if* presupposes that the answer will be positive, given that John's tossing facilitates the speaker's presupposition that he is indeed awake.

⁵ Similarly, Japanese and Korean feature matrix morphemes licensing both yes/no and *wh*-questions. Example (i) shows that in Japanese, the question marker *no* can appear in a yes/no or a *wh*-question (data from Yoshida & Yoshida 1998) (see also example (15)).

- (i) a. gakko-oni ik-u no?
 school-to go-PRES Q
 'Are you going to school?'
 b. doko-ni ki-u no?
 where-to go-PRES Q
 'Where are you going?'

Like French *est-ce que* and the intonation morpheme, these morphemes must be viewed as a Q-morpheme underspecified for [y/n] and [wh].

- (5a) Quel livre est-ce que Jean a acheté?
 which book EST-CE QUE Jean has bought
 ‘Which book did Jean buy?’

From a theoretical point of view, this means that both *est-ce que* and the intonational Q-morpheme are underspecified for [yes/no] and [wh] features. The intonational yes/no question in (6) can thus be represented (in overt syntax) as (11).

- (11) Q Jean a acheté un livre
 [Q:]

We assume that with this type of Q-morpheme, the underspecification of Q needs to be resolved. In (10) and (11), the underspecification of the Q-morpheme is resolved by a default operation, yielding a [y/n] value for the attribute Q at LF. In other words, at LF [Q :] is set by default to [Q : y/n] (i.e., the default value of [Q :] is [Q : y/n]). As a result, (11) is interpreted as a yes/no question, just as (10) is. (11) differs from (10) in that, at PF, the underspecified intonational morpheme is realized under the form of a specific yes/no intonation.

Consider now cases in which the underspecified Q-morpheme is used to license *wh-in-situ*. We propose that the underspecified Q-morpheme in such questions is inserted to check the Q-feature in C⁰, just as *wh*-particles are merged in C⁰ to check the Q-feature of C⁰ (see section 2.3). The representation of (4a) in overt syntax is (12).

- (12) Q Jean a acheté quoi
 [Q:]

If no operations take place at LF, (12) will yield an illegitimate interpretation because the default setting of the underspecified Q is [Q : y/n], as in (11). This default interpretation would leave the interpretation of the *wh*-word *quoi* unresolved, leading to a nonconvergent derivation. We therefore propose that, apart from filling in the default value (i.e., [y/n]), the underspecification of the Q-morpheme can be resolved in another way: at LF, the underspecification of Q can be resolved by movement of the *wh*-feature (e.g., of *quoi* in (12)) to C⁰. We follow Chomsky (1995) and assume that only features move at LF.⁶ Movement of the *wh*-feature to C⁰ then sets the value of [Q :] to [Q : wh]. In other words, the underspecified nature of the Q-morpheme triggers movement of the *wh*-feature. If there is nothing for the underspecified Q-morpheme to attract, it will end up having a default [y/n] interpretation. Importantly, however, LF feature movement does not occur

⁶ Our analysis can be recast in terms of Agree (Chomsky 1998). For ease of discussion, we phrase our discussion in terms of feature movement.

for the purpose of *checking* the Q-feature in C, because the Q-feature in C is checked by the intonation morpheme itself. Rather, feature movement only serves to *disambiguate* the underspecified Q-feature by setting its value to [wh], resulting in a convergent derivation.⁷

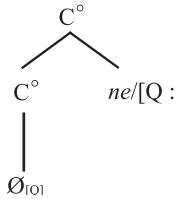
2.3. *Est-ce que* vs. *the intonation morpheme*

One question that immediately arises here is why the Q-morpheme *est-ce que* does not avail itself of LF feature movement as well. Recall that under this analysis, both *est-ce que* and the intonation morpheme are underspecified [Q:] morphemes. Nevertheless, *est-ce que* triggers overt movement of *wh*-elements whereas the intonation morpheme does not (as shown in (5a) and (13)).

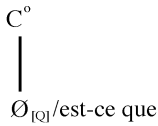
- (13) **Est-ce que* Jean a acheté quel livre
EST-CE QUE Jean has bought which book

We suggest here that the crucial difference between the intonation morpheme and *est-ce que* lies in their checking relation with respect to C^0 . Chomsky (1995:289) suggests that the feature that checks the Q-feature of C^0 can enter the checking domain by Merge or Move. If Merge is involved, it is possible to adjoin an X^0 category (and *if* in English is a case in point) to the null C^0 . Recall that we have assumed that the Chinese *wh*-particle is inserted (and thus merged) in C^0 and thereby checks the Q-feature present in C^0 . The French intonation morpheme is similar to the Chinese *wh*-particle in that it is likewise merged in C^0 and subsequently checks the Q-feature of C^0 . Because the Q-feature of C^0 is checked, overt movement is precluded. In other words, in these cases, a null C^0 carrying a Q-feature is checked by Merge of a Q-morpheme (a *wh*-particle or an intonational Q-morpheme). By contrast, we propose that the overt Q-morpheme *est-ce que* differs from the intonation morpheme in that it does not check the Q-feature of C^0 . Rather, we take *est-ce que* to be an instantiation of the C^0 feature itself, a feature which needs to be checked.

⁷ This is in spirit similar to Simpson (to appear), who argues that overt *wh*-movement is to disambiguate C^0 , which can be a head licensing *wh*-questions, yes/no questions, focus, and so on. We differ from Simpson in that the C^0 in our account necessarily carries a Q-morpheme, which in the case in French, needs to be disambiguated (at LF).

(14) a. Chinese *ne* and French intonation Q

(*ne* and [Q :] checked Q feature)

b. French *est-ce que* and English null C°

(unchecked Q-feature, to be checked by either merging an X⁰ or moving an XP to Spec)

Importantly, LF feature movement in French *wh*-in situ questions is not for feature-checking purposes. The Q-feature itself is already checked by the intonation morpheme, as in Chinese *wh*-questions. Instead, feature movement is for disambiguation purposes: since the French intonation morpheme is underspecified (for [yes/no] or [wh]), *wh*-feature movement “fills in” the value of the Q-feature in C⁰, setting it to [wh].

It should be noted that *est-ce que* and the yes/no intonational morpheme can in fact co-occur. That is, the yes/no question in (10) can be combined with yes/no intonation. In our analysis, this can indeed occur because the yes/no intonation is a morpheme which can serve to check the Q-feature in C⁰, in this case, *est-ce que*. The co-occurrence of *est-ce que* and yes/no intonation thus provides a piece of supporting evidence.⁸

We have already noted that *est-ce que* “triggers” overt *wh*-movement (5a). However, *est-ce que* plus the yes/no intonation is not compatible with overt *wh*-movement; the combination yields only an echo interpretation. This follows from the analysis presented here, because either the intonation morpheme or *wh*-movement checks the Q-feature represented by *est-ce que*, but not both.⁹

We would further like to point out that an underspecified [Q] is not a priori precluded in languages with only in-situ questions (e.g., Japanese, Chinese,

⁸ Note that given the assumptions made by Chomsky (1995), nothing prevents *est-ce-que* from co-occurring with the intonation morpheme in C⁰ (i.e., with the intonation morpheme adjoined to *est-ce-que*). This is comparable to adjoining *if* to a null C⁰ in English.

⁹ It should be noted that *est-ce que* plus yes/no intonation cannot accommodate *wh*-in-situ. This implies that *est-ce que* is not exactly the same as a null C⁰. We leave this question open.

Korean) (see fn. 5). A reviewer notes that in Korean, a sentence such as (15) can be interpreted either as a *wh*-question or a yes/no question.¹⁰

- (15) *chelswu-ka mues-ul po-ass-ni*
 Chelswu-NOM what-ACC see-PAST-Q
 a. 'What did Chelswu see?'
 b. 'Did Chelswu see something?'

Given our analysis, the question particle *ni* in (15) is underspecified. A reviewer raised the following question: how does the *wh*-interrogative interpretation arise if the *wh*-word is ambiguous (between an interrogative word and an indefinite quantifier). Following Cheng (1991), (see also Watanabe 1992 and Tsai 1994b), a question word such as *mues* in Korean has the following representation:

- (16) $\emptyset_{[wh]}$ -*mues*

In (16), *mues* represents the "core" of the *wh*-word (which is an indefinite) and the *wh*-force comes from a null *wh*-determiner (or a null *wh*-operator). If $\emptyset_{[wh]}$ is present, it can undergo movement to disambiguate *ni*. On the other hand, if it is not present, a default value for *ni* is filled in, yielding a yes/no interpretation. Given this account, the question particle *ni* in Korean is just like the intonation morpheme in French; it is underspecified for its yes/no or *wh* value.¹¹

Our analysis suggests that in-situ *wh*-questions in French involve *wh*-feature movement at LF. We briefly mentioned in section 1 that in-situ *wh*-words in multiple questions in English do not involve *wh*-feature movement at LF. The question that arises is thus whether there is in fact a difference

¹⁰ The reviewer notes that there is an intonational difference between the yes/no and the *wh* variant. If the sentence is interpreted as a *wh*-question, the intonation peak is on the *wh*-word. On the other hand, with a yes/no question interpretation, either *Chelswu* or the verb carries the peak. This is not surprising because the *wh*-word in a *wh*-question naturally carries focus (and hence the intonation peak). Further work needs to be done before we can examine the connection between intonation and question interpretation in Korean.

¹¹ Lakota appears to be similar to Korean in that the *wh*-word *táku* 'what' is also ambiguous between an indefinite and an interrogative reading, and that the question marker *he* can mark either a yes/no question or a *wh*-question. However, with a *wh*-question reading, *he* and the *wh*-word *táku* cannot be separated by an island (data from Van Valin and LaPolla 1997:617):

- (i) *wícháša ki* [[*šúka wá táku ø-ø-yaxtáke*] *ki le*] *wá-ø-ø-yáka he*
 man the dog a 3SGU-3SGA-bite the this 3SGU-3SGA-see Q
 'Did the man see the dog which bit something?'
 *'What did the man see the dog which bit?'

This follows from our account: in order to have the interrogative reading, the $\emptyset_{[wh]}$ attached to *táku* has to undergo movement to disambiguate *he*. However, movement out of an island is not possible. For the yes/no reading, the default value of *he* is filled in.

between multiple *wh*-questions in English (and Chinese *wh*-questions) and French in-situ *wh*-questions, which can be attributed to *wh*-feature movement. We noted earlier that the distribution of in-situ *wh*-questions is rather limited. Aside from the well-known restrictions we mentioned in the previous sections, Chang (1997) shows that there are in fact more subtle restrictions.¹² *Wh*-in-situ cannot be preceded by quantifiers, negation, or modals; in such cases, only an echo interpretation is allowed. (The notation # is used in Chang 1997 to indicate that the sentence can be interpreted as an echo question only.)

- (17) #Tous les étudiants ont rencontré qui?
 all the students have met who
 'Who did all the students meet?'
 (Chang 1997:17, ex. 34)
- (18) a. #Il n' a pas rencontré qui?
 he NE has not met who
 'Who didn't he meet?'
 (Chang 1997:19, ex. 40)
- b. #Il peut rencontrer qui?
 he can meet-INF who
 'Who can he meet?'
- c. #Il admire toujours qui?
 he admires always who
 'Who does he always admire?'
- d. #Personne n' admire qui?
 nobody NE admires who
 'Who does nobody admire?'

The restrictions shown in (17) and (18) easily follow from our analysis if we assume Honcoop's (1997) analysis of weak islands (see Beck 1996 for an alternative analysis). In Honcoop 1997, elements such as negation, modals, and quantifiers are considered to create an inaccessible domain between an operator and an indefinite. Given the analysis presented here, the movement of the *wh*-feature creates an operator-indefinite configuration, as shown in (19).

- (19) [Q : wh_i] il admire **toujours** t_i-indefinite_[qui]

This analysis entails that *wh*-feature movement is sensitive to the intervention effect involving negation, modals, and quantifiers.

Consider now *wh*-in-situ in Chinese/English again. We have noted earlier that in these languages, *wh*-in-situ is much less restricted (and negation, modals, and quantifiers do not block *wh*-in-situ in Chinese or English). This

¹² Bošković (1998) also discusses the restriction related to negation (18a) and the matrix clause restriction (see section 3). We delay the discussion of Bošković's account to section 4.1.

indicates that no *wh*-feature movement is involved in Chinese/English *wh*-in-situ. To interpret the in-situ *wh*-element(s), we follow Reinhart (1998) and assume that there is no need for *wh*-feature movement in the case of Chinese and English *wh*-in-situ. It thus naturally follows that inaccessible domains such as islands do not play a role in *wh*-in-situ in these two languages.¹³

3. The Root Properties of the Intonational Morpheme

Aside from the special intonation, the intervention effects, French in-situ *wh*-questions have a further restriction. That is, French *wh*-words cannot stay in situ in embedded clauses, as shown in (20).

- (20) *Marie pense que Jean a acheté quoi?
 Marie thinks that Jean has bought what

This, we suggest, is again due to the intonation Q-morpheme, which is a root morpheme: it appears only in matrix clauses and has only matrix scope. Consider first the matrix scope property. This is not just an idiosyncratic property of the intonational Q-morpheme. In French and English, both the intonationally marked yes/no questions in (21) and the nonintonation questions (22) are interpreted by default as asking a question regarding the matrix elements rather than the embedded ones.

- (21) a. Jean a dit que Guy a acheté un livre?
 Jean has said that Guy has bought a book
 b. John said that Bill bought a book?
 (22) a. Est-ce que Jean a dit que Guy a acheté un livre?
 EST-CE QUE Jean has said that Guy has bought a book?
 b. Did John say that Bill bought a book?

In both (21) and (22), the speaker is asking whether John/Jean said or did not say that Bill/Guy bought a book. Importantly, they cannot be interpreted as asking whether John/Jean said that Bill/Guy did or did not buy a book. In other words, the scope of the question concerns the matrix sentence only, and it does not inquire about the truth of the embedded sentence, the purchase of a book.¹⁴ We suggest that this matrix scope property contributes to the ungrammaticality of (20).

¹³ A remaining question with Reinhart's account is that although *wh*-words such as *why* cannot stay in islands in Chinese, they can very well stay in situ. In Reinhart's account, *why* cannot be in situ because it is an adverbial (without the proper set for choice functions). This rules out an in-situ *why* in Chinese simple questions as well. Tsai (1994a), however, suggests that although nominal *wh*-words do not undergo movement, *wh*-adverbials do.

¹⁴ One reviewer suggests that this claim is false on the basis of the fact that (22) "can be interpreted as asking about a book (possible felicitous answer *No, a boat*)."

We think that this misconstrues the interpretation of the question: the denial *No, a boat* does not directly involve a

Moreover, the yes/no intonational Q-morpheme cannot license an indirect question. Sentences such as (23) are excluded simply because the intonational Q-morpheme is a root morpheme and thus cannot appear in an embedded C.

- (23) *Je me demande que Jean a acheté quoi
I REFL wonder that Jean has bought what

It should be noted that there is no correlation between underspecification and root property. That is, it is conceivable that a nonroot morpheme can also be underspecified. In fact, European Portuguese is a case in point. In European Portuguese, the yes/no morpheme strategy of licensing *wh*-in-situ also exists in indirect questions, as shown in (24) (João Costa, personal communication).

- (24) a. O João perguntou se tu compraste o livro.
João asked whether you bought the book
'João asked whether you bought the book.'
b. O João perguntou se/*que tu compraste o quê.
João asked whether/that you bought what
'João asked what you bought.'

Example (24b) shows that in contrast to French, Portuguese allows not only matrix *wh*-in-situ but also *wh*-in-situ in indirect questions, though the presence of *se* is obligatory.¹⁵ The use of *si* 'whether' however is not possible in French in the same context:

- (25) *Je me demande si Jean a acheté quoi.
I REFL wonder whether Jean has bought what

This illustrates that the underspecification that we see in French intonational Q-morpheme does not extend to the nonroot yes/no morpheme, *si*. Portuguese nonroot yes/no morpheme, *se*, however, is similar to the yes/no intonational morpheme in French in being underspecified for [y/n] or [wh] features.

In other words, languages simply differ as to whether a yes/no morpheme has become underspecified; if it is, then the morpheme can be "borrowed" to license *wh*-questions. In English for example, though a yes/no intonation morpheme exists (shown in (9b) and (26b)), it cannot be "borrowed" to license *wh*-in-situ (26c).

- (26) a. Jean a acheté un livre? (rising intonation)
b. John bought a book? (rising intonation)
c. *John bought what? (rising intonation)

denial about the purchase of a book, but rather, it is an elliptical answer for *No, John didn't say that Bill bought a book, John said that Bill bought a boat.*

¹⁵ Aside from the difference in the ability to have indirect in-situ *wh*-questions, Portuguese differs from French in many ways. See Cheng and Rooryck (in progress).

The yes/no intonation morpheme in French, on the other hand, has become underspecified, therefore allowing the licensing of *wh*-questions as well.

Comparing the [Q : y/n] value of the root intonational Q-morpheme in English with the underspecified [Q :] value of the French root intonational Q-morpheme on the one hand, and the [Q : y/n] value of the French embedded Q-morpheme *si* with the underspecified [Q :] value of the Portuguese *se*, it appears that underspecified Q-morphemes originate as [y/n] markers and they gradually become underspecified and thus can license *wh*-elements. This generalization is further supported by the behavior of the embedded Q-morpheme *of* in the different dialects of Dutch. In Standard Dutch and many dialects, *of* functions as an embedded yes/no morpheme and does not appear in embedded *wh*-interrogatives. However, there is at least one dialect of Dutch (Northern) in which *of* appears in both yes/no embedded questions and *wh*-questions, triggering movement of the *wh*-element (see, e.g., Hoekstra & Zwart 1994).

- (27) a. Ik vroeg of je zou komen.
 'I asked whether you would be coming.'
 (Standard Dutch)
- b. Ik vroeg wie (*of) zou komen.
 I asked who Q would be coming
 (Standard Dutch)
- c. Ik vroeg wie of (dat) zou komen.
 I asked who Q that would be coming
 (Northern Dutch)

Let us recapitulate our results so far. French *wh*-in situ is triggered by a root intonational Q-morpheme. This morpheme is underspecified as [Q :], enabling it to license both root yes/no questions and root *wh*-questions. Furthermore, this morpheme is similar to the Chinese *wh*-morpheme in that it checks the Q-feature in C⁰, making overt movement of the *wh*-element unnecessary. The underspecified [Q :] morpheme has a "default" [Q : y/n] interpretation. In cases where a *wh*-word is in the scope of the Q-morpheme, the *wh*-feature of the *wh*-word moves at LF to set the value of the underspecified [Q :] morpheme to [Q : wh].

In view of the many facts discussed, we have provided an overview in table 1 that shows the various Q-morphemes discussed and their properties.

4. Some Further Issues

4.1. Bošković (1998)

Bošković (1998) proposes that French allows LF insertion of C⁰ with a strong [+wh] feature. This yields three immediate results:

Table 1

	French intonation	Chinese <i>wh</i> -particle	St. French <i>est-ce que</i>	Portuguese <i>se</i>	French <i>si</i>	St. Dutch <i>of</i>	N. Dutch <i>of</i>
Checks Q-feature in C ⁰	√	√		√	√	√	
Instantiates Q- feature in C ⁰			√				√
[Q :]	√		√	√			√
[Q : <i>wh</i>]		√					
[Q : <i>y/n</i>]					√	√	
Root scope	√	√	√				
Embedded scope		√		√	√	√	√
Island sensitive	√		√	√	√	√	√
<i>Wh</i> -word moves			√		N/A	N/A	√
Feature moves	√			√	N/A	N/A	

- (i) in overt syntax in French, the *wh*-word in a sentence such as (4a) does not move because there is no feature yet to attract the *wh*-word,
- (ii) no *wh*-in-situ is allowed in indirect questions because LF insertion of *wh*-feature can only be at the root level, and
- (iii) at LF, after the insertion of the feature, the *wh*-feature of the *wh*-word moves to check the C^0 .

Bošković (1998) further argues that the feature movement is subject to head-movement restriction. More specifically, feature movement is blocked by A' -heads. This thus rules out cases in which an in-situ *wh*-word appears in an embedded clause (20) and it can also account for (18a) involving negation.

However, Bošković (1998) fails in several respects. First, as we have pointed out, both the intonation and the interpretation of in-situ *wh*-questions differ from questions involving *wh*-movement. If C^0 is only inserted at LF, it is hard to account for the relation between yes/no intonation and *wh*-in-situ intonation. Further, the difference between *wh*-movement and *wh*-in-situ in French is that the former involves generalized pied-piping. It is not immediately obvious how the lack of generalized pied-piping would affect the interpretation in terms of presuppositional contexts. Lastly, we have shown that the restrictions on *wh*-feature movement cannot be solely accounted for by having intervening A' -heads (such as C^0 and Neg^0), because quantifiers and modals have the same effect, as Chang (1997) has shown.

4.2. *Other types of wh-in-situ?*

Now consider another type of in-situ *wh*-question in French. These in-situ *wh*-questions differ from the in-situ questions such as (4a) in three respects:

- (i) the *wh*-words are not bare but are suffixed with *ça* (28),
- (ii) *wh-ça* cannot undergo movement (29a,b), and
- (iii) *wh-ça* questions require an answer from a contextually introduced set (i.e., D-linked). (*wh-ça* questions are not echo questions (30).)

(28) Tu as vu qui ça (cet après-midi)?
you have met who-that (this afternoon)

(29) a. * Qui ça as-tu vu?
who-that have-you met

b. * Qui ça est-ce que tu as vu?
who-that Q you have met

c. C'est qui ça que tu as vu?
(cleft sentence with *wh*-in-situ)

(30) a. A: Paul est parti de Paris vers 1800h.
Paul is left from Paris around 6:00 p.m.
'Paul left Paris around 6.00 p.m.'

- B: Et il arrive à Bruxelles quand ça exactement?
 and he arrives in Brussels when-that exactly
 'And he arrives in Brussels when exactly?'
- b. Context: Paul has invited some colleagues for dinner and his
 wife asks him:
 Tu as invité qui ça ce soir?
 you have invited who-that this evening

We will not discuss all the details connected to the *wh-ça* questions here. We would like to point out that *wh-ça* questions show that besides a morpheme that can check the Q-feature in C^0 , other factors may be operative in determining *wh*-in-situ. We have noted above that bare *wh*-in-situ questions appear to require yes/no intonation. This contrasts with the *wh-ça* questions, which do not require yes/no intonation, although they are compatible with it. The *wh-ça* elements appears to be the exact opposite of the *wh-the hell* elements in English: *wh-the hell* elements in English are required to move, whereas *wh-ça* elements in French are prohibited from moving.

- (31) a. What the hell did you buy?
 b. *Who bought what the hell?

Pesetsky (1987) shows that strongly non-D-linked *wh*-words such as *what the hell* must undergo movement whereas strongly D-linked *wh*-words do not undergo movement (see also Obenauer 1994). The French *wh-ça* can be considered to be the prime example of strongly D-linked *wh*-words. This D-linking property of *wh-ça* is probably related to the fact that the element *ça* 'that' occurs independently as a deictic pronoun in French.

However, it should also be noted that *wh-ça* questions show that syntactic restrictions play a role as well: the restrictions on typical *wh*-in-situ in French apply to *wh-ça* questions as well (i.e., the Chang 1997 facts). We will for now leave open the question of what forces a strongly D-linked *wh*-phrase such as *wh-ça* to be in situ. These examples may make clear, however, that the choice between *wh*-movement and *wh*-in situ in a language like French is strongly correlated with differences in interpretation that cannot be simply accounted for in terms of the strength of attraction or the moment of insertion of the Q-morpheme in C.

4.3. Optionality

So far, we have not touched on the question of optionality. In French, *wh*-words can undergo *wh*-movement or stay in situ. Given our analysis, optionality is only apparent. That is, it is not the case that *wh*-words optionally stay in situ or optionally undergo movement. Instead, the apparent optionality rests upon whether or not the yes/no intonation morpheme is in the numeration. If the yes/no intonation morpheme starts out in the numeration and is merged in C^0 , *wh*-word(s) in the sentence must remain in situ. If the intonation morpheme is not in

the numeration, movement must take place to check the Q-feature. The apparent optionality then simply is the result of different numerations. It should also be noted that the in-situ *wh*-questions have different interpretations from the *wh*-questions involving movement. Thus, it will also not fall within Reinhart's (1998) global economy.

This particular way of looking at optionality of *wh*-movement in French, however, leads to a potential problem in languages like Chinese. Recall that we assume that Chinese *wh*-questions involve a *wh*-particle, and the presence of the particle yields *wh*-in-situ just as the presence of a yes/no intonation morpheme yields *wh*-in-situ in French. The question that arises then is why Chinese does not allow for numerations without the *wh*-particle, leading to *wh*-movement.

This, we think, may relate to how *wh*-operators are introduced into the numeration. Following Tsai (1994b), we suggest that the Chinese *wh*-operators are pairs consisting of a *wh*-word and *wh*-particle whereas English/French *wh*-operators are single lexical elements. When *wh*-operators in Chinese are introduced into the numeration, the pair is introduced, yielding a co-existence relationship between the *wh*-word and a *wh*-particle and thereby ensuring that there is no overt *wh*-movement in Chinese.

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