Medial Wh- Words and Inversion Phenomena in Complex Questions: The Case of Canadian French Speakers Acquiring L2 English

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1. Introduction

Systematic non-target language behaviour in L2 acquisition is a widely attested phenomenon. Investigation of consistent error patterns is commonly used to draw generalizations about the acquisition process or to test different L2 models. One major challenge in such research is that L2 errors come from a variety of sources, including different feature configurations between the native and the target languages, morphological mismatches, and processing constraints, to name just a few. Generally, non-target utterances can be linked to some properties of the L1 or the L2. On rare occasions, however, such L2 utterances can be ungrammatical in both the native and the target language, yet typologically attested in other natural languages. This constitutes an obvious acquisition paradox: how can L2 learners 'know' something that does not exist in the L1 or the L2, but is typologically attested in other languages, of which they report no knowledge? The phenomenon I investigate in this paper, known as *medial wh-*, is an example of this paradox.

Medial wh- constructions are complex (bi-clausal) wh- questions in which an "extra" wh- word appears in the CP of the embedded clause. Such constructions are common in some varieties of German (also in Frisian, Afrikaans, Romani, Hindi, Hungarian, etc.). Medial wh- constructions can be divided into two types as illustrated in German (1)-(2). The first type is known as *wh- copying* because an exact copy of the matrix wh- word is pronounced in the CP of the embedded clause (1). The second type is called *wh-scope marking* (2); in this construction the contentful wh- word appears only in the CP of the embedded clause, while an expletive *what* is inserted in the matrix CP to mark scope[1].

(1) **Wen$_i$** denkt Tina **wen$_i$** die Demokraten t_i nominieren werden?[2]
    who thinks Tina **who** the Democrats   nominate   will
    'Who does Tina think the democrats will nominate?'

(2) **Was$_i$** denkt Tina **wen$_i$** die Demokraten t_i nominieren werden?
    what thinks Tina **who** the Democrats   nominate   will
    'Who does Tina think the democrats will nominate?'   (adapted from Schulz 2006)

Both *wh- copying* and *wh- scope marking* are not licensed in English, as indicated in (3) and (4) respectively. The grammatical equivalent of these medial wh- constructions is given in (5) where a

[1] There is a debate in the literature on whether the wh- element in the matrix clause is an inserted expletive or a phonological realization of a wh- feature that has moved to the specifier of the matrix CP. I do not take a specific stand on this issue, as it is not relevant to the discussion in this paper.
[2] Throughout this paper the *trace (t)* notation is used for convenience, even though *copy* notation can be applied to all the examples used, and is generally more appropriate for medial wh- constructions.

single contentful wh- phrase has undergone (successive cyclic) movement to the matrix CP, and the intermediate wh- copies have been deleted.

(3) *$\mathbf{Who_i}$ do you think $\mathbf{who_i}$ John kissed t_i?

(4) *$\mathbf{What_i}$ do you think $\mathbf{who_i}$ John kissed t_i?

(5) $\mathbf{Who_i}$ do you think t_i John kissed t_i?

Despite the fact that medial wh- constructions are ungrammatical in adult English, Thornton (1990) attested such sentences in elicited production experiments in child L1 English. Similar utterances have also been observed in the L1 acquisition of other languages where medial wh- is not part of the adult grammar. These include Dutch (van Kampen, 1997), French (Oiry, 2002; Oiry and Demirdache, 2006), Spanish (Gutierrez, 2004a; 2006) and Basque (Gutierrez, 2004b). More recently, medial wh- has been reported in the L2 acquisition literature as well: Okawara (2000), Wakabayashi and Okawara (2003), Yamane (2003) and Schulz (2006) attested medial wh- in the L2 English of Japanese speakers; and Gutierrez (2005) observed medial wh- utterances in the L2 English of Spanish/Basque bilinguals[3]. Crucially, in all these cases, medial wh- structures are unavailable in both the L1 and the L2.

In terms of the acquisition paradox mentioned above, and working within a generative framework, it is tempting to evoke Universal Grammar in proposing an explanation for medial wh- constructions in language acquisition. It can be argued that since medial wh- is attested in a number of natural languages, it represents a valid option in UG; this option is available and can be selected in the acquisition process regardless of whether it is licensed or not in the target language; eventually, medial wh- utterances disappear from the target language, if they are not part of its grammar, due to indirect negative input (i.e. medial wh- utterances are absent in the input). Such a scenario can in principle apply to both first and second language acquisition, and a version of it has been proposed by some of the authors mentioned above (but see, for example, Schulz (2006) for a different account).

While the assumption that UG plays a crucial role in L1 acquisition is well-established, it is subject to much more controversy in L2 acquisition. Some researchers believe in partial or full access to UG in L2 learning (e.g. White 1985b, 1989, 2003; Schwartz and Sprouse 1996; Flynn 1987, Epstein, Flynn and Martohardjono 1996; among others), while others claim that the mechanisms involved in L1 and L2 acquisition are entirely different and UG has no role in the latter (e.g. Bley-Vroman 1990; Bates and MacWhinney 1989; among others). The issue of whether L2 acquisition involves access to UG is confounded by the high number of additional variables involved. Age of exposure, L1 transfer, length of instruction, type of acquisition setting, and motivation are just a few of the many factors that distinguish L2 from L1 acquisition. Furthermore, the different degrees of success in language learning as well as the greater variability generally attested in L2 studies, compared to L1 studies, make the task of providing empirical support for or against access to UG in L2 even more challenging.

The main goal of this paper is to provide new empirical data and discussion relevant to the issues outlined above. In particular, I demonstrate that medial wh- is attested in the interlanguage of (Canadian) French speakers acquiring L2 English. A crucial question that I ask is whether medial wh- in the interlanguage of these speakers represents a *direct* or an *indirect dependency*. The *direct dependency* [$_{cp}$ wh_i-… [$_{cp}$ wh_i-…t_i]] constitutes a complex (bi-clausal) question with long-distance (LD) wh- movement. In this case, pronouncing an intermediate wh- word in the embedded clause is indeed ungrammatical in both the L1 (French) and the L2 (English); therefore, this scenario is of great interest with regards to the L2 acquisition paradox discussed above. On the other hand, the *indirect dependency* [$_{cp}$ wh-$_i$… t_i] [$_{cp}$ wh-$_j$… t_j] constitutes two independent local movements, which amounts to two sequential questions with two separate wh- phrases (6)-(7).

(6) $\mathbf{Who}$ do you think … $\mathbf{who}$ did John kiss?

(7) $\mathbf{What}$ do you think? $\mathbf{Who}$ did John kiss?

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[3] Schulz (2006) also attests medial wh- structures in the English interlanguage of German speakers. However, these data do not bear relevance to the acquisition paradox described above since this is a case in which medial wh-constructions are licensed in the L1 grammar, and can therefore be transferred into L2 English.

Such utterances are attested in both the L1 and the L2, and therefore do not bear relevance to the acquisition paradox. However, they are still of interest as it could be argued that L2 learners go through a stage where they favour sequential questions and avoid long-distance movement because the latter is a more complex syntactic operation and is more difficult to process.

With this background in mind, the rest of the paper is organized as follows: in the next section I provide a brief overview of the literature on medial wh- in first and second language acquisition, and in natural languages in which medial wh- is a target option. In section 3, I outline the specifics of the present study and its results. In section 4, I offer general discussion and concluding remarks.

2. Background
2.1. Medial Wh- in L1 Acquisition

Thornton (1990) pioneered the research on medial wh- in L1 acquisition. In an elicited production experiment originally designed to test for *that*-trace phenomena, she found children producing both wh-copying and wh- scope marking constructions in subject, object and adjunct extractions in L1 English. Furthermore, she attested utterances with overt complementizer *that* in subject extractions, which are ungrammatical in the adult grammar as well (8).

(8) ***Who** do you think **that's** in the box?

Since Thornton found non-adult structures with medial wh- (3)-(4) and with overt complementizer *that* (8) in identical contexts and the two phenomena never co-occurred, she proposed a unified syntactic account for them. She assumed that the intermediate wh- word is misanalysed by the children as a complementizer and that it appears as the head of the embedded CP (just as the complementizer *that*). The analysis is grounded in Rizzi's (1990) proposal whereby complementizers in different languages may agree overtly or covertly with their specifiers. An example of overt agreement (limited only to subject extractions) is the *que/qui* alternation in French (9).

(9) a. *Qui crois-tu*   *qu'est (= que est) parti?*
      who believe you **that** is   left
      'Who do you think left?'

    b. *Qui crois-tu*   *qui est parti?*
      who believe you **that** is left
      'Who do you think left?'

As illustrated above, the complementizer *que* (9a) must change to *qui* (9b) when the wh- phrase is extracted from subject position[4]. Rizzi (1990) proposes that this is an example of specifier-head agreement; that is, the complementizer in C^0 agrees with the trace of the wh- phrase which has moved through the Spec CP position of the embedded clause (10).

(10) $[_{CP}$ qui $_i$ ... $[_{CP}$ t_i $[_C$ qui $[_{IP}$ t_i ...]]]].

            spec-head
            agreement

According to Rizzi, an equivalent agreement process applies to English, although it is not expressed overtly (i.e. the complementizer is phonologically null). To return to the medial wh- utterances observed by Thornton, the proposal is that children who produce them have not realized that in English complementizer agreement is covert. Thus Thornton assumes that the medial wh- words are

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[4] Incidentally, the wh- word and the complementizer are homophonous in this case. This fact will be discussed further later on in the paper.

complementizers agreeing with the traces of wh- phrases in the specifier of CP[5]. A key point that Thornton makes is that children's productions may be ungrammatical in the target language, but they are still available options in Universal Grammar. That is, even if they misanalyse wh- words as agreeing complementizers, their conjectures about their L1 grammar are consistent with the principles of UG.

Apart from child L1 English, medial wh- has been attested in the acquisition of other L1s. Van Kampen (1997) reports on two children acquiring Dutch as a first language who produced medial wh-utterances both spontaneously and in elicited production. Oiry and Demirdache (2006) attested what they claimed to be equivalent medial wh- in child L1 French, and Gutierrez (2004a, b) observed similar utterances in child L1 Basque and Spanish.

Overall, medial wh- utterances have become a well-documented phenomenon in child language acquisition. Either wh- copying or wh- scope marking, or both, have been attested in the L1 acquisition of English, Dutch, French, Spanish and Basque. Although the data are subject to some variation, in all cases the researchers argue that medial wh- is an instantiation of children's access to UG in the process of acquisition. That is, since medial wh- constructions are not available in the target languages discussed, and are thus not part of the input, the children have no way of 'knowing' them unless they resort to UG. Eventually, the medial wh- constructions disappear from the children's grammar, as they are not part of the input.

2.2. Medial Wh- in L2 acquisition

The literature on medial wh- phenomena in L2 acquisition is much more recent and still relatively limited. All studies to date focus on English as a second language, although the L1 backgrounds of the participants differ. Yamane (2003) attested medial wh- questions in the L2 English of Japanese speakers. She administered an oral translation task and an acceptability judgment task to low-level L2 learners. The results showed that some learners consistently produced and accepted medial wh-constructions while others did so only occasionally. Wakabayashi and Okawara (2003) also investigated the presence of medial wh- phenomena in the L2 English of Japanese speakers. They used an adaptation of Thornton's oral elicitation task and reported four different types of non-target productions. These involved medial wh- of the scope marking type without and with inversion (T-to-C movement) in the embedded clause (11)-(12); lack of wh- word in the embedded clause, but presence of inversion (13); and lack of a wh- word in the matrix clause (14).

(11) **What** do you think **who** loved Mr. Yellow?

(12) **What** do you think **who did** he love?

(13) **Who** do you think **did** Mr. Yellow kiss?

(14) Do you think **what** is in the bag?

These results differ from the L1 data originally reported by Thornton in several respects. On the one hand, no structures with wh- copying nor overt complementizer *that* in subject extraction questions were produced by the Japanese participants. On the other hand, questions like (13)-(14) were not attested in Thornton's child L1 English data. However, all of these non-target structures are consistent with UG principles and their equivalents are attested in natural languages.

Another study that attested medial wh- constructions in L2 English was carried out by Gutierrez (2005). Similarly to Wakabayashi and Okawara (2003), Gutierrez used an adaptation of Thornton's experimental task to elicit complex questions. She attested productions of both the wh- copying and the wh- scope marking constructions in the interlanguage of a relatively small subset of the participants. However, the rate of occurrence of medial wh- constructions was high enough to make these utterances a robust phenomenon in the L2 English of Spanish/Basque bilinguals.

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[5] Note that this analysis applies to the wh- copying construction only. Thornton does not analyse wh- scope marking, which was also attested in her data, as long-distance movement.

Finally, Schulz (2006) also reported on medial wh- constructions in L2 English. She focused exclusively on wh- scope marking and tested two different populations: one with German L1 and one with Japanese L1. Schulz administered three different tasks in order to show that medial wh- is indeed a robust phenomenon in the interlanguage of her participants, and not merely an effect produced or exaggerated by a specific task. The three tasks were an oral elicitation experiment adapted from Thornton (1990), a grammaticality judgment task, and an on-line self-paced reading task. Using these three techniques, Schulz was able to attest wh- scope marking utterances in both the Japanese and the German populations.

2.3. Medial Wh- in Natural Languages

One of the main sources of contention in the literature on medial wh- (in particular wh- scope marking) in natural languages is the nature of the dependency: *direct* versus *indirect*. Under the *direct dependency approach*, there is a direct relationship between the wh- phrase in the embedded clause and the scope marker in the matrix. Proposals following this general line of reasoning have been made for German by van Riemsdjik (1982), McDaniel (1989), Müller (1997), Cheng, (2000), Sabel (2000a, 2000b); for Hungarian by Marácz (1990) and Brody (1995); and for Hindi by Mahajan (1990). In all these analyses, the wh- element in the matrix clause is a true expletive that serves the purpose of marking scope and typing the clause as interrogative. Depending on the specific analysis, this expletive scope marker may be: a) inserted directly in the specifier of the matrix CP and form a chain with the contentful wh- phrase at some level, b) replaced by the contentful wh- phrase at LF, or c) represent a feature separated from the wh- phrase and moved up to the matrix Spec CP.

On the other hand, the *indirect dependency approach*, represented by Dayal (1994, 1996, 2000), among others, assumes that the wh- element in the matrix CP is not a vacuous scope marker, but a contentful argumental wh- phrase. The analysis is based on data from Hindi (15), although Dayal claims that it applies cross-linguistically.

(15) *Jaun **kyaa** soctaa hai ki   merii **kis-se**   baat karegii?*
      Juan what think-PR   that Mary who-INS   talk do-FUT
      'Who does John think Mary will talk to?'

Note that Hindi is a wh- in situ SOV language and both wh- words in the example above appear in object position in their respective clauses. The wh- phrase *kyaa* 'what' in the first clause quantifies over propositions to which John is in a *think* relationship; the wh- phrase *kisse* 'who' is a question over individuals. Essentially under the indirect dependency approach, there are contentful wh- phrases in both clauses, which are interpreted as two independent questions in their own right. In English, this would be equivalent to two sequential questions: *What does John think?... Who will Mary talk to?*

The debates between the proponents of the indirect and the direct dependency approaches in the literature on medial wh- in natural languages remain beyond the scope of this paper. The key point is that the direct dependency roughly corresponds to long-distance successive cyclic movement $[_{cp} wh\text{-}_i \ldots$ $[_{cp} wh\text{-}_i \ldots t_i]]$ while the indirect one corresponds to two independent local movements as in sequential questions $[_{cp} wh\text{-}_i \ldots t_i]$ $[_{cp} wh\text{-}_j \ldots t_j]$. The distinction between these two approaches is of crucial importance to the study described below.

3. The Study
3.1. Research Questions

The research questions of this study were designed to both confirm some previous findings and address some outstanding issues in the L2 literature described above. Considering that so far there have been only a handful of studies attesting medial wh- utterances in L2 English, one of the main goals of the present study was to confirm that medial wh- is indeed a robust phenomenon that occurs in the interlanguage of L2 speakers with various L1 backgrounds. This poses the main research question laid out below.

R1. Can medial wh- be attested in the L2 English of (Canadian) French speakers?

Based on the fact that medial wh- has been attested in the English interlanguage of Japanese speakers as well as Spanish/Basque bilinguals, I hypothesised that it would also be attested in the interlanguage of French speakers. The rest of the research questions are based on this assumption.

R2. If attested, can medial wh- co-occur with overt complementizer *that*?

This second research question aims to determine whether Thornton's (1990) analysis of medial wh-utterances in child L1 English can also apply to L2 English. Recall that in her data medial wh- words never co-occurred with complementizer *that*; thus she proposed that the medial wh- words attested in children's utterances are in fact misanalysed as complementizers. If the same applied in the case of L2 speakers of English, the prediction would be that utterances containing both a medial wh- word and overt complementizer *that* would not be attested. On the other hand, if utterances where a medial wh-word and complementizer *that* co-occur were to be attested in the interlanguage of the L2 learners, this would provide evidence against applying Thornton's analysis to L2 English.

The next research question addresses the nature of the dependency. Recall that medial wh-utterances can be analysed as either a direct (i.e. long-distance movement) or as an indirect (two independent local movements or sequential questions) dependency.

R3. If attested, does medial wh- constitute a direct or an indirect dependency?

This question is crucial in determining whether a medial wh- utterance is indeed an instantiation of the acquisition paradox discussed earlier. If medial wh- is attested in the interlanguage of the L2 learners and it represents a direct dependency, the learners would be relying on a syntactic configuration unavailable in both the L1 (French) and the L2 (English). On the other hand, if medial wh- is attested in the interlanguage of these learners and is found to represent sequential questions, then the syntactic configuration in question is available in both the L1 and the L2 and poses no challenge to acquisition.

As Schulz (2006) points out, most L2 studies assume that medial wh- represents a direct dependency but do not explicitly test for it. The way generally used to distinguish between a true long-distance question and two sequential questions is by looking at inversion patterns in the embedded clause. If there is inversion in the embedded clause, then the utterance is considered to represent two sequential questions. Conversely, if there is no inversion in the embedded clause, the utterance is considered to represent a direct dependency. This diagnostic, however, can be used reliably only if the study controls for the participants' knowledge of inversion. In other words, if the participants have not acquired T-to-C movement, then an utterance which contains no inversion in the embedded clause could actually be an instance of two sequential questions (16).

(16) Who you think … who John kissed?

Since previous L2 studies use mostly spoken tasks and some of the L2 utterances reported in the literature are similar to (16), the question arises as to whether they really represent a direct dependency. As will become clear below, the present study explicitly controls for the participants knowledge of T-to-C movement in both embedded and matrix clauses and as such offers a reliable way of addressing R3.

The last research question aims to find out which type of medial wh- might be attested in the interlanguage of this particular learner population.

R4. If attested, is medial wh- of the wh- copy or the wh- scope marking type?

The limited L2 literature to date indicates that wh- scope marking is attested more often than wh-copying. Thus, the goal of *R4* is to confirm or reject this pattern. If such a pattern is confirmed, it would subsequently require a formal explanation (which remains beyond the scope of this paper).

3.2. Participants

The study is part of a larger ongoing project which tests about 200 participants and involves several different experimental tasks and different L1 backgrounds. Here I report on 47 Francophone learners of

L2 English who were at the intermediate level at the time of testing. These participants were enrolled in a five-week intensive ESL program at the Centre linguistique du Collège de Jonquière in Ottawa, Ontario. They were recruited to take part in the study as volunteers and were given a certificate of participation from the Language Acquisition Laboratory of the University of Ottawa. In addition to the L2 participants, there was also a control group of 20 native speakers of North American English. As expected, the native speakers' performance on the experimental task described below was close to 100%, so their results are not discussed further. It suffices to say that they provide a steady baseline for comparison with the L2 participants.

3.3. Materials and Procedures
3.3.1. Placement Test

At the beginning of the project, a placement test was administered by the ESL program. Based on the results of this test, the participants were divided into high beginner, intermediate and advanced groups. As mentioned in the previous section, this paper focuses on the group of learners at the intermediate level. Note, however, that the level of performance on the experimental task described below increased with the level of proficiency determined by the ESL program. This provides an independent measure of the validity of the initial placement administered by the program.

3.3.2. Language Background Questionnaire

In addition to the placement test, the participants were given a language background questionnaire designed by the Language Acquisition Laboratory of the University of Ottawa. The purpose of the questionnaire was to determine the level and context of exposure to the L2 prior to participation in the study. It also asked the participants to report their native language(s) and knowledge of other foreign languages. The results of the questionnaire were used in deciding which participants to exclude from the study (e.g. due an L1 other than French, more than one L1, etc.). The 47 intermediate participants on which this paper focuses were between 15 and 18 years old at the time of testing. They reported between 5 and 12 years of prior ESL instruction (mainly in school setting) and limited or no previous immersion in English environment (i.e. no or only short-term residence in English-speaking parts of Canada or other English-speaking countries).

3.3.3. Experimental Task

The experimental task that I report on in this paper is a written multiple-choice grammaticality judgement test which contains a total of 40 items: 16 experimental items, 8 control items, and 16 fillers[6]. These are summarized in table 1.

Table 1. Grammaticality judgment task: types and number of items

Type of Item	No. of items
Condition 1: *Basic* (Complex question)	8 (4 wh- copy + 4 wh- scope marking)
Condition 2: *Complementizer* (Complex question)	8 (4 wh- copy + 4 wh- scope marking)
Control (Simple question)	8
Filler (Declarative)	8
Filler (Complex question)	8
Total:	**40**

All items were introduced by a brief story of about 3 sentences in order to provide context and to prevent the task from becoming mechanical. Each story was also accompanied by a picture to provide further context and to facilitate comprehension. All items contained four choices: *A*, *B*, *C* and *D*. Both the items and the four choices contained within them were randomized. The items were matched for relative length within each type (matching across types would be unnatural since a simple question is

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[6] Of the 16 items classified as fillers, 8 were actually complex questions for an experimental condition that I do not discuss in this paper.

typically shorter than a complex one). The participants were instructed to choose the one correct choice (*A, B, C,* or *D*) for each item.

The four choices in the two experimental conditions represent four different options for an embedded clause. *Choice A* is the target utterance (i.e. the grammatical option in Standard English); *Choice B* contains subject auxiliary inversion (T-to-C movement) in the embedded clause[7]; *Choice C* contains medial wh- in the embedded clause; and *Choice D* contains both medial wh- and embedded inversion. These four choices are summarized in Table 2.

Table 2. Multiple-choice options in conditions 1 and 2

Choice	Embedded clause	Grammaticality in Standard English
A	[–] medial wh-, [–] embedded inversion	grammatical
B	[–] medial wh-, [+] embedded inversion	ungrammatical
C	[+] medial wh-, [–] embedded inversion	ungrammatical
D	[+] medial wh-, [+] embedded inversion	ungrammatical

A sample item from conditions 1 and 2 is given below. The only difference between the *basic condition* (17) and the *complementizer condition* (18) is that in the latter the embedded clause is introduced by overt complementizer *that*. Note that the basic condition is the unmarked one as it does not contain an overt complementizer.

Condition 1: Basic

(17) Sam likes to eat sweet things. Ten minutes ago he was eating a chocolate bar. Five minutes ago he was eating an ice-cream. Two minutes ago he was eating a piece of cake.

What do you think _____ right now?
- A. √ he is eating
- B. is he eating
- C. what he is eating
- D. what is he eating

Condition 2: Complementizer

(18) Anna and Martin want to buy a house in Ottawa. But they are not sure when to buy it. They are asking a real estate agent for advice.

When do you recommend _____ a house in Ottawa?
- A. √ that we should buy
- B. that should we buy
- C. that when we should buy
- D. that when should we buy

To return to the research questions outlined earlier, both experimental conditions test for *R1*. Answers containing *Choice C [+] medial wh-, [–] embedded inversion* or *Choice D [+] medial wh-, [+] embedded inversion* would attest medial wh- constructions in the interlanguage of French Canadian speakers of L2 English. As for *R2*, condition 2 provides a context in which an overt complementizer and medial wh- co-occur, and allows to determine whether Thornton's (1990) account for child L1 English can be applied to L2 English. The third research question, testing for the distinction between the direct and the indirect dependency, is addressed in the difference between *Choice C* and *Choice D* in both conditions. That is, the *[–] embedded inversion* specification of *Choice C* points to a direct dependency while the *[+] embedded inversion* specification of *Choice D* points to an indirect one (see also control item below for more on inversion). Finally, R4 is addressed in both the basic and the

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[7] Note that subject auxiliary inversion in the embedded clause can be grammatical in some varieties of English (e.g. Belfast English, etc.). For extensive discussion see McCloskey (2006).

complementizer conditions as half of the items in each of the two conditions are of the wh- copying type and the other half of the wh- scope marking type[8].

As indicated in Table 2, the experimental task also contains 8 control items. These are simple (mono-clausal) questions which were included to control for knowledge of inversion in matrix clauses. A sample control item is provided in (19). It contains one grammatical choice with subject auxiliary inversion (*A*) and three ungrammatical options without inversion (*B, C,* and *D*).

Control Item (Simple question)

(19) Barb is a teacher. She is not happy with her students. She thinks they are learning very slowly and always complaining. She is asking her colleagues:

Why _____ the material so slowly?
A. √ are students learning
B. students learns
C. students learn
D. students are learning

As mentioned earlier, controlling for knowledge of inversion in matrix clauses is crucial in terms of providing a reliable answer to *R3*. That is, presence or absence of inversion in the embedded clause can be used as a diagnostic for the nature of the wh- dependency (long-distance vs. sequential questions) only if matrix and embedded inversion patterns for each participant can be juxtaposed.

Finally, a sample filler item is given in (20). Unlike the rest of the items, the fillers were declaratives in order to introduce variety in the task. They were also always biclausal in order to match the experimental items in relative length and complexity.

Filler Item

(20) Ten years ago Jessica Johannes was killed in a nearby park. The police have finally captured the criminal.

The police captured the criminal _____ Jessica Johannes 10 years ago.
A. √ that murdered
B. that murders
C. that murder
D. that he murdered

As illustrated in (20), the fillers contained a target utterance (*A*) and three ungrammatical utterances (*B, C* and *D*) involving tense and agreement errors and resumptive pronouns.

The experimental task was presented visually using a multimedia projector. The stories and the accompanying pictures for each item were introduced first, followed by the multiple-choice item on the next screen. The stories were also accompanied by a recording of a native speaker of English, so that the participants would have both aural and visual input at the same time. The participants were provided with an answer sheet and had between 30 and 40 seconds for each item depending on its length and complexity (i.e. simple vs. complex questions). To warn the participants that an item was about to disappear from the screen, an animated *NEXT* sign appeared accompanied by a beep. The sign remained for 4 seconds before the next story would appear. The entire task took about 35 minutes.

3.4. Results

The experiment was successful in attesting medial wh- constructions in the interlanguage of this population. As figure 1 illustrates, a total of 14% of the responses represented medial wh- (*choices C* and *D* combined). As such, the data provide an affirmative answer to *R1* and add support to previous findings in the L2 literature on medial wh-. In this respect, the main contribution of the present study amounts to adding learners with a new L1 background, French, to the pool of L2 English speakers who accept as grammatical and/or produce medial wh- constructions (recall the above discussion of speakers
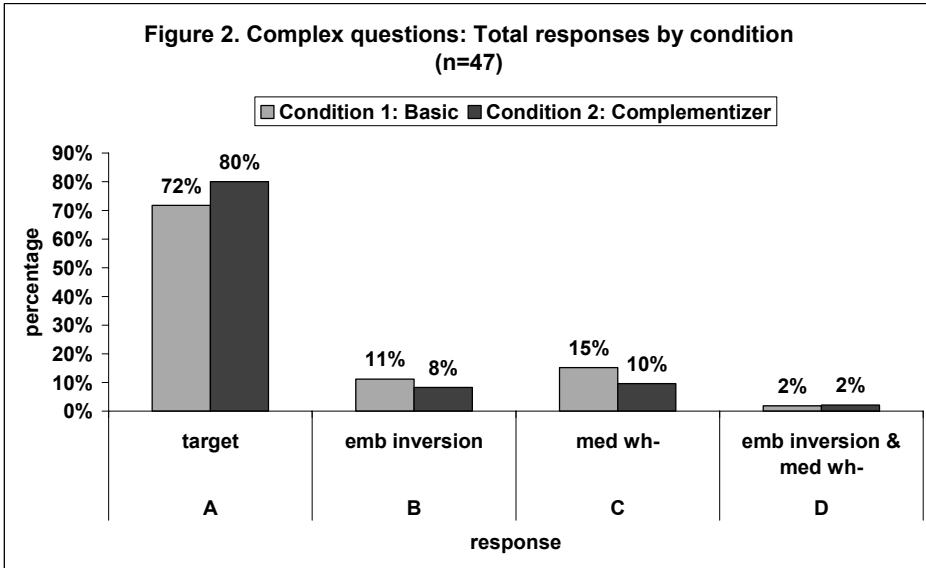
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[8] Due to limited space the sample experimental items provided in this paper are of the wh- copying type only.

with Japanese, Spanish/Basque and German L1 backgrounds). The fact that medial wh- constructions in L2 English at this point has been attested in the interlanguage of learners with several typologically different L1s suggests that such constructions may represent a stage in (English) L2 acquisition regardless of the learners' native language. At the very least, it indicates that such constructions merit greater attention in L2 research than they have received so far.

Figure 1. Complex questions: Total responses (n=47)
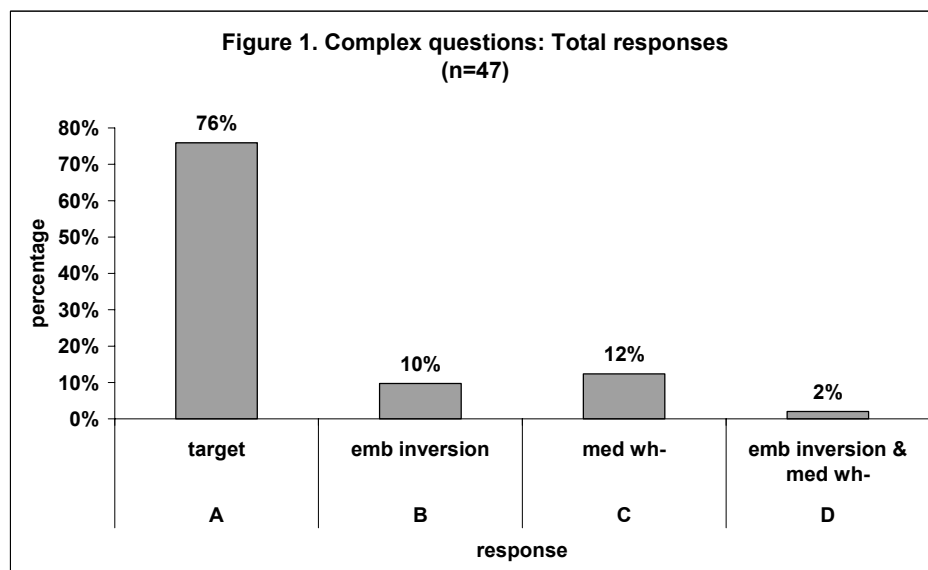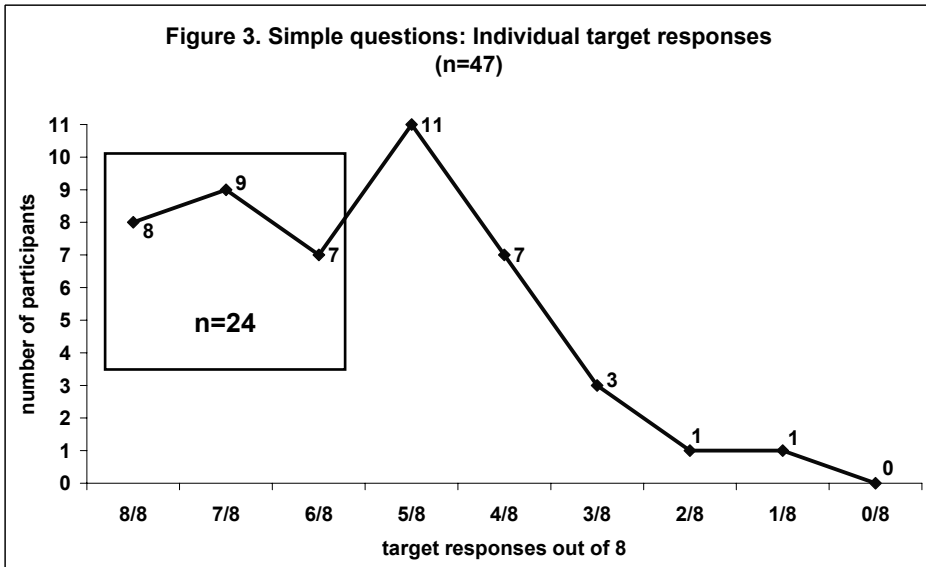

Another interesting fact that figure 1 indicates is that the overwhelming majority of responses represents the target utterance (76%). This shows that learners at this level have for the most part acquired the target representation of complex questions in English. However, the data show that this is not the only representation in their interlanguage grammar. Both *[+] medial wh-, [–] embedded inversion* (*Choice C*) and *[–] medial wh-, [+] embedded inversion* (*Choice B*) constitute competing representations that co-exist with the target one. At this point the question arises as to whether the two non-target representations disappear or continue to exist in the L2 grammar at a later stage of acquisition. Data from a pool of advanced learners (which I do not discuss in this paper) show that the two non-target representations do disappear as proficiency increases. Finally, note that the rate of acceptance of *[+] medial wh-, [+] embedded inversion* (*Choice D*) is at a negligibly low level. This indicates that the participants do not favour the sequential question configuration (see below for further discussion).

Turning to *R2*, the question regarding the co-occurrence of medial wh- and complementizer *that*, a comparison between the *basic* and the *complementizer* conditions is provided in figure 2. The data indicates that medial wh- can co-occur with an overt complementizer in the interlanguage of this learner population, although at a lower rate. A logistic regression revealed that the difference in the percentage of responses containing *Choice C* in condition 2 (10%) and condition 1 (15%) is significant ($p<0.05$). These results carry a mixed message with regards to extrapolating Thornton's (1990) account of medial wh- in child L1 English to L2 English. On the one hand, the L2 learners do exhibit a sensitivity to the presence of an overt complementizer and accept medial wh- in this context to a lower extent. This shows that Thornton's (1990) original proposal can explain the L2 data to a certain degree. On the other hand, however, if Thornton's account were to apply fully, we would expect the responses containing *Choice C* (medial wh-) in the condition 2 to be close to zero. That is, if the participants misanalysed medial wh- words as complementizers across the board, they should not have accepted utterances containing both a medial wh- word and a complementizer at all. As such, the precise syntactic status of medial wh- words in L2 English remains ambiguous and should be further clarified in future research.

Figure 2. Complex questions: Total responses by condition (n=47)

□ Condition 1: Basic   ■ Condition 2: Complementizer

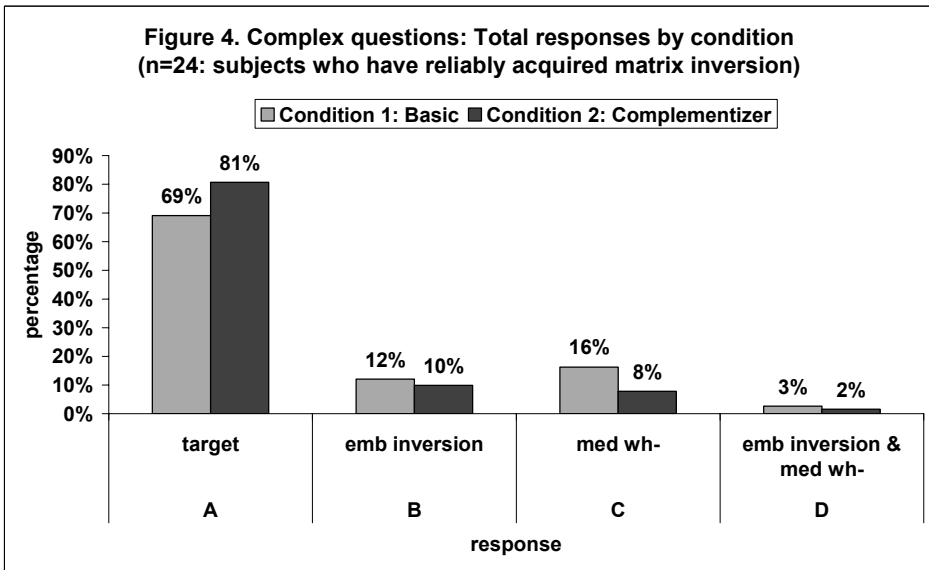| response	Condition 1: Basic	Condition 2: Complementizer
target (A)	72%	80%
emb inversion (B)	11%	8%
med wh- (C)	15%	10%
emb inversion & med wh- (D)	2%	2%

The third research question posed by this study addresses the nature of the wh- dependency in medial wh- utterances. It was noted that *Choice C* responses constitute evidence for a direct dependency due to their *[+] medial wh-, [–] embedded inversion specification*, while *Choice D* responses represent an indirect dependency as they are *[+] medial wh-, [+] embedded inversion*. As both figures 1 and 2 indicate, the rate of *Choice C* responses is much higher than the rate of *Choice D* responses. The latter is in fact at a low enough level to be considered noise. This suggests that the medial wh- constructions attested are an instantiation of a direct dependency. Such results are of great interest as they represent an acquisition paradox. However, as already mentioned, presence or absence of embedded inversion (i.e. *Choice C* vs. *Choice D*) can be a reliable diagnostic for the nature of the dependency, only if the participants' knowledge of inversion in matrix clauses is controlled for. The results for the 8 control items of the task are given in figure 3.

Figure 3. Simple questions: Individual target responses (n=47)

| target responses out of 8	number of participants
8/8	8
7/8	9
6/8	7
5/8	11
4/8	7
3/8	3
2/8	1
1/8	1
0/8	0

n=24

As figure 3 indicates, the majority of the participants chose the target response on simple questions at a very high rate. However, to ensure that a participant had reliably acquired the target inversion rule in simple questions, it was decided that he or she had to have achieved a score of at least 6 out of 8 correct responses on the control items (i.e. 75% correct or higher). About half of the participants (24 out of 47)

met this criterion, as indicated by the box in figure 3. The rest were excluded at this point and the analysis of complex questions was re-run. These results are given in figure 4.

Figure 4. Complex questions: Total responses by condition (n=24: subjects who have reliably acquired matrix inversion)

□ Condition 1: Basic ■ Condition 2: Complementizer

response		
target — A	69% / 81%	
emb inversion — B	12% / 10%	
med wh- — C	16% / 8%	
emb inversion & med wh- — D	3% / 2%	

As figure 4 indicates, the pattern of responses with the subset of participants who have reliably acquired T-to-C movement in L2 English is the same as the pattern displayed by the larger group. At this point it can be said with confidence that the absence or presence of embedded inversion in medial wh-utterances (*Choice C* vs. *Choice D*) is a valid diagnostic of the nature of the wh- dependency and that almost all medial wh- responses represent a direct dependency. By this token, the medial wh-constructions attested are indeed ungrammatical in both the L1 and the L2 and represent an acquisition paradox. The possible source of such constructions will be discussed in more detail in the next section.

Finally, recall that R4 was concerned with the type of medial wh- construction (wh- copying vs. wh- scope marking). Figure 5 shows these results for the original group of 47 participants[9].

Figure 5. Total medial wh- constructions: Wh- copy vs. wh- scope (n=47)

response	
total wh- copy	33%
total wh- scope marking	67%

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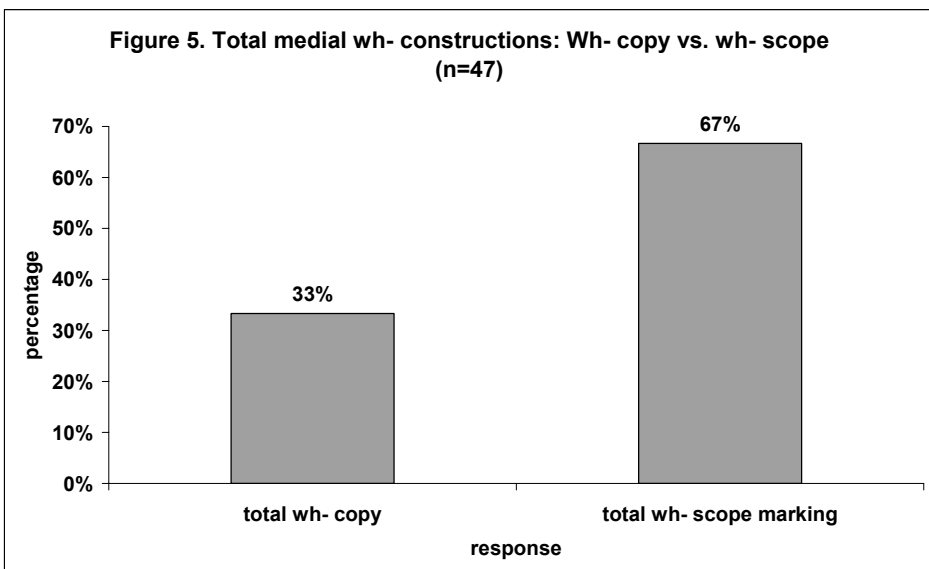
[9] Note that excluding participants with lower scores on the control items is only necessary in addressing *R3*.

As the data indicate, there is an asymmetry in the distribution of wh- copying versus wh- scope marking. The strong preference for wh- scope marking over wh- copying confirms the pattern suggested by previous L2 studies. This fact requires an explanation which can be sought in the frequency distribution of the two constructions in natural languages where wh- scope marking and wh- copying are licensed in the adult grammar. Without being aware of any cross-linguistic distributional surveys of the two constructions, it seems that wh- copying occurs less frequently than wh- scope marking. Thus, I will propose informally that the distributional properties of medial wh- constructions in L2 acquisition mirror the distributional properties of such structures in natural languages. An alternative explanation for the above asymmetry can be sought in processing or grammatical constraints. However, a more in-depth inquiry of this issue remains beyond the scope of this paper.

4. Discussion and Conclusion

The goal of this study was to explore a construction which had not been reported in the L2 English of French speakers before. Thus, the key finding is that medial wh- constructions are systematically accepted by this speaker population and constitute a competing representation to target wh- questions in complex sentences. A second key finding of the study is that the medial wh- constructions attested constitute a direct dependency. As such, they are ungrammatical in both the L1 and the L2 and pose an acquisition paradox. That is, since they are absent from the native grammar and not part of the target input, the source of such constructions constitutes a puzzle.

Three potential explanations can be offered with regards to this phenomenon. The first one is in terms of L1 transfer. Even though medial wh- is ungrammatical in the L1, it is possible that the learners confuse French complementizers *qui/que* with wh- words in English. Note that these complementizers in French are homophonous with the wh- words *who* (*qui*) and *what* (*que*), which makes an explanation in terms of L1 transfer (21) quite plausible, and potentially trivializes the acquisition paradox.

(21) **Que**   penses-tu   **que**   j'ai   acheté ?
    what   think-you   **that**   I have   bought

↓ *COMP TO MED WH- TRANSFER*

"*__What__ do you think **what** I bought"
    Intended utterance: "What do you think **that** I bought?"

Arguing that the medial wh- word results from L1 transfer of a French complementizer is also consistent with Thornton's (1990) account of medial wh- in child L1 English. Recall that Thornton claimed that children produce medial wh- utterances because they incorrectly categorize the wh- word as a complementizer. However, the results presented in figure 2 show evidence against such an explanation. That is, if the participants transferred a French complementizer as a medial wh- word in English, they should have consistently rejected *choices C and D* in condition 2, as these choices would contain two complementizers (*that* and a *medial wh- word*) on this analysis. Further evidence against the L1 transfer scenario comes from the fact that wh- adjuncts such as *where* and *when* are not homophonous with complementizers in French, yet they were accepted in medial wh- utterances even more often than wh- arguments such as *what* and *who*. In other words, if due to homophony in French the participants were transferring French complementizers into wh- words in English, these should only be *what* and *who*, which was not the case. For these reasons, the L1 transfer account does not offer a satisfactory explanation of the data.

A second potential explanation for the existence of medial wh- constructions can be sought in terms of processing. It could be that the participants are trying to shorten the long-distance wh-dependency in complex questions and thus select utterances with undeleted intermediate copies of the moved wh- words. Under this scenario, the extra wh- word in intermediate position would help bridge the two clauses and alleviate the processing burden, which, especially during earlier stages of acquisition, can be very high. This explanation is quite plausible in light of the fact that medial wh-seems to be a phenomenon that occurs during the early stages of acquisition and tends to disappear as acquisition progresses (i.e. the processing capacities of the learner increase). However, there are several factors, both in terms of the nature of the experimental technique and in terms of the results obtained, that point against a processing explanation. First, the experimental design of this study is more likely to

reflect the learners' grammatical competence rather than their processing profile. That is, an off-line task similar to standard grammaticality judgment tests is considered to be a measure of existing grammatical representations rather than processing. Furthermore, the participants had ample time to provide an answer to each item, which would alleviate the processing burden[10]. A second factor pointing against a processing account is the attested higher rate of wh- scope marking than wh- copying. Under a processing explanation it would be more plausible that an exact copy of the wh- word would be pronounced in an intermediate position in order to shorten the long-distance dependency. Scope marking, on the other hand, involves different wh- words in the matrix and the embedded clause. Thus, it is unclear how a processing account would explain the pronouncing of two distinct wh- elements without relying on the implicit syntactic knowledge of the learners.

The strongest piece of evidence against a processing analysis comes from the fact that the percentage of indirect medial wh- dependency responses (*Choice D*) was at a negligibly low level. If the learners accept medial wh- utterances as grammatical because the medial wh- element helps them shorten the long-distance dependency, then we would expect them to accept the indirect dependency (*Choice D*) much more often. In other words, the most logical way of shortening a long-distance dependency is to posit sequential questions which contain two local dependencies. Yet, the participants almost never chose this option as indicated by figures 1, 2 and 4. Finally, independent support against a processing account comes from Schulz (2006) who investigates wh- scope marking using an elicitation experiment in conjunction with an off-line and an on-line grammaticality judgment tasks. Her study was specifically designed to address the question of whether wh- scope marking in the L2 English of German L1 and Japanese L1 speakers is due to a processing effect. The conclusion she reached was that the phenomenon does not result from a processing deficit.

The third explanation of why medial wh- constructions are attested in the English interlanguage of French L1 speakers is in terms of access to UG. Recall that medial wh- constructions are ungrammatical in the L1 as well as the L2; they are not taught, nor are they part of the target input in any other way; they are attested in a number of natural languages, of which the participants report no knowledge; they appear in the L2 English of speakers with different L1 backgrounds (e.g. Japanese, Spanish/Basque and now French); and finally, they seem to be a phenomenon that the learners overcome in the later stages of acquisition. Taken together, all these factors are best explained by the idea that L2 learners have (at least partial) access to Universal Grammar. Under this account, medial wh- constructions are attested in L2 English because they represent a valid UG option. During the earlier stages of acquisition, the learners' grammar consists of a wide variety of competing representations which may not necessarily be part of the native or target language, but are licensed in other natural languages. As acquisition progresses, the L2 grammar becomes more restrictive and closer to the target. Learners with enough exposure to the L2 eventually start to exclude the non-target representations from their interlanguage and can identify the target ones with high accuracy. In other words, indirect negative input (or lack of medial wh- constructions in the input) is sufficient for the L2 learners to achieve the target representation of complex wh- questions in English.

In essence, a UG-based account of medial wh- constructions in the L2 English of French speakers is the only one that can resolve the acquisition paradox discussed in this paper. As such, this account best explains the data obtained in this study. Of course, UG-based accounts are often challenged in the L2 literature and thus more data, especially from production, are needed to provide further support for my proposal. In addition, a more specific syntactic implementation of wh- scope marking and wh- copying in L2 would be necessary to show the compatibility of the present data with UG. These logical extensions of the present study are currently in progress, and will be reported on in future work.

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[10] Even though the task was not self-paced (i.e. each item appeared on a screen for a limited time), the time allotted to each item was quite generous, and in fact some participants reported that they had to wait too long before the next item would appear.

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