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ABSTRACT

The two possible positions for *wh*-words (i.e., in situ or preposed) represent a long-standing area of research in French. The present study reports on statistical analyses of a new seminaturalistic corpus of child L1 French. The distribution of the *wh*-words is examined in relation to a new verb tripartition: Free *be* forms, the Fixed *be* form *c'est* 'it is', and Other Verbs. Results indicate that a discriminating variable is verb form (i.e., Free vs. Fixed), regardless of verb type (i.e., *be* vs. Other Verbs), and that there is a correlation between the *wh*-in-situ position and the Fixed *be* form. The Fixed *be* form is thus identified as the component that leads to *wh*-in-situ utterances, in contrast to other languages such as English. Overuse of the Fixed *be* form in child speech could also account for the predominance of *wh*-in-situ in child object questions compared to adjunct questions and child *wh*-questions in general compared to adult questions.

1. Introduction

Variation in *wh*-position is well documented in both adult and child Metropolitan French (i.e., the variety of French spoken in France). To control for geographic variation, we leave aside other varieties of French spoken throughout the world (in Belgium, Switzerland, Quebec, etc.), whose *wh*-questions are also the matter of much investigation (Boeckx, Stateva & Stepanov 2001; Starke 2001; Mathieu 2009; Tailleur 2014, among others). Sociolinguistic studies on the variability of the *wh*-position in adult Metropolitan French show very different distributions of the two potential positions (45.9%, 10.5%, and 16.1% for the in-situ position in Ashby 1977; Coveney 1995, 2002 respectively; see example (1a) in Section 1.1). In the same vein, naturalistic, child-directed data also display variable in-situ rates (38.1%, 51%, and 16.6% in Strik & Pérez-Leroux 2011; Geveler & Müller 2015; Becker & Gotowski 2015 respectively). Proportions in child corpora also differ. However, it is reported that French preschool children systematically produce more *wh*-in-situ questions than adults (90.9%, 62.5%, and 66.7% for three children in Hamann 2006). In sum, there is variation in both the children's input and output, and the two patterns do not seem to overlap neatly. These facts lead to crucial questions on what constrains *wh*-position in adult and child French, and why their utterances are not alike.

Based on statistical analyses of a new seminaturalistic child corpus, the goal of the present article is to seek a variable that correlates with the position of the *wh*-words in child French and thus may explain the variation previously identified. Ideally, this variable could also account for the discrepancy between child and adult *wh*-in-situ questions and show coherence with languages with no *wh*-in-situ in matrix information-seeking questions, such as English (*Where does he live?* vs. **He lives where?*).[1]

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[1]We exclude echo questions, which are not information-seeking questions but rather requests for repetition of material that was not perceived or not understood. In the following example, B utters an echo question because either s/he is astonished by A's assertion or s/he did not hear what A said. His/her aim is not to know where X lives.
  A: He lives on Mars.
  B: He lives WHERE? (capitals denote emphasis)

Since different, nonmutually exclusive constraints might apply, Section 1 first reviews the existing literature on variation in adult and child French to explore possible connections with previous research. Section 2 details our method. It provides the verb tripartition we will statistically examine, the related Verb-form hypothesis we propose to account for the variation in the *wh*-position in child data and our corpus. Section 3 displays the statistical analyses and results using the Cochran-Mantel-Haenszel Test for repeated 2 x 2 tests of independence (Cochran 1954; Mantel & Haenszel 1959). Finally, Section 4 covers our conclusions on the Verb-form hypothesis in child French and highlights the compatibility of our hypothesis with adult French and English.

1.1. *Variation in adult French*

To form matrix information-seeking questions like *Where does he live?*, most languages allow either initial, preposed *wh*-words or final, in-situ *wh*-words. More rarely, languages like French allow both possibilities, as exemplified in (1).[2] Much investigation has focused on uncovering the reasons for this unusual variation in adult French using both specific and interfaced approaches. Generative grammar posits that the position to the right of the verb, as in (1a), is the underlying, "in-situ" position and that (1b) is obtained by moving the *wh*-word from this underlying position to a "preposed/fronted" position in the left periphery of the sentence. There is a wide consensus on the claim that *wh*-movement is constrained, but there still is a lively debate on the constraints that actually operate when a *wh*-word is in-situ or preposed.

(1) a.   In-situ *wh*-word: *Il   vit   où?*

he   live-PRS.3SG   where

'Where does he live?'

b.   Preposed *wh*-word: *Où   il   vit?*[3]

where   he   live-PRS.3SG

'Where does he live?'

Many approaches have focused on syntactic explanations based on: (i) overt vs. covert movement (Aoun, Hornstein & Sportiche 1981); (ii) strong vs. weak features, with a possible late insertion (Rizzi 1991/1996; Bošković 2000); (iii) phrasal vs. feature movement (Cheng & Rooryck 2000); (iv) inflectional-phrase (IP) movement (Munaro, Poletto & Pollock 2001; Munaro & Pollock 2005; Déprez, Syrett & Kawahara 2012, 2013); (v) a split determiner phrase (DP) in a (silent) left-peripheral operator and a *wh*-in-situ acting as a variable (Mathieu 2004); or (vi) default-positioning of the *wh*-phrase at the right edge of the clause to mark focalization (Hamlaoui 2010).

Since the 1980s, most linguists have tried to tie these syntactic accounts to interpretive differences, with the exception of Adli (2006), who argues for syntactic optionality between the two possible *wh*-positions in French. Semantic and pragmatic aspects of *wh*-questions, notably D(iscourse)-linking, have been the focus of particular attention. A *wh*-word is D(iscourse)-linked when the answer to the question belongs to a limited set of references shared by the speaker and hearer. As Pesetsky (1987:107–108) notes, the *wh*-phrase *which books* in the question *Which books did you read?* is D-linked because the speaker and hearer have the same, limited set of books in mind, whereas *who* or *what* are normally not D-linked since questions like *Who came?* or *What happened?* can refer to any person or event. The author concedes that D-linking does not interfere with the *wh*-position in

[2]Dryer (2013) reports that 97.5% of 902 languages studied worldwide display either "initial" (29.3%) or "not initial" (68.2%) interrogative phrases. French and Hausa (a West African language) are examples of "mixed" languages (2.5%).
[3]Accepted in spoken French (Gadet 1989; Grevisse 1993; Riegel, Pellat & Rioul 1994), whereas standard French requires clitic-verb inversion (*où vit-il ?*).

simple questions in English, since English has both types of *wh*-words but only one *wh*-position. With respect to French, the notion of D-linking has developed in two directions.

First, the discourse constraint is loosened from the limited set of felicitous answers suggested in Pesetsky (1987) to a more general notion of "presupposed context" (Coveney 1989; Obenauer 1994; Chang 1997; Boeckx 2000; Cheng & Rooryck 2000). Within this framework, in-situ *wh*-questions in French, but not preposed *wh*-questions, are construed as seeking information on a strongly presupposed context. For instance, *Tu as mangé quoi?* 'What have you eaten?' presupposes that the hearer has eaten something, whereas the preposed equivalent question *Qu'est-ce que tu as mangé?* does not make such a presupposition and can be answered *Rien* 'Nothing'. This presupposition triggers movement of the IP to a discourse position in the left periphery (Munaro, Poletto & Pollock 2001; Munaro & Pollock 2005), or a need for repair by prosodic means (Cheng & Rooryck 2000), or both (Déprez, Syrett & Kawahara 2012, 2013). The grammatical category of the *wh*-word—that is, whether it is an adverb or a pronoun—is also claimed to interfere with its position in connection with its interpretation. There is even debate as to the possibility of interpreting adverbs when in-situ (Mathieu 1999; Reinhart 2006). The analyses that depend on presupposition have, however, been challenged. A second approach in spoken French claims that in-situ *wh*-questions are not necessarily presuppositional. For example, *Tu fais quoi dans la vie?* 'What do you do for a living?' can be answered *Rien, je suis au chômage* 'Nothing, I am unemployed' (Mathieu 2004; Baunaz 2011). This approach suggests that an in-situ *wh*-phrase is not necessarily presuppositional in the variety of French under scrutiny.

Finally, Coveney (1995) investigated the orthogonal, "socio-stylistic value" of different *wh*-structures by examining pragmatic, semantic, syntactic, and social factors, to include communication function, the type of verb, and the length of the *wh*-phrase. The work discovered a strong preference for both low informational verbs (e.g., forms of the copula *être* 'be') and *wh*-phrases of three or more syllables (e.g., *combien de* 'how many') in in-situ rather than preposed *wh*-structures.

In sum, different specific and interfaced approaches have been used to account for the variation in the *wh*-position in adult Metropolitan French, but no consensus has yet been reached. One main difficulty is the variability in the proportion of in-situ versus preposed *wh*-words in the different data sets used in previous studies. This variability suggests that there is no constant or straightforward pattern for *wh*-questions in the French children are exposed to in their first years of life and raises the question of the (possibly multiple) constraints children apply to their own productions.

1.2. *Variation in child French*

Variation with respect to *wh*-position is also reported in matrix *wh*-questions in both naturalistic and elicited L1 French data from monolingual preschool children (Crisma 1992; Déprez & Pierce 1993; Hulk 1995, 1996; Plunkett 1999, 2000a, 2000b, 2001; Hamann 2000, 2006; Zuckerman & Hulk 2001; De Cat 2002; Oiry & Demirdache 2006; Strik 2007, 2008, 2012; Jakubowicz 2011; Oiry 2011; Becker & Gotowski 2015; Gotowski & Becker 2016). The present article focuses on matrix *wh*-questions produced by typically developing French L1 children. We leave aside the abundant literature on embedded questions, long-distance questions, multilingualism, and language impairment. In addition, since it is widely acknowledged that children do not produce inversion or other features specific to standard (written) French at this stage of development (Hamann 2006; De Cat 2007; Palasis 2015), we focus only on the spoken variety of the language.

Wh-structures emerge around the age of 2;00 and mostly feature the copula *est* 'is' and the *wh*-word *où* 'where' (Prévost 2009). Studies report that preschool children usually produce both in-situ and preposed *wh*-words from the outset but that the proportions vary a good deal from one child to another (Crisma 1992; Déprez & Pierce 1993; Plunkett 1999; Hamann 2006; Strik 2007). Table 1 presents the *wh*-in-situ rates and raw numbers in four children between 1;08 and 2;09 in naturalistic data, thus giving an overview of this variability. Note that the data also suggest an absence of a straightforward, common developmental pattern since Marie's rates decrease over time while the

Table 1. In-situ *wh*-words in naturalistic child speech (% of all *wh*-questions and raw numbers).[4]

	1;08	1;09	1;10	1;11	2;00	2;01	2;02	2;03	2;04	2;05	2;06	2;07	2;08	2;09
Marie	90.9 (10)						81.2 (26)		80.6 (25)					
Louis			62.5 (5)			84.2 (16)		88.6 (31)						
Augustin				66.7 (2)					94.4 (67)					85 (17)
Philippe					0			1.3 (1)			11.5/40.7 (23/81)[5]			

other three increase. It has also been shown that children produce higher rates of preposed *wh*-words in elicited contexts than in naturalistic settings, although this difference may be due to methodological biases (Zuckerman & Hulk 2001).

Another characteristic of children's questions concerns the syntactic status of the *wh*-phrase. Children distinguish between arguments and adjuncts (Roeper & de Villiers 1992). Indeed, arguments are required by the verb and appear in a fixed position, whereas adjuncts usually freely relate to the sentence and can appear in various positions. Child studies generally report more in-situ positions in argument questions than adjunct questions, as illustrated in (2) (Strik 2007; Jakubowicz 2011).[6]

(2)　a.　Argument *wh*-word:　*Tu　vois　qui?*

　　　　　　　　　　　　　you　see-PRS.2SG　who

　　　　　　　　　　　　　'Who do you see?'

　　b.　Adjunct *wh*-word:　*Comment　on　joue?*

　　　　　　　　　　　　　how　one　play-PRS.3SG

　　　　　　　　　　　　　'How do we play?'

Moreover, in a comparative study of children and adults, Zuckerman & Hulk (2001) show that children behave differently from adults only in argument questions. Indeed, children favor the in-situ position and adults favor the preposed position in argument questions, whereas both groups produce proportionally more preposed *wh*-phrases in adjunct questions. Strik (2007) hypothesized a possible relationship between the verbal-phrase (VP) internal position of objects and their in-situ position in child data. Interestingly then, there does not seem to be a correlation between the input children receive from their caregivers and the children's subsequent productions (Zuckerman & Hulk 2001; Strik & Pérez-Leroux 2011; Becker & Gotowski 2015). Overall, children are reported to produce more in-situ questions than adults, both in naturalistic and elicited corpora, before they enter kindergarten and during their kindergarten years (Becker & Gotowski 2015).[7]

In summary, variation in the position of the *wh*-words is well documented in preschool child Metropolitan French, but no particular correlation between the child and adult productions of *wh*-questions has been established. A number of explanations have, however, been put forward to account for child-adult differences in use. These are examined in the following section.

[4]Marie, Louis, and Augustin's data are part of the Geneva corpus (Rasetti 2003). Rates are from Hamann (2006). Philippe's data come from Suppes, Smith & Léveillé's (1973) corpus. Rates are from Crisma (1992).
[5]Excluding/including the questions of the type *C'est qui NP ?* 'It is who NP?' The author mentions that these forms could be considered as "fixed forms" and could therefore not be counted as instances of *wh*-in-situ questions (Crisma 1992:120).
[6]Authors also address this distinction by using the "adverb" vs. "pronoun" terminology (e.g., Mathieu 1999 mentioned in Section 1.1). We will use these terms when referring to our work. Indeed, the adverb/pronoun distinction is more relevant in our data than the adjunct/argument distinction, since our corpus mostly features sentences like *Où il va?* 'Where is he going?' and *C'est qui* 'Who is it?', where *où* can be viewed as an argument of the verb despite its adverbial status, and the pronoun *qui* is not an argument per se since it is not selected for by the presentational *c'est* 'it is'.
[7]Twenty children in first kindergarten year, 2;09–3;10 (corpus from Palasis 2010). Rates for *qu'est-ce que/quoi* 'what': children in-situ: 88.2% vs. adult: 16.6% (Becker & Gotowski 2015).

1.3. *Variation in child French compared to adult French*

Variation in child-adult data is usually accounted for in terms of differential abilities. However, many of the purely syntactic accounts given for adults (Section 1.1) cannot be tested in child preschool data, since the utterances are short at this stage (no long-distance effects), with rare or no use of quantifiers (no intervention effects). Consequently, we find only one syntactic account but several interfaced approaches that include semantics and pragmatics in addition to syntax. In what follows we summarize these studies and discuss their strengths and weaknesses.

An argument for derivational economy has been frequently advanced to explain the prevalence of *wh*-in-situ questions in child speech compared to adults (Zuckerman & Hulk 2001; Hamann 2006; Strik 2007, 2008; Jakubowicz 2011). Indeed, in-situ structures result from covert movement of the *wh*-word, which is described as computationally more economical than overt movement, since the former affects features whereas the latter moves whole categories (Chomsky 1995). The authors thus ascribe the decrease in *wh*-in-situ questions from children to adults to the development of the children's syntactic abilities with regard to Merge and Move. However, this approach, taken alone, does not seem to account for: (i) the presence of some preposed *wh*-words from the outset (all children in Table 1); (ii) an absence of decrease in early *wh*-in-situ questions in some children (Louis, Augustin, and Philippe in Table 1); (iii) the fact that the final state adult language is not restricted to preposed *wh*-words exclusively; and (iv) the total absence of matrix *wh*-in-situ questions in the early productions of children acquiring languages with preposed *wh*-words in information-seeking questions (e.g., English, Dutch, Italian, German, Swedish), but in-situ *wh*-words in echo-questions (Stromswold 1995; Van Kampen 1997; Guasti 2000; Roeper & De Villiers 2011; Strik 2012).

Indeed, if derivational economy were the sole explanation for the prevalence of in-situ questions in child speech, one would expect at least some early errors in these languages, due to the existence of in-situ echo questions in the child's input—for example, 16% of the *what* questions in Brown's (1973) corpus (Eve's files examined in Gotowski & Becker 2016). It is also doubtful whether overt movement is really more complex than covert movement, since some kind of movement is necessary in both cases (Becker & Gotowski 2015).

Moving from core syntax to the interface between syntax and semantics, Palasis and Faure (2014) examined the verbs involved in *wh*-questions in kindergarten speech between 2;06 and 4;11 and observed that in-situ questions feature significantly more copulas than lexical verbs (Fisher exact test, *p* < .0001). This led the authors to propose a "Lexical hypothesis"—that is, the existence of a correlation between the movement of the *wh*-word to the left periphery and the semantic information contained in lexical verbs but not copulas. Palasis and Faure (2014) suggested that the preposed *wh*-phrases are endowed with a quantificational, Distributive-Selective feature. When the *wh*-phrase is preposed, lexical verbs feed this type of operator. A similar relationship based on the informational value of lexical versus copula-type verbs was put forward in adult speech (Coveney 1995). We find it interesting that the same constraint has been invoked in different studies addressing the same phenomenon in child and adult speech. The discrepancy in in-situ rates between child and adult speech could thus be related to a difference in the use of copulas. It has been established that copulas are more frequent in child than adult speech (Guillaume 1927; Bassano 1998).

Nevertheless, there are two reasons why the Lexical hypothesis requires closer examination. First, Coveney's (1995) and Palasis and Faure's (2014) analyses are not completely congruent. What Coveney (1995) labeled as "copulas" are forms of the verb *être* 'be' and other verbs such as *il y a* 'there is', whereas Palasis and Faure (2014) considered only forms of *être* 'be', excluding other verbs. Second, the lexical/copula partition also calls for further investigation of the nature of the sentences —that is, predicational versus nonpredicational (Higgins 1973/1979; Roy 2013). Lexical verbs are always predicational, since they always attribute a property denoted by the verbal phrase to the subject (e.g., *Paul likes bananas*). Copulas, on the other hand, can be either predicational (e.g., *Paul is nice*) or, when they establish an equation between two referents, nonpredicational (e.g., *Paul is my English teacher*). Thus, the predicational/nonpredicational division does not correspond exactly to

the lexical/copula distinction, and it might be worth exploring this more closely in connection with the position of the *wh*-words. This question is addressed in Section 2.1.

In addition to these open questions in syntax and semantics, the pragmatic/discourse lead has also been investigated to account for the discrepancy between child and adult *wh*-in-situ structures (Becker & Gotowski 2015; Gotowski & Becker 2016). These authors followed: (i) Mathieu's (2004) proposal that the *wh*-in-situ position corresponds to background information, that is, knowledge shared by the speaker and hearer, also called "common ground"; and (ii) Schaeffer & Matthewson's (2005) hypothesis that children under 4;00 lack the pragmatic ability to distinguish between their own knowledge and that of their interlocutors. Becker & Gotowski (2015) and Gotowski & Becker (2016) examined *wh*-words expressing 'what' (i.e., *quoi* and *qu'est-ce que*) between 2;09 and 3;10 and suggested that children under 4;00 overuse the *wh*-in-situ position because they overattribute referents to the common ground. This pragmatic/discourse hypothesis predicts that the in-situ rate should decrease after 4;00. The open question here concerns the actual knowledge young children have of common ground, and recent changes in experimental settings to have children participate rather than observe tasks offer opportunities to investigate this knowledge (Clark 2015). New experimental studies show that, as participants in the task, infants under 2 years of age gesture appropriately with respect to the amount of information they share with the hearer, and 3-year-olds also behave relevantly in ignorance compared to common-ground conditions (Liszkowski, Carpenter & Tomasello 2008; Liebal et al. 2009; Liebal, Carpenter & Tomasello 2013). These findings suggest that young children may in fact have greater awareness of common ground than previously attested (Clark 2015).

This brief review of some hypotheses to account for variation in *wh*-position in child French and its discrepancy with adult speech shows that possible explanations are numerous, appealing, and probably not mutually exclusive. In the present article, we focus on research taking a syntactic/ semantic approach to the lexical/copula partition in child and adult French (Coveney 1995; Palasis and Faure 2014) and test the influence of the verbal form on the position of *wh*-words using statistical analyses of a large corpus of child productions. This method complies with the first two aims mentioned in Section 1: (i) to test for a variable that correlates with *wh*-word position in child French, and (ii) to reconsider the discrepancy between child and adult *wh*-in-situ questions. In Section 2, we present the Verb-form hypothesis, our subjects and data, and we address the third aim: (iii) to relate the hypothesis to languages with no *wh*-in-situ in matrix information-seeking questions, like English.

2. Method

We aim to extend previous findings on the position of *wh*-words in child French at several levels by: (i) elaborating on the lexical/copula distinction proposed in adult and child French (Section 2.1); (ii) proposing a fine-grained, statistical examination of *wh*-positions in relation to the form of co-occurring verbs (Section 2.2); and (iii) supplying new, seminaturalistic data to the field (Sections 2.3–2.6).

2.1. A new verb tripartition: "Free *be* forms", "Fixed *be* form" and "Other Verbs"

The partition between lexical verbs and copulas emerged in both adult and child studies on the *wh*-in-situ position (Coveney 1995; Palasis and Faure 2014). It requires finer examination, though, since the label "copula" was applied differently in the two studies and, as noted in Section 1.3, does not coincide precisely with the (non-)predicational division, another dichotomy at the interface of syntax and semantics (Higgins 1973/1979; Roy 2013). These considerations lead us to abandon the standard lexical-copula dichotomy in favor of a new verb tripartition based on the conjunction of two characteristics: (i) the type of verb (lexical vs. copula), and (ii) its co-occurring subject pronoun (the pronoun *ce* 'that' vs. other pronouns). This new approach also has the advantage of addressing cross-linguistic variation between English and French. Table 2 displays declarative sentences in English and French,

Table 2. Declarative sentences in English and French.

Examples		Specifications		
		Verb	Sentence	Form
(3)	Paul likes bananas	(4): lexical	predicational	free
(4)	*Paul (il) aime les bananes*			
(5)	Paul is nice	(6): copula	predicational	free
(6)	*Paul (il)/(*c') est gentil*			
(7)	Paul is my English teacher	(8): copula	nonpred/equative	free
(8)	*Paul *il/*(c') est mon professeur d'anglais*			fixed
(9)	This man is Paul	(10): copula	nonpred/identificational	free
(10)	*Cet homme *il/*(c') est Paul*			fixed
(11)	The cook is Paul	(12): copula	nonpred/specificational	free
(12)	*Le cuisinier *il/*(c') est Paul*			fixed

distinguished according to three specifications that we will discuss in this section: "Verb" (lexical vs. copula), "Sentence" (predicational vs. nonpredicational), and "Form" (free vs. fixed).

Predication shows that the copula *be* is semantically manifold (Higgins 1973/1979; Roy 2013). A declarative sentence is predicational when a property denoted by the verbal phrase is attributed to the subject. The copula *be* and lexical verbs can both convey predication. The syntactic relationship between the verb and the subject is the same in English and French in these predicative structures—that is, the subject can be freely chosen among any singular or plural, masculine, neutral, or feminine noun or pronoun. We shall henceforth call these predicative *be* forms "Free *be* forms" and these predicative, lexical verbs "Other Verbs". Table 2 labels these two specifications "Verb" (lexical vs. copula) and "Sentence" (predicational vs. nonpredicational) and provides English and French counterparts for each case (examples 3–4 and 5–6 respectively).

On the other hand, a declarative sentence is nonpredicational when it features an equation between two referents. The copula *be* is the only verb found in these nonpredicational structures. Higgins (1973/1979) further divided these nonpredicational, copular sentences into three subtypes: equative, identificational, and specificational. Table 2 provides English and French counterparts for each subtype (examples 7–8, 9–10, and 11–12 respectively). An interesting finding is that English and French do not behave the same way in these nonpredicational sentences. Indeed, only English can freely use any pronoun in these contexts, whereas spoken French displays a unique and constrained form—that is, the presentational form *c'est* 'it is', which obligatorily features the elided, neutral, third-singular pronoun *c'* 'it'.[8] We shall henceforth call the former "Free *be* forms", the latter "Fixed *be* form", and label the specification "Form". Coveney (1995) included the fixed form *il y a* 'there is/are' in his "copulas". Since English and French are not completely identical in this respect— because while the choice of the pronoun is constrained in both languages (*il/there*), the conjugation of the verb varies only in English (*is/are*)—we choose not to follow Coveney (1995) and categorize *il y a* 'there is/are' as "Other Verbs".

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[8]The question is abundantly discussed in the literature. Here we build on recent research from Amary-Coudreau (2010, 2014) and Roy (2013). Note that the third-singular pronoun also takes the form *c'* 'it' when the sentence has a generic interpretation, as in (i):

(i) La glace, *(c') est bon.
the ice-cream it be-PRS.3SG good
'Ice-cream is good'.

However, this *c'est* is free: It is analyzable as *ça + est* 'it is' (*ça* shows up when the verb is lexical, as in (ii) and (iii)), contrary to *c'est* in Table 2, which is an unanalyzable, fixed form.

(ii) La glace, j' aime ça.
the ice-cream I like-PRS.1SG that
'I like ice-cream'.

(iii) La glace, ça me plaît.
the ice-cream that to.me appeal-PRS.3SG
'I like ice-cream'.

When the declarative sentences displayed in Table 2 are transformed into *wh*-questions, English only allows the preposed *wh*-position, whereas French potentially accepts preposed and in-situ positions (Huddleston 1988 and Grevisse 1993 respectively). Table 3 displays preposed *wh*-structures in English (examples 13–17), and Table 4 provides their preposed equivalents in French (examples 18, 20, 22, 24, 26) along with their *wh*-in-situ counterparts (examples 19, 21, 23, 25, 27). The shaded area in each table shows the boundaries with respect to our three specifications—that is, Verb (lexical vs. copula), Sentence (predicational vs. nonpredicational), and Form (free vs. fixed).

Moreover, the gray shade in Table 4 shows that the Sentence and Form partitions are redundant, since they establish the same dichotomy in French (examples 18–21 vs. 22–27). We choose to retain the Form partition only, for two reasons. First, Table 5 illustrates that combining the features of the Verb and Form partitions provides a new verb tripartition that has the advantage of increased clarity. Second, the Form partition is the only distinction that corresponds to a difference between English and French: English has no Fixed *be* form. English thus displays two types of verbs—"(Free) *be* forms" (14–17) and "Other Verbs" (13), whereas French has three types—"Free *be* forms" (20–21), the "Fixed *be* form" (22–27), and "Other Verbs" (18–19).

2.2. Hypotheses and predictions on the *wh*-position in English and French

Using the analysis proposed in Table 5, Section 2.2 spells out two hypotheses and their predictions about English and French *wh*-questions.

Table 3. English *wh*-structures.

Examples		Specifications		
		Verb	Sentence	Form
(13)	What does Paul like?	lexical	predicational	free
(14)	How is Paul?	copula	predicational	free
(15)	Who is Paul?	copula	nonpred/equative	free
(16)	Who is this man?	copula	nonpred/identificational	free
(17)	Who is the cook?	copula	nonpred/specificational	free

Table 4. French *wh*-structures.

Examples		Specifications		
		Verb	Sentence	Form
(18)	*Qu'est-ce qu'il aime Paul?*	(19): lexical	predicational	free
(19)	*Il aime quoi Paul ?*			
(20)	*Comment il est Paul?*	(21): copula	predicational	free
(21)	*Il est comment Paul ?*			
(22)	*Qui *il/(c') est Paul?*	(23): copula	nonpred/equative	fixed
(23)	**Il/*(c') est qui Paul ?*			
(24)	*Qui *il/(c') est cet homme?*	(25): copula	nonpred/identificational	fixed
(25)	**Il/*(c') est qui cet homme ?*			
(26)	*Qui *Il/(c') est le cuisinier?*	(27): copula	nonpred/specificational	fixed
(27)	**Il/*(c') est qui le cuisinier ?*			

Table 5. Verb tripartition.

Categories / Features	Free *be* forms	Fixed *be* form	Other Verbs
Verb (± copula)	+	+	−
Form (± fixed)	−	+	−

2.2.1. *The Lexical hypothesis (H1)*

The dichotomy labeled "Verb" focuses on the opposition between "Free *be* forms" plus the "Fixed *be* form" on the one hand and "Other Verbs" on the other hand (Table 5). The corresponding hypothesis with respect to *wh*-position is the Lexical hypothesis (Palasis and Faure 2014, henceforth H1, introduced in Section 1.3). H1 makes the prediction (P1) that questions with a *be* form, whether free or fixed, should display an in-situ *wh*-word, whereas questions with another verb should exhibit a preposed *wh*-word because of the semantic information carried by verbs other than *be*. P1 will be statistically examined for child French in Section 3.1 (Table 12, Result 1). H1, however, requires further examination, since it relies in part on a category that blends two cases: "Free *be* forms" plus the "Fixed *be* form". If H1 is correct, it makes the additional prediction (P1') that the position of the *wh*-word should be in-situ with all *be* forms, whether free or fixed. P1' will be statistically examined by comparing "Free *be* forms" versus the "Fixed *be* form" in Section 3.2 (Table 13, Result 2) and "Free *be* forms" versus "Other Verbs" in Section 3.3 (Table 14, Result 3). At this stage, we cannot yet test "Other Verbs" against the "Fixed *be* form", since the two modalities differ in two features, as shown in Table 5. We will be able to conduct the test in Section 3.4 (Table 15, Result 4). As mentioned in Section 1.3, H1 might be too broad to account for the variation found in French. Moreover, Table 3 illustrates that H1 cannot be validated in English, which displays the two verbal categories but allows no variation in matrix information-seeking questions. Section 2.2.2 therefore spells out a second hypothesis by focusing on the French "Fixed *be* form" *c'est* 'it is'.

2.2.2. *The Verb-form hypothesis (H2)*

The dichotomy labeled "Form" focuses on the opposition between the "Fixed *be* form" on the one hand and "Free *be* forms" plus "Other Verbs" on the other hand (Table 5). The corresponding hypothesis on the *wh*-position is the new "Verb-form hypothesis" (H2). Building on H1, H2 makes the prediction (P2) that questions with the "Fixed *be* form" should display *wh*-in-situ words, whereas questions with "Free *be* forms" and "Other Verbs" should display a preposed *wh*-word. P2 will be statistically examined by comparing the "Fixed *be* form" versus "Other Verbs" in Section 3.4 (Table 15, Result 4) and the "Fixed *be* form" versus a new category "All Free forms" in Section 3.5 (Table 16, Result 5).

This complies with our first aim—to clearly identify a variable that would correlate with the position of the *wh*-words in child French. We find it interesting that H2 could also satisfy our other two aims by addressing the discrepancy between child and adult *wh*-in-situ questions and showing coherence with languages like English with no *wh*-in-situ matrix information-seeking questions, as will be discussed in Section 4. Section 2.3 gives details of the children and the utterances we examined.

2.3. *Subjects and data*

The subjects were 17 native speakers of L1 French in a kindergarten class in the south of France (eight male, nine female). The children were audio- and video-recorded between 2;06 and 4;11 during 23 sessions over a 20-month period (two school years from November to June). Transcripts and codes follow CHILDES guidelines (MacWhinney 2000).[9] The data involve 40 hours of child-child and child-adult seminaturalistic interactions. The children were offered activities during the recording sessions to create situations for language production and interaction, but these were chosen to resemble ordinary everyday conversations as closely as possible (Eisenbeiss 2010). No attempt was made to elicit specific linguistic structures, and the children were free to interact spontaneously. For each session, the investigator and three to five children were seated around a small table with books and games. The investigator encouraged the children to narrate their activities in and out of school, "read" books, and play games. An animal matching game proved particularly

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[9]The first year is available online at http://childes.talkbank.org/access/French/Palasis.html

effective for collecting child questions. Each child chose a board to fill with six different animal cards by taking turns picking a card from the pack. If a card did not fit a child's board, the player was encouraged to ask whether another child could use that animal, as shown in (28). Such semistructured tasks obviously require the investigator to interact with the children, unlike naturalistic studies where the researcher interferes as little as possible. To minimize potential elicitation artifacts, the investigator (INV) was careful not to prime any particular *wh*-words or structures when asking questions to the children and hence produced *yes/no* questions rather than *wh*-questions, as illustrated in (28). Nevertheless, the independent status of adult and child questions in the corpus is crucial, and the matter is therefore addressed statistically in Section 2.6.

(28)   Transcript excerpt (MAT, 3;03,25; brackets indicate unpronounced segments):

   INV: *Tu   as   pioché   la   vache.*

           you   have-PRS.2SG   pick-PTCP   the.F   cow

           'You have picked the cow.'

   INV: *Est-c(e) qu'   elle   est   à   toi   la   vache?*

           Q   she   be-PRS.3SG   to   you   the.F   cow

           'Is the cow yours?'

   MAT: Nan.

           no

           'No.'

   INV: *Alors   i(l)   faut   demander …*

           so   one   must-PRS.3SG   ask-INF

           'So you must ask …'

   MAT: *C'   est   à   qui?*

           it   be-PRS.3SG   to   who

           'Whose is it?'

   INV: *Voilà.*

           there

           'Good.'

   MAT: *C'   est   à   qui   la   vache?*

           it   be-PRS.3SG   to   who   the.F   cow

           'Whose is the cow?'

The child corpus comprises a total of 27,464 utterances, including 2,527 questions (9.2%). Table 6 shows that these questions can be divided across six different types with very different frequencies, as

Table 6. The different types of questions in the child corpus.

	Nonverbal	Yes/No	Est-ce que	Finite matrix wh-	Finite embedded wh-	Nonfinite wh-	Total
n	721	757	45	913	84	7	2,527
%	28.5	30.0	1.8	36.1	3.3	0.3	100.0

illustrated in (29). This research investigated the most frequent type at this stage of the children's development: finite matrix *wh*-questions (36.1% of the total questions). No echo questions were found in the corpus.

(29)   Examples of different question types:

    a.   Nonverbal:

        Et   moi?   (LUS, 2;10,27)

        and   me

        'And me?'

    b.   Yes/No:

        Tu   viens?   (MAI, 2;08,00)

        you   come-PRS.2SG

        'Are you coming?'

    c.   *Est-ce que* 'is it that':

        Est-c(e) qu'   il   était   cassé   ton   biberon?   (LUS, 2;10,27)

        Q   he   be-PST.3SG break-PTCP your   bottle

        'Was your bottle broken?'

    d.   Finite matrix *wh*-:

        Où   elle   est   ta   maison?   (MAT, 3;11,18)

        where she   be-PRS.3SG   your   house

        'Where is your house?'

    e.   Finite embedded *wh*-:

        Tu   sais   ce   que   c'   est   hein   un   TGV?

                                               (LSN, 3;11,17)

        you   know-PRS.2SG what that it be-PST.3SG hm a.M TGV

        'Do you know what a TGV (high-speed train) is?'

    f.   Nonfinite *wh*-:

        J'   arrive   pas   comment l'   enlever.   (LUS, 3;10,00)

        I   manage-PRS.1SG NEG how   it-OBJ take.off

        'I can't figure out how to take it off.'

2.4. Distributing the data

First, repetitions were excluded from the analysis (self-repetitions and repetitions of the previous speaker, *n* = 9). The remaining occurrences (*n* = 904) were classified according to the following criteria:

- *Wh*-word (12 modalities + potential combinations with the interrogative marker *est-ce que* 'is it that'):
  - *que* 'what', *quoi* 'what', *à quoi* 'to what', *qui* 'who', *à qui* 'to whom', *quel(les)* 'which', *le(s)quel (les)* 'which one(s)', *où* 'where', *pourquoi* 'why', *comment* 'how', *quand* 'when', *combien* 'how many/much'.
  - Any combination of the preceding *wh*-words with the interrogative marker *est-ce que*—for example, *qu'est-ce que* 'what is it that', *quand est-ce que* 'when is it that', etc.
- Type of verb (three modalities, as described in Table 5):
  - Free *be* forms: the copula *être* 'be' used freely, that is, with any pronoun except within the fixed *c'est* form—for example, *Comment il est Paul?* 'How is Paul?' (20 in Table 4; with the caveat in Fn. 8).
  - Fixed *be* form: the copula *être* 'be' used within the fixed, presentational structure *c'est* 'it is'—for example, *C'est qui Paul?* 'Who is Paul?' (23 in Table 4).
  - Other Verbs: all verbs except the copula *être* 'be', used with any pronoun—for example, *Il aime quoi Paul?* 'What does Paul like?' (19 in Table 4).
- Position of the *wh*-word in the sentence (two modalities):
  - Beginning: at the beginning of the sentence—that is, to the left of the verb (what generative grammar calls "preposed/fronted *wh-*" under the assumption that the *wh*-word moves from an initial, lower position to a final, left-periphery position).
  - End: at the end of the sentence—that is, to the right of the verb (what generative grammar calls "*wh*-in-situ").
- Child: the data from each child were tagged separately to control for quantitative and qualitative individual variation. Table 11 (in Section 3) shows the quantitative distribution of occurrences in the final corpus across the 17 children, displayed from the oldest to the youngest child. To maintain sufficient numbers of occurrences for statistical analysis no longitudinal analysis was conducted.

Table 7 displays the distribution of the total of 904 *wh*-questions according to the *wh*-word (in order of decreasing frequency) and the syntactic structure. First, the children used 11 of 12 possible *wh*-words (*combien* 'how many/much' never appeared in the data). The most frequent *wh*-questions in this corpus feature *que/quoi* 'what' (33%), *où* 'where' (22.1%), *qui* 'who' (20.7%), and *pourquoi* 'why' (10.6%). The less frequent *wh*-words are *comment* 'how' (5.8%), *à qui* 'to whom' (5.5%), *quand* 'when' (1.5%), *lequel/quel* 'which (one)' (0.3% and 0.2%, respectively), and *à quoi* 'to what' (0.2%). This frequency distribution is consistent with previous studies (as reported in Prévost 2009:346–347). Second, Table 7 exhibits 12 different syntactic structures, three of which are exemplified in (30). The structures vary depending on:

Table 7. Distribution of questions according to *wh*-word and syntactic structure.

Structures*		quoi/ que	où	qui	pourquoi	comment	à qui	quand	lequel	à quoi	quel	Total
1a	S V_o *wh-*	50/2	15	12	0	4	0	0	0	2	1	86
1b	S V_{be} *wh-*	0	55	0	0	1	1	0	0	0	0	57
2a	*wh-* (S) V_o	1	9	31	79	41/6	0	0	0	0	1	168
2b	*wh-* (S) V_{be}	0	112/1	3	8	0	0	0	0	0	0	124
3a	*wh-* V_o S	2	0	0	0	0	0	0	0	0	0	2
3b	*wh-* V_{be} S	0	6	0	0	0	0	0	0	0	0	6
4	*c'est wh-*	170/2	1	30/2	0	0	45	0	3	0	0	253
5	*wh- c'est*	14	0	2	9	0	4	0	0	0	0	29
6	*c'est wh-* que S V	0	1	53	0	0	0	12	0	0	0	66
7	*wh- c'est* que S V	0	0	54	0	0	0	2	0	0	0	56
8	*wh-* ESK S V_o	55	0	0	0	0	0	0	0	0	0	55
9	*wh-* ESK V_o S	2	0	0	0	0	0	0	0	0	0	2
	Total	298	200	187	96	52	50	14	3	2	2	904

*S = Subject, V_o = Other Verbs, V_{be} = Free *be* forms, *c'est* = Fixed *be* form, (x) = x is optional, ESK = *est-ce que* 'is it that', gray shade = only one grammatical position for the *wh*-word in the sentence (see Section 2.5), y/z = z were excluded.

(i) the verb form: "Free *be* forms" (V_{be}; 1b, 2b, 3b), the "Fixed *be* form" (*c'est* 'it is'; 4, 5, 6, 7), and "Other Verbs" (V_o; 1a, 2a, 3a, 8, 9); (ii) syntactic criteria: Subject-Verb inversion (3a, 3b), insertion of the *c'est … que* 'it is … that' cleft (6, 7), and insertion of the *est-ce que* 'is it that' interrogative marker (henceforth ESK; 8, 9); and (iii) the position of the *wh*-word: Beginning vs. End (2, 3, 5, 7, 8, 9 vs. 1, 4, 6). Note that since Subject-Verb inversions, clefts, and ESK are mutually exclusive, we did not expect to find examples of all 48 theoretically possible structures. It is also important to understand that each *wh*-word was not realized in every structure.

(30)   The three most frequent structures in the child corpus:

   a.   Structure 4 (c'est *wh*-):

C'	est	quoi	ça?	(LIN, 3;04,02)
it	be-PRS.3SG	what	that	

   'What's that?'

   b.   Structure 2a (*wh*- S V_o):

Comment	on	joue	à	ce	jeu?	(LUS, 3;04,05)
how	one	play-PRS.3SG	to	this.M	game	

   'How do we play this game?'

   c.   Structure 2b (*wh*- S V_{be}):

Où	il	est	l'	aspirateur?	(DYL, 4;02,21)
where	he	be-PRS.3SG	the.M	vacuum cleaner	

   'Where is the vacuum cleaner?'

2.5. *Filtering out the data*

Before searching the corpus for a possible discriminating variable, it was necessary to exclude some occurrences from further analysis. There were no errors of *wh*-position (such as a preposed *quoi* 'what') in the utterances retained for analysis, but to comply with the constraints of French grammar, some *wh*-words can only appear in one of the two potential positions. Since these instances are therefore not subject to the alternation of interest in our study, we discarded those utterances where the *wh*-words could appear in only one of the two positions. The exclusions are as follows (shaded cells in Table 7).

- *Pourquoi* 'why' (*n* = 96; Structures 2a, 2b, and 5):

The *wh*-word *pourquoi* 'why' always appears to the left of the verb (e.g., MAI, 2;10,23: *Pourquoi i(l) veut pas le prêter?* 'Why doesn't he want to lend it?'). This *wh*-word is assumed to be directly generated in the left periphery, higher than the other *wh*-words (Rizzi 2001; Hamann 2006; Myers & Pellet 2014).

- *Qui* 'who' (*n* = 34; Structures 2a and 2b):

The *wh*-word *qui* 'who' is always preposed to the verb when used as a subject (e.g., MAT, 3;08,09: *Qui a le mien alors?* 'So who has mine?'). These utterances were also discarded from our analysis. The occurrences of *qui* when *qui* is the object of the verb were retained (*n* = 12; Structure 1a). Note, however, that the latter are all

ungrammatical, since they always display the reflexive verb *s'appeler* 'to be called', with which children used *qui* instead of *comment* 'how' to ask *Tu t'appelles comment?* 'What's your name?'.

• The *wh*-words in Verb-Subject inversion contexts (*n* = 10; Structures 3a, 3b, and 9):

In-situ *wh*-words are ungrammatical in inversion contexts (e.g., LSN, 4;03,15: *Elmer où es-tu?* vs. **Elmer es-tu où?* 'Elmer where are you?'; VIK, 3;05,08: *Que se passe-t-il?* vs. **Se passe-t-il quoi?* 'What's happening?'). The "Wh-criterion," which assumes obligatory structural proximity between the *wh*-word (in the specifier position of the complementizer phrase CP) and the *wh*-feature (picked up by the verb in its I-to-C movement), accounts for this phenomenon (Rizzi 1991/1996).

• Clefts of the type *c'est ... que* S V 'it is that S V' (*n* = 66 + 56; Structures 6 and 7):

The *wh*-word is always to the left of V. We discarded both structures and hence leave discussion of movement of the *wh*-word around the cleft for future research (but see Labelle 1990, 1996; Oiry 2011).

• D-linked *wh*-words (*n* = 18):

The literature reports a possible interaction between D-linking and the in-situ position in French (see Section 1). The corpus displays 18 D-linked *wh*-words (four *quoi* 'what', one *où* 'where', two *qui* 'who', six *comment* 'how', two *quel* 'which', and three *lequel* 'which one'). Since D-linking is a possible factor that is likely to influence the position of the *wh*-word, but the number of D-linked utterances in our corpus was too low for statistical investigation, we discarded these 18 items to prevent them from biasing the analyses.[10]

Note that *wh*-ESK S V$_o$ items were not discarded (*n* = 55; Structure 8) because all the *wh*-ESK combinations in the corpus are occurrences of *qu(e)+est-ce que* 'what is it that', which have an in-situ equivalent in Structure 1a—that is, S V$_o$ *quoi*, as illustrated in (31a) vs. (31b). The items in Structure 8 were retained for analysis.

(31)   a.   Structure 8 (*wh*-ESK S V$_o$):

Qu'   est-ce que   t(u)   as   Elena? (LOU, 4;04,24)

what   Q   you   have-PRS.2SG   Elena

'What's wrong Elena?'

   b.   Structure 1a (S V$_o$ *wh*-):

J'   ai   mangé   quoi?   (LOU, 4;04,24)

I   have-PRS.1SG   eat-PTCP   what

'What did I eat?'

After discarding *wh*-words that can appear in only one of the two *wh*-positions in French, we were left with 624 *wh*-questions. Table 8 displays these utterances, which constitute the final corpus on which statistical analyses were performed. Table 9 shows the distribution of these 624 occurrences with respect to the variables of interest: the two potential *wh*-positions and the three verb types. The predominance of in-situ position (61.9%) and *be* forms (69.7%) shown in Table 9 indicates that this corpus is similar to previous sets of child data (as described in Sections 1.2 and 1.3).

Before moving to the statistical examination of these data, Section 2.6 first compares the child distribution in Table 9 with the language used by the investigator during interactions to exclude imitation as a source of bias.

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[10]We thank an anonymous reviewer for drawing our attention to this factor in our data.

Table 8. Final corpus for analysis.

		quoi 'what'	où 'where'	qui 'who'	comment 'how'	à qui 'to whom'	à quoi 'to what'	Total
1a	S V_o wh-	50	15	12	4	0	2	83
1b	S V_{be} wh-	0	55	0	1	1	0	57
2a	wh- S V_o	1	9	0	41	0	0	51
2b	wh- S V_{be}	0	112	0	0	0	0	112
4	c'est wh-	170	1	30	0	45	0	246
5	wh- c'est	14	0	2	0	4	0	20
8	wh- ESK S V_o	55	0	0	0	0	0	55
	Total	290	192	44	46	50	2	624

Table 9. Distribution of occurrences according to variables of interest.

Wh-position Category	Beginning	End	Total n (%)
Free be	112	57	169 (27.1)
Fixed be	20	246	266 (42.6)
Other Verbs	106	83	189 (30.3)
Total n (%)	238 (38.1)	386 (61.9)	624 (100)

2.6. Addressing the independence of the children's and investigator's wh-questions

The investigator's wh-questions were extracted and filtered using the same criteria as those described in Section 2.5 for the child data. Table 10 displays the distribution of the adult wh-questions (n = 1,377) with respect to the same variables as in Table 9.

Two comments are in order with regard to previous adult corpora reported in Section 1. First, the investigator's rate for wh-in-situ questions (58.5%) is higher than in other data sets, the highest previously reported in-situ rate in child-directed speech being 51% (Geveler & Müller 2015). Second, the investigator's rate for be forms is lower than the children's rate (60.6% vs. 69.7%), which is consistent with studies reporting that copulas are less frequent in adult than child speech (Guillaume 1927; Bassano 1998). Nevertheless, it is crucial to examine the independence of the distribution of the investigator's and children's wh-questions in this corpus through statistical measures.

The independence of the distribution of wh-positions as a function of the verbal variable (displayed in Table 5) was compared in adult and child data. First, we examined the distribution of frequencies in the adult data according to the same 2 x 2 tables of frequencies as detailed in Section 3 for the child data. Second, we compared adult and child distributions for each table, leading to three-level 2 x 2 x 2 contingency tables, with frequencies for the wh-position, the verbal variable under test, and whether the data are child or adult utterances. This series of tests statistically addresses the question: Does the relationship between the wh-position and the verbal variable depend on the speaker (adult vs. child)?

We used the lme package in R (Pinheiro & Bates 2000) to first run a model of mutual independence, which tests for the effect of each of the three variables without interactions between the variables. Second, we ran a model of conditional independence, which tests for the effect of each variable with two-way interactions between the variables. Model comparison by the Akaike's

Table 10. Distribution of occurrences in investigator's data according to variables of interest.

Wh-position Category	Beginning	End	Total n (%)
Free be	108	50	158 (11.5)
Fixed be	106	570	676 (49.1)
Other Verbs	357	186	543 (39.4)
Total n (%)	571 (41.5)	806 (58.5)	1,377 (100)

Information Criterion (henceforth AIC) allowed us to conclude that, for each verbal variable under study, including the two-way interactions in the model better accounts for the data (lower AICs) than not including the interactions (higher AICs). In other words, the distribution of *wh*-positions as a function of the verbal variable is statistically different in the adult and child data. This outcome enables us to conclude that the children's distributions of frequencies examined in Tables 12–19 in Section 3 are different from the investigator's distributions.

3. Results and discussion

The 624 child utterances remaining after data filtering (Table 9) were submitted to the Cochran–Mantel–Haenszel Test (henceforth CMH, Cochran 1954; Mantel & Haenszel 1959) for repeated 2 x 2 tests of independence. CMH allowed us to take three variables into consideration. First, we could test the independence of the variables of interest: the verb form in the sentence (Fixed *be* form vs. Free *be* forms vs. Other Verbs) and the position of the *wh*-word in the sentence (Beginning vs. End). Second, it enabled us to submit the data in as many 2 x 2 tables as there were participants with available data, hence taking into account a third variable corresponding to repeated measures in different children, each with a different amount and distribution of data (McDonald 2011). Table 11 displays the quantitative distribution of occurrences in the final corpus across the 17 children, ranging from the oldest to the youngest child. All the children contributed to the data in the tests, with occasional exceptions indicated in the relevant sections.

3.1. Testing H1: *Wh*-position according to verb type (Other Verbs vs. All *be* forms)

Table 12 investigated whether *wh*-words are more likely to be preposed with Other Verbs or more in-situ with the copula (Free *be* forms and the Fixed *be* form), as suggested in Palasis and Faure (2014) (H1, described in Section 2.2.1). Our first result thus counted Free *be* forms and the Fixed *be* form together to uncover a possible overall pattern for All *be* forms.

Analyzing the independence between *wh*-position and verb type—that is, Other Verbs vs. All *be* forms (Free and Fixed)—using CMH, the result was $\chi^2_{CMH} = 39.11$, 1 *df*, *p* < .00001 (Result 1). Overall, the *wh*-position is significantly more frequent at the beginning of the questions with Other Verbs and at the end with *be* forms. Cramér's V, which determines the degree of association between variables, indicates an intermediate effect size for Result 1 (H1, *V* = 0.25, Cramér 1946). In Section 3.5, we will determine the effect size for Result 5 (H2), and compare the two results.

At this stage, the statistical analysis leads us to reject the null hypothesis and validate H1. Consequently, despite the fact that French allows the speaker to place the *wh*-word either preposed or in-situ with both types of verbs, Result 1 indicates that the placement of the *wh*-word is related to the type of verb, linking the in-situ position with *be* forms, in line with Coveney's (1995) findings on adult data. However, Result 1 is not fully satisfactory, since the category All *be* forms combines two cases: Free *be* forms plus the Fixed *be* form. Sections 3.2 and 3.3 will address this issue to discover whether this finding can be further refined.

Table 11. Quantitative distribution of occurrences in final corpus across 17 children.

	KEL	LOU	ELE	VIC	CAR	ENZ	LIZ	MAT	LSN	LIN	LUS	NIN	WIL	LAN	DYL	MAI	MAS	*n*
Free *be*	6	2	3	5	0	4	1	29	5	6	8	5	22	0	31	0	42	169
Fixed *be*	1	6	6	24	5	14	12	52	13	5	23	14	5	17	16	20	33	266
Other Verbs	0	8	10	7	0	3	5	22	13	2	15	15	12	5	9	43	20	189
n	7	16	19	36	5	21	18	103	31	13	46	34	39	22	56	63	95	624
%	1.1	2.6	3.0	5.8	0.8	3.4	2.9	16.5	5.0	2.1	7.4	5.4	6.3	3.5	9.0	10.1	15.2	100

Table 12. *Wh*-position according to verb type (*n* = 624, all children).

	Beginning	End
Other Verbs	106	83
All *be* forms	132	303

Table 13. *Wh*-position according to copula form (*n* = 435, all children).

	Beginning	End
Free *be* forms	112	57
Fixed *be* form	20	246

3.2. Refining H1*: Wh*-position according to copula form (Free *be* forms vs. the Fixed *be* form)

To test the impact of each *be* form on the position of the *wh*-word separately, Table 13 examined each form independently: Free *be* forms (any person) versus the Fixed *be* form (*c'est* 'it is').

Analyzing the relationship between *wh*-position and the Free *be* forms vs. the Fixed *be* form using CMH, the result was χ^2_{CMH} = 138.61, 1 *df, p* < .00001 (Result 2). Overall, the *wh*-position is significantly more likely to occur at the beginning with the Free *be* forms and more at the end with the Fixed *be* form. Consequently, despite the fact that French grammar permits both in-situ and preposed *wh*-positions with both types of *be* forms, Result 2 indicates that the in-situ position of the *wh*-word correlates with only one form of the copula, the Fixed form *c'est* 'it is'.

Result 2 thus refines H1, by examining the Free and Fixed *be* forms separately. Their significant impact on the *wh*-position indicates that the partition suggested by H1 is insufficiently fine-grained. Result 2, however, also limits the scope of our findings, since it is based on only a subset of the data, the *be* forms. In Section 3.3, we will connect Result 2 to the rest of the data on the basis of this new variable, the form of the verb (Free vs. Fixed).

3.3. Abandoning H1*: Wh*-position according to the type of Free verb forms (Free *be* forms vs. Other Verbs)

To connect Result 2 to the rest of the data, Table 14 examined Free *be* forms in relation to Other Verbs, which are also free verb forms. Since one child (CAR) had no data for this test, data were submitted in only sixteen 2 x 2 tables.

Analyzing the relationship between *wh*-position and Free *be* forms vs. Other Verbs using CMH, the result was χ^2_{CMH} = 2.48, 1 *df, p* = 0.12 (Result 3). Overall, the *wh*-position is not significantly different when comparing Free *be* forms and Other Verbs, which are also free verb forms. Result 3 shows that the type of free verb (i.e., *be* vs. Other Verbs) is not the discriminating variable for the position of the *wh*-words in the corpus. We therefore abandon the Lexical hypothesis (H1) and test the Verb-form hypothesis (H2), which suggests that it is the form of the verb that correlates with the position of the *wh*-word in the sentence (Section 2.2.2). H2 makes the predictions that the position of the *wh*-word is related to: (i) the Fixed *be* form vs. Other Verbs, and (ii) the Fixed *be* form vs. Other Verbs together with Free *be* forms (Sections 3.4 and 3.5 respectively).

Table 14. *Wh*-position according to the type of Free verb forms (*n* = 358, 16 children).

	Beginning	End
Free *be* forms	112	57
Other Verbs	106	83

Table 15. *Wh*-position with Fixed *be* form vs. Other Verbs (*n* = 454, 16 children).

	Beginning	End
Fixed *be* form	20	245
Other Verbs	106	83

3.4. First step toward H2: *Wh*-position according to verb form (Fixed *be* form vs. Other Verbs)

To test the impact of the Fixed *be* form on the position of the *wh*-word, Table 15 compared the Fixed *be* form vs. Other Verbs, which are free verb forms. This test excludes Free *be* forms. As in the previous test, one child (KEL) had insufficient data for this test (*n* = 1), so only sixteen 2 x 2 tables were calculated.

Analyzing the relationship between *wh*-position and Fixed *be* form vs. Other Verbs using CMH, the result was χ^2_{CMH} = 116.87, 1 *df, p* < .00001 (Result 4). *Wh*-position is significantly more frequent at the beginning with Other Verbs and more common at the end with the Fixed *be* form. Result 4 thus supports a twofold conclusion: (i) verb form is indeed a discriminating variable with respect to *wh*-position, and (ii) the in-situ position seems strongly related to the Fixed *be* form.

3.5. Confirming H2: *Wh*-position according to verb form (Fixed *be* form vs. All Free forms)

Table 16 further investigated the impact of the Fixed *be* form on the position of the *wh*-words by testing the Fixed *be* form against All Free forms, regardless of verb type. The new subset All Free forms was created by merging Other Verbs with Free *be* forms.

Analyzing the relationship between *wh*-position and the Fixed *be* form vs. All Free forms using CMH, the result was χ^2_{CMH} = 170.97, 1 *df, p* < .00001 (Result 5). The *wh*-position is significantly more common at the beginning with All Free forms and at the end with the Fixed *be* form. Result 5 therefore confirms Result 4 and suggests that a discriminating variable for *wh*-word position is verb form (Fixed vs. Free), regardless of verb type (*be* vs. Other Verbs). Cramér's V, which determines the degree of association between variables, indicates a large effect size for Result 5 (H2, *V* = 0.52), which is twice the effect size for Result 1 (H1, *V* = 0.25, Section 3.1).

Taken together, Result 5 and Cramér's V provide strong support for the Verb-form hypothesis (H2, Section 2.2.2), which predicts that questions with the Fixed *be* form should display *wh*-in-situ words. Our investigation therefore highlights a correlation between the form of the verb and the position of the *wh*-word. Although this covariation does not constitute proof of a causal relation between the two variables, it is compatible with the hypothesis of a causal effect of the form of the verb on the position of the *wh*-word. In any case, these results allow us to accomplish our primary objective, to identify a variable that correlates with the position of *wh*-words in child French. We discuss the predictions made by H2 with respect to our other aims—that is, the clarification of the relationship between child and adult French, and the compatibility with English, in Section 4.

Table 16. *Wh*-position with Fixed *be* form vs. All Free forms (*n* = 624, all children).

	Beginning	End
Fixed *be* form	20	246
All Free forms	218	140

3.6. *Wh*-position according to grammatical category of the *wh*-word (adverb vs. pronoun)[11]

Previous studies have shown that *wh*-in-situ questions are more frequent with object *wh*-words than adjuncts in child data (Zuckerman & Hulk 2001; Strik 2007; Jakubowicz 2011). A possible relationship between the VP-internal position of objects and their in-situ position in child *wh*-questions has been proposed (Strik 2007). We address this matter by statistically examining the position of the adverbial *wh*-words in the corpus (*où* 'where' and *comment* 'how') and the pronominal *wh*-words (*quoi* 'what', *qui* 'who', *à qui* 'to whom', *à quoi* 'to what') as a function of verb form (Free *be* forms, the Fixed *be* form, and Other Verbs).

Table 17 shows the distribution of all the *wh*-words retained for analysis according to grammatical category and syntactic structure (as in Table 8). Table 17 shows that children use more pronominal *wh*-words than adverbial *wh*-words, which is consistent with previous descriptions (Clark 1985; Prévost 2009; Plunkett 2000a).

3.6.1. Adverbial *wh*-words

The distribution of adverbial *wh*-words according to verb form in the corpus is quite clear-cut. Adverbs only occur in sentences with free verbs (Other Verbs, Structures 1a and 2a in Table 17; Free *be* forms, Structures 1b and 2b). Only one adverb appears with the Fixed *be* form (Structure 4: LSN, 3;05,08: *ben c'est où les trucs?* 'Where are the things?'). The Verb-form hypothesis (H2, tested and validated in Sections 3.4–3.5), which opposes All Free forms to the Fixed *be* form, predicts that we should not obtain significant results when testing the position of adverbial *wh*-words with Free *be* forms against Other Verbs. Table 18 examined the distribution of the two adverbs retained for analysis (*où* 'where' and *comment* 'how') in data from the 14 children who produced sufficient examples for this test ($n = 224$).

Analyzing the relationship between the position of *wh*-adverbs and the two types of verbs (Free *be* forms vs. Other Verbs) using CMH, the result was $\chi^2_{CMH} = 0.124$, 1 *df*, $p = 0.72$ (Result 6), indicating that the *wh*-position is not significantly different with Free *be* forms and Other Verbs. Result 6 therefore confirms H2 for this subset of the corpus, similar to Result 3 for the entire corpus (Section 3.3, Table 14). As expected, (i) adverb position is not significantly different when comparing

Table 17. *Wh*-words according to grammatical category and syntactic structure.

		Adverbial		Pronominal		Total	
		n	%	*n*	%	*n*	%
1a	S V$_o$ *wh-*	19	8.0	64	16.6	83	13.3
1b	S V$_{be}$ *wh-*	56	23.5	1	0.3	57	9.1
2a	*wh-* S V$_o$	50	21.0	1	0.3	51	8.2
2b	*wh-* S V$_{be}$	112	47.1	0	0.0	112	17.9
4	*c'est wh-*	1	0.4	245	63.5	246	39.4
5	*wh- c'est*	0	0.0	20	5.2	20	3.2
8	*wh-* ESK S V$_o$	0	0.0	55	14.2	55	8.8
	Total	238	38.1	386	61.9	624	100.0

Table 18. Position of adverbial *wh*-words ($n = 224$, 14 children).

	Beginning	End
Free *be* forms	112	56
Other Verbs	39	17

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[11]See Footnote 6 on the distinction between adverbs vs. pronouns on the one hand and adjuncts vs. arguments on the other hand.

the two types of verbs, since both are free forms; and (ii) adverbial *wh*-words are mainly preposed in these sentences, in relation with the free form of the verbs.

Result 6 is consistent with previous descriptions of a higher incidence of preposing adverbial *wh*-words compared to object *wh*-words (Zuckerman & Hulk 2001; Strik 2007; Jakubowicz 2011). Result 6, however, points to a different explanation, since it suggests that it is the absence of the Fixed *be* form in adverbial *wh*-questions that underlies the observed asymmetry. It would be interesting to reexamine previous corpora to test our hypothesis.[12]

3.6.2. Pronominal *wh*-words

Unlike adverbial *wh*-words, pronominal *wh*-words occur with both free and fixed verb forms—that is, Other Verbs and Free *be* forms on the one hand (Structures 1a–1b, 2a–2b, and 8 in Table 17) and the Fixed *be* form on the other hand (Structures 4 and 5). The Verb-form hypothesis makes the prediction that we should obtain significant results when testing the position of pronominal *wh*-words in the corpus. Table 19 examined the distribution of the pronominal *wh*-words retained for analysis (*quoi* 'what', *qui* 'who', *à qui* 'to whom', and *à quoi* 'to what') in data from the 16 children who produced sufficient examples for this test (n = 385).

As in Section 3.5 (Table 16, Result 5), we analyzed the relationship between the position of the *wh*-words and verb form (the Fixed *be* form vs. All Free forms) using CMH. The result was χ^2_{CMH} = 68.01, 1 *df*, *p* < .00001 (Result 7), indicating that the position of the pronominal *wh*-words is significantly more frequent at the end of the sentence with the Fixed *be* form than with All Free forms. Result 7 confirms H2 for this subset of the corpus, that the form of the verb (free vs. fixed) is related to the position of the *wh*-word.

Once again, these findings are consistent with previous descriptions of a preference for keeping object *wh*-words in-situ rather than adjuncts (Zuckerman & Hulk 2001; Strik 2007; Jakubowicz 2011). Result 7, however, just like Result 6, suggests that it is the massive presence of the Fixed *be* form in these pronominal *wh*-questions that leads to the observed asymmetry, not the grammatical category of the *wh*-words.

4. Conclusions

Based on statistical analyses of a new seminaturalistic child French corpus, the present article set out to clearly identify a variable that correlates with the position of *wh*-words in child language. Ideally, this variable would also explain the incidence of *wh*-in-situ questions in child corpora in comparison with adult French and show coherence with languages with no *wh*-in-situ in matrix information-seeking questions, such as English.

Using an analysis combining syntactic and semantic considerations (following Coveney 1995 and Palasis and Faure 2014), we examined two features, verb type (copula *be* vs. Other Verbs) and verb form (Free vs. Fixed), and suggested a new verb tripartition: Free *be* forms, the Fixed *be* form *c'est* 'it is', and Other Verbs (Table 5). Using this classification, the Verb-form hypothesis makes two predictions: (i) a discriminating variable for *wh*-position is verb form (Free vs. Fixed), regardless of verb type (*be* vs. Other Verbs); and (ii) the *wh*-in-situ position is related to the Fixed *be* form (Section 2.2.2).

Table 19. Position of pronominal *wh*-words (n = 385, 16 children).

	Beginning	End
Fixed *be* form	20	244
All Free forms	56	65

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[12]We thank an anonymous reviewer for drawing our attention to the importance of this asymmetry.

We statistically examined the distribution of the *wh*-position (in-situ vs. preposed) as a function of verb form (Free *be* forms, the Fixed *be* form, and Other Verbs) in 624 matrix *wh*-questions by 17 French-speaking children between 2;06 and 4;11 (Table 9). Results suggest that the distribution of the *wh*-position is not random in this child corpus but rather that there is a correlation between the Fixed *be* form and the in-situ position of *wh*-words (e.g., *c'est quoi ça?* 'what is that'; Table 16, Result 5 in Section 3.5, $p < .00001$). Although this finding does not constitute proof of a causal relation between the two variables, it is consistent with a hypothesis of a causal effect of verb form on *wh*-position. Further work is needed to investigate this relationship.

Our results also shed new light on a previously discussed partition in child French: the differential behavior of adverbial and pronominal *wh*-words. Our findings are consistent with previous results: object *wh*-words tend to remain in-situ while adverbial *wh*-words are more likely to be preposed (Zuckerman & Hulk 2001; Strik 2007; Jakubowicz 2011). Results 6 and 7 (Section 3.6) suggest that it is the absence of the Fixed *be* form in adverbial *wh*-questions compared with its strong predominance in pronominal *wh*-questions that may underlie this observed asymmetry. It would be interesting to reexamine previous corpora for similar correlations.

On the basis of these results, we are now in a position to reassess previous approaches and suggest an explanation for the *wh*-in-situ/preposed alternation in child French. Approaches reviewed in Section 1.3 hypothesized that *wh*-in-situ questions are derivationally more economical than *wh*-preposed questions (Zuckerman & Hulk 2001; Hamann 2006; Strik 2007, 2008; Jakubowicz 2011). We questioned the idea of derivational cost as the sole explanation for the high frequency of in-situ questions in French child speech compared to adults, and this for two reasons. First, adults also produce *wh*-in-situ structures. Second, in *wh*-preposed-only languages (such as English), *wh*-in-situ is absent in the very earliest child productions. Nevertheless, we claim that cost can explain our data if we change perspective. A notable difference with the Fixed *be* form *c'est* 'it is' compared to All Free forms (Free *be* forms and Other Verbs) is that Free forms are always semantically heavier than the Fixed *be* form (see also Coveney's 1995 conclusions on adult speech, as reported in Section 1.1). Indeed, even Free *be* forms involve an operation of predication that does not apply in the case of the Fixed *be* form. We follow Amary-Coudreau (2011), for whom French predicational *be* (our Free *be* forms) takes a small clause whose structure depends on how the predicate organizes the relations between its arguments. In contrast, the Fixed *be* form *c'est* 'it is' only plays a role at the discourse level, by bringing together topical and focal elements. This would mean that French generates *wh*-phrases in-situ by default and so requires an additional factor to trigger preposing. This is in line with the generativist assumption that movement must be motivated and Palasis and Faure's 2014 suggestion reported in Section 1.3. This is also a step toward discarding the full optionality hypothesis (Adli 2006). In our child recordings, preposed *wh*-questions are especially frequent when there is a contrast between two or more possibilities, as with a set of cards, for example, as in (32a), or when there is an element of surprise (32b). We tentatively suggest that a feature related to the notion of contrast could be the trigger for *wh*-preposing in child French.

(32)   a.   *Où*   *il*   *est*   *le*   *papa*   *oiseau?*   (MAS, 2;07,05)

          where   he   be-PRS.3SG   the   daddy   bird

          'Where is the daddy bird (card)?'

     b.   *Qu'*   *est-ce qu'*   *i(l)*   *raconte*   *euh?*   (MAI, 4;00,24)

          what   Q   he   say-PRS.3SG   er

          'What is he talking about er?'

Our final point concerns the secondary objectives of the present study: The Fixed *be* form might also provide the beginnings of an answer to these questions. First, the variable could account for the

discrepancy between child and adult *wh*-in-situ questions (reported in Section 1). The Verb-form hypothesis makes the prediction that children should produce more *wh*-in-situ questions than adults if they produce more *wh*-questions with the Fixed *be* form than adults. The difference could be at least partly developmental, in line with Guillaume's (1927) and Bassano's (1998) findings that French children produce more copulas than adults and Clark's (1978) observations that children initially lack specific verbs and use more general-purpose verbs instead (in English, *do* and *make*). The phenomenon is well known in language acquisition as "overextension". This developmental hypothesis makes the prediction that all the children's in-situ rates should be higher than all adults' rates. Idiolectal and contextual factors could also be envisaged to explain the variation in children on the one hand and adults on the other. It would be interesting to study adult corpora in light of this new variable.

Regarding the compatibility of the Verb-form hypothesis with languages with no *wh*-in-situ in matrix information-seeking questions, our prediction is that there should be no *wh*-in-situ questions in languages with no Fixed *be* form. The prediction is borne out in English, since it is admitted that English displays no Fixed *be* form: *Le problème *(c') est la cravate* vs. *The problem (*it) is the tie* (Roy 2013). Additional work remains to be done to test the Verb-form hypothesis in other, non-in-situ languages. Finally, the Verb-form hypothesis addresses the matter of variation in the *wh*-position in French with an interfaced syntactic-semantic approach, which could probably be enriched with fine-grained syntactic, semantic, and pragmatic considerations.

Acknowledgments

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