Cross-Linguistic Influence in the Acquisition of Wh-Questions by French-English Bilingual Children: A Comparison with Monolingual French Children

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Cross Linguistic Influence in the Acquisition of Wh-Questions by French-English Bilingual Children: A Comparison with Monolingual French Children

Abstract

This study investigated the acquisition of optionality in French wh-questions by monolingual and French-English bilingual children. In bilinguals, this language pairing aimed to explore whether cross-linguistic influence occurred between languages offering two isomorphic linguistic options with varying degrees of pragmatic restriction. Data from the CHILDES database (MacWhinney, 2000) of children aged 1;04 to 4;01 were analysed. Use of wh-fronting was compared with MLUw to assess monolingual and bilingual groups at equivalent stages of development. The relationship between bilingual childrens' language dominance, operationalised as MLUw differential, and wh-fronting was also examined. Results of the corpus analysis confirmed monolingual overuse of wh-in-situ, supporting the Derivational Complexity Hypothesis. The bilingual group used higher proportions of wh-fronting, calling into question the Surface Overlap Hypothesis. Dominance impacted cross-linguistic influence but did not determine its directionality.

1. Introduction

The acquisition of wh-questions in French by monolingual and bilingual children warrants examination due to the apparent optionality of wh-movement in this construction. Monolingual children have largely been shown to use higher rates of wh-in-situ than adult speakers, demonstrating children's preference for more economical structures. However, data from Philippe (Suppes et al, 1973) dispute this (Crisma, 1992; Becker and Gotowski, 2015). With regards to bilingual acquisition, data from French-English bilinguals will reveal whether Cross Linguistic Influence (CLI) arises when both languages offer two grammatical options with varying degrees of pragmatic restriction. Some influencing factors of CLI, namely language dominance and gap structures, will also be investigated.

The present study is structured as follows: Section 2 will discuss existing literature surrounding monolingual and bilingual acquisition of wh-questions and the impact of CLI. Research questions and hypotheses will be presented in this section. Next, Section 3 will detail the corpus-based methodology employed. Section 4 will present results, and Section 5 will explain findings with reference to the literature. Section 6 will discuss conclusions, present limitations, and suggest avenues for further research.

2. Literature Review

2.1 French wh-questions

In French, matrix wh-questions can be formed as a variety of syntactic constructions, as seen in Table 1. The wh-element can be fronted, moving to spec-CP (a), or remain in situ (b). In non-subject wh-fronted questions, the auxiliary (or the main verb, if no auxiliary is present) can move to a pre-subject position (c). WH + ESK (d) is also available, in which the wh-element is fronted and followed by *est-ce que* [ESK]. Subject-verb inversion does not occur with [ESK]. Following Zuckerman and Hulk (2001), [ESK] is regarded as an unanalysed chunk which is base-generated in C^0 and functions as a Q-morpheme. Similarly, the present study will also consider *qu'est-ce que* [KESK] (e) to be an unanalysed chunk which functions as an (exclusively fronted) wh-element, rather than the periphrastic construction *que* + [ESK]. This is following evidence from Hulk (1996, in Zuckerman & Hulk, 2001), who finds that [KESK] is acquired earlier than other wh + [ESK] constructions.

Table 1 Wh-questions in French

Wh-question type	Example
a. Wh-in situ	Il fait quoi? he does what "What is he doing?"
b. Wh-fronted	Qui est l'aîné? who is the eldest "Who is the eldest?"
c. Wh-fronted with inversion	Que penses-tu? what think you "What do you think?"
d. WH + ESK	Comment est-ce que vous le connaissez? how ESK you him know "How do you know him?"
e. KESK	Qu'est que vous voulez? KESK you want "What do you want?"

While French speakers have a variety of available wh-question constructions, their use is subject to various linguistic and extralinguistic constraints and is therefore not truly optional. The present study does not have the scope to discuss the widely debated nature of these restrictions (cf. Aldi, 2006; Becker & Gotowski, 2015; Boškovic,1998; Chang, 1997; Zuckerman & Hulk, 2001). It is clear, however, that wh-in-situ use increases in colloquial French, rising from representing 50% of wh-questions when an interlocutor is unfamiliar, to 63% when they are familiar (Déprez & Gotowski, 2020). On the other hand, wh-fronting with inversion is rare, accounting for around 2% of wh-questions in colloquial French (Elsig, 2009). The present study has a focus on colloquial French as it is assumed that this is the variety that children are primarily exposed to during the acquisition period (Palasis et al, 2023), and the corpus data analysed will be colloquial, naturalistic speech.

2.2 French monolingual acquisition of wh-questions

French monolingual children have been widely reported to use a higher proportion of wh-in situ than their adult counterparts (Hamann, 2006; Prévost et al, 2014; Zuckerman & Hulk,

2001). Hamann (2006) argues that this is because children prefer more economical structures, as wh-fronting requires overt movement, whereas wh-in situ is commonly regarded as involving less costly, covert movement at LF (although there is some debate over this idea, see Cheng, 2009). This idea is further supported by the fact that wh-fronting with subject-verb inversion is almost non-existent in child speech up to as old as 5;9 (Geveler & Müller, 2015; Gotowski, 2014; Hamann, 2006; Zuckerman & Hulk, 2001). Therefore, children use wh-in situ, wh-fronting without inversion, and wh-fronting with inversion at rates corresponding to the increasing derivational complexity of these constructions. This follows the Derivational Complexity Hypothesis (DCH) (Jakubowicz, 2011) which states that young children avoid movement unless it is obligatory because it is less economical (Chomsky, 1995).

Crisma's (1992) analysis of Philippe's (in the Leveillé corpus (Suppes et al, 1973)) use of wh-questions offers an opposing view: Philippe used exclusively wh-fronted questions. Hamann (2006) described Philippe as an anomaly due to his unique input. In the corpus data, neither of Philippe's parents used any wh-in situ questions, and he therefore did not have this option available in his input. Becker and Gotowski (2015) used data from the Palasis corpus (Palasis, 2009) to show that 85% of wh-questions in child-directed speech are fronted, while only 12% of wh-questions produced by children are fronted. Becker and Gotowski assert that this asymmetry between adult and child production, combined with Philippe's exclusive use of wh-fronting, is evidence against economy. However, the same figures can be interpreted as supporting children's preference for less derivationally complex options. Philippe's lack of input for wh-in-situ simulates a linguistic environment with only one option available for wh-question construction. The DCH correctly predicts that Philippe would exclusively use wh-fronting because he is not aware that a less derivationally complex option is available in his language. On the other hand, the Palasis corpus clearly demonstrates that when both options are present in the input, children favour the more economical one.

2.3 English wh-questions

In comparison to French, English wh-question formation is substantially more restricted. In English non-subject wh-questions, the auxiliary verb and the subject must be inverted (Bruening, 2017), whereas in French inversion is possible but rare in colloquial speech (Elsig, 2009). Additionally, in many pragmatic contexts, wh-fronting is the only acceptable construction (Becker & Gotowski, 2015). Wh-in-situ is permissible in highly restricted

pragmatic contexts: both echo questions (Blakemore, 1994) and probe questions (Nguyen and Legendre, 2022) use wh-in-situ. While wh-in-situ is present in child input, studies note that monolingual English children very rarely produce these constructions (Becker & Gotowski, 2015; Nguyen and Legendre, 2022; Valian & Casey, 2003). For example, Becker & Gotowski (2015) found that 16% of all *what* questions in child-directed speech were in-situ echo questions, whereas just 0.4% of questions produced by the child were in-situ.

2.4 CLI in bilingual acquisition

CLI, or a lack of it, provides evidence for theories of bilingual language acquisition. The Separate Development Hypothesis (De Houwer, 1990;1994) claims that a bilingual child's linguistic systems remain independent until approximately four years old. Their languages cannot influence each other until later in their development, when their languages begin to interact. On the other hand, systematic influence from one language on another supports the Interdependent Development Hypothesis, which claims that the two linguistic systems develop separately but can interact, resulting in CLI (Cummins, 1991; Genesee & Nicoladis, 2007). Prior research has found that CLI can impact various linguistic domains, such as phonology (Fabiano-Smith & Goldstein, 2010; Meziane & Macleod, 2021), and at the semantic/pragmatic interface (Serratrice et al, 2004; Mazzaggio & Stateva, 2024). However, as data analysed in the present study is morphosyntactic, the present section will only discuss CLI with regards to this domain.

Constraints on CLI in morphosyntax have been suggested by a variety of studies. Hulk and Müller's (2000) Surface Overlap Hypothesis (SOH) states that two conditions must be met for CLI to occur:

(1) The construction in question must involve an interface between syntax and pragmatics, i.e. CLI will occur in the C-domain.
(2) Surface overlap must occur between the two languages.

Wh-question formation involves the C-domain (Platzack, 2001), satisfying Condition 1. Yip and Matthews (2009, as cited in Strik, 2012) suggested a modification to Condition 2: "There is surface overlap between the two languages, such that Language A allows one option and Language B allows two, one of which is isomorphic to the option allowed in Language A." (Yip and Matthews, 2009, as cited in Strik, 2012, p135). This modification is

supported by evidence from French-Dutch bilingual children in Strik (2012). Dutch only allows wh-fronting with subject-verb inversion which, according to Hulk and Müller's Condition 2, should have resulted in French-Dutch bilingual children using wh-fronting with subject-verb inversion at a higher rate when speaking French. Strik found that bilingual French-Dutch children used wh-in situ at a similar rate to monolingual French children. The two languages are not isomorphic (Dutch is SOV while French is SVO), suggesting that Yip and Matthews' modification to Condition 2 should be upheld.

Additionally, there is evidence that CLI impacts wh-question acquisition when these conditions are met from English-Cantonese (Yip & Matthews, 2000) and English-Mandarin (Guo & Qi, 2024) children. All of these languages permit wh-in-situ, whereas only English allows wh-fronting. They are also all SVO languages. As predicted, the children used wh-in-situ in pragmatically infelicitous contexts when speaking English.

The only prior study to have investigated the impact of CLI on bilingual acquisition of optional wh-movement appears to be Riham (2023). In Egyptian Arabic, complement wh-questions do not allow wh-movement. For argument wh-questions, wh-in-situ is the default option, but wh-fronting is also possible. Riham found that English-Egyptian Arabic children speaking Egyptian Arabic overused wh-fronting in argument wh-questions but used almost no wh-fronting in complement wh-questions. This research demonstrated that optional constructions are particularly vulnerable to CLI.

It must be highlighted there are significant conflicts between Riham (2023) and other studies, with reference to Hulk and Müller's (2000) conditions for CLI. Yip and Matthews (2000) and Guo and Qi (2024) argued that effects of CLI from exclusively wh-in-situ languages were present in English because English wh-in-situ was available, albeit highly pragmatically restricted. Essentially, English is 'Language B' and allows two options. Conversely, Riham (2023) stated that Egyptian-Arabic children were so strongly influenced by pragmatic constraints on wh-in-situ that English was 'Language A', with only wh-fronting available. Given evidence that English exhibits sufficient surface overlap to be influenced by wh-in-situ languages, it should not be possible for it to also function as Language A. This confound suggests that a further modification is required to the SOH (Hulk and Müller, 2000; Yip and Matthews; 2009 in Strik, 2012)

Condition 2: There is surface overlap between the two language, such that either:

(a) Language A allows one option and Language B allows two, one of which is isomorphic to the option allowed in Language A, or

(b) Language A and Language B both allow two isomorphic options with differing degrees of pragmatic restriction between languages.

Condition 2(a) is applicable to French and English: French allows both subject-auxiliary inversion and non-inversion in non-subject wh-questions, while English only allows the inverted option. This suggest that French-English bilingual children will use wh-fronting with inversion more frequently than French monolingual children. Condition 2(b) is relevant to wh-in-situ and wh-fronting in French and English. Both languages offer wh-in-situ and wh-fronting, yet wh-in-situ is highly pragmatically restricted in English compared to French. Therefore, wh-fronting is more frequently used in English compared to French. Bilingual children are likely to use wh-fronting at a higher rate than monolingual children.

2.5 Factors impacting CLI

Research has shown that the directionality of CLI is usually associated with language dominance, with the child's more dominant language influencing the less dominant language (Chantal et al, 2022; Strik & Pérez-Leroux, 2011; Yip & Matthews, 2000; 2007). The extent to which dominance affects CLI is debated. Chantal et al (2022) found that language dominance was a significant predictor of CLI directionality, while Strik and Pérez-Leroux (2011) argue that dominance is one part of a set of constraints impacting CLI. Similarly, Argyri & Sorace (2007) found that CLI was constrained by other factors in addition to dominance, but when CLI occurred its directionality was dictated by dominance. An exception to these findings is Hulk and Müller (2000), who did not find any evidence that dominance was associated with directionality of CLI.

Yip and Matthews (2007) suggested an alternative factor potentially impacting CLI in wh-questions: gap structures. In their study, Cantonese-English children dominant in Cantonese (an exclusively wh-in situ language) overused wh-in-situ when speaking English. They suggested that this may not be the result of dominance; rather it may have been that children preferred wh-in situ because it did not contain a syntactic gap. To examine this proposition, the present study will examine French-English bilinguals' French wh-questions. If CLI in wh-questions is impacted by an avoidance for gap structures, French-English bilingual

children should experience less CLI as the influencing construction (wh-fronting) contains a gap.

2.6 Research questions and hypotheses

The present study will investigate the following Research Questions (RQs):

(1) How do monolingual French children acquire wh-questions?
(2) How does CLI impact French-English bilingual children's acquisition of French wh-questions?
(3) To what extent do dominance and gap structures impact CLI?

With regards to RQ1, it is hypothesised that French monolingual children will overuse wh-in-situ, gradually increasing their usage of wh-fronting over time (Hamann, 2006; Prévost et al, 2014; Zuckerman & Hulk, 2001). This trajectory is expected to continue until children use wh-fronting in the proportions as adult French speakers (approximately 37% wh-fronting in colloquial French (Déprez & Gotowski, 2020)).

Concerning RQ2, French-English bilingual children are expected to experience CLI in their use of French wh-questions, resulting in increased rates of wh-fronting compared to monolingual French children. Bilingual children are also hypothesised to use subject-auxiliary inversion in French wh-questions more often than French monolingual children. These outcomes would support the modification made in Section 2.4 to Hulk and Müller's (2000) SOH.

The literature regarding RQ3 suggests that dominance will have at least some impact on CLI, meaning that CLI is hypothesised to occur when bilinguals are dominant in French. However, if children are discouraged from using gap structures, as suggested by Yip and Matthews (2007), they will avoid wh-fronting when speaking French and CLI may not occur.

3. Method

3.1 CHILDES

Children have been shown to use higher rates of wh-fronting in elicitation experiments, possibly because the environmental context is similar to a classroom or other more formal setting (Nguyen and Legendre, 2022). To examine children's naturalistic speech

longitudinally, the present study will analyse corpora from the Child Language Data Exchange System (CHILDES) (MacWhinney, 2000). The Paris corpus (Leroy et al, 2009) provided monolingual data. Of the monolingual corpora available on CHILDES, this corpus had the largest sample of longitudinal data for children between ages 2;0-4;0. Data were processed from both of the two bilingual corpora available in CHILDES, the GNP corpus (Paradis et al, 2000) and the Watkins corpus (Watkins, 2004). However, only data from the GNP corpus were relevant to the present study as no instances of wh-questions were found in the Watkins corpus. The children in the Paris corpus grew up in France, while the bilingual children were Canadian. While it would have been ideal to control for possible dialectal variation, no two corpora were available with a sufficient sample size for both monolingual and bilingual groups for the same dialect.

3.2 Subjects

The Paris corpus contains data from seven children growing up in France between ages 0;7-6;03. Data for five children were available in the GNP corpus with ages ranging between 1;2-4;0. Of the seven monolingual children, three were excluded: one whose age range did not match that of the bilingual data available, and two who used insufficient wh-questions to draw meaningful conclusions. Three bilingual children were excluded for using very few to no wh-questions. Ultimately, data from four monolingual children and two bilingual children between the ages 1;04.23 and 4;01.17 contributed to the present study.

3.3 Wh-element CLAN search

Data was gathered from transcripts using CLAN (MacWhinney, 2000). A KWAL command extracted French wh-elements:

> KWAL +d4 +s"combien" +s"comment" +s"laquelle" +s"lequel" +s"lesquelles" +s"lesquels" +s"où" +s"pourquoi" +s"quand" +s"que" +s"qu'est" +s"quel" +s"quelle" +s"quelles" +s"quels" +s"qui" @

These data were cleaned to ensure only wh-words used in multi-word wh-questions were accepted. Wh-elements in the following contexts were excluded:

(1) *Que* when used to mean *that*

(2) *Que* in *parce que* (*because*)

(3) Code-mixed utterances

Pourquoi over there? (Gen, 3;00.20)

(4) Wh-elements in relative clauses

C'est moi qui va mettre ça hein. (Anae, 2;10.23)

(5) Repeated wh-element within the utterance.

Pourquoi pourquoi ils s'en vont avec petit camion Père Noël?

However, if a child repeated the entire wh-question, both instances of the question were included. At times, children would repeat a question and change the position of the wh-element, demonstrating that each instance of a question represents an opportunity of the child to use wh-fronting or wh-in-situ.

(6) *Qui* (*who*) in subject position, as subject *qui* is situation at the head of the phrase when in-situ

For each child at each age, proportions of wh-fronting and wh-in-situ were calculated. To ensure precision and reliability in the monolingual group, proportions were excluded if their confidence interval width exceeded 0.3 or if they were calculated from fewer than five uses of wh-questions. The paucity of data in the bilingual group meant it was not possible to exclude any further data at this stage for this group.

3.4 MLUw and MLUw differential

CLAN was also used to calculate Mean Length of Utterance in words (MLUw) for each child at each age, using an MLT command. While MLU in morphemes (MLUm) would have provided a more accurate measurement of morphosyntactic development (Wieczorek, 2010), the transcripts did not have morphological analyses available. Nevertheless, MLUw in French will be used to compare bilingual and monolingual groups to ensure children are compared at equivalent stages of language development.

Additionally, the bilingual children's MLUw differentials were calculated at each age to assess language dominance. The children spoke limited French during recordings with the English-speaking parent and vice versa. Therefore, some recordings with the English-speaking parent were combined with recordings with the French-speaking parent. No longer than 6 days passed between any recordings that were combined. This provided more robust MLUw calculations. After combining French-English recordings for both bilingual children, MLUw were calculated for 8 ages. The median number of utterances produced at each age was 113 for French (range: 73-284) and 85 for English (range: 42-195).

MLU differential can be an effective method of quantifying language dominance (Yip & Matthews, 2006). MLUw, rather than MLUm, provides a suitable comparison between French, a more inflectionally rich language, and English, an inflectionally poorer language (Babatsouli, 2017; De Clercq & Housen, 2019).

3.5 Statistical analysis

Linear regression analysis was conducted in R (R Core Team, 2025) to compare the monolingual and bilingual groups. While multi-level modelling would have provided valuable insight into individual differences between children (Gorman, 2009), the limited sample size and number of recordings per child made this unfeasible.

4. Results

4.1 Monolingual versus bilingual wh-questions

In aggregate, across all ages, bilingual French-English children speaking French used wh-fronting more often than monolingual French children (Table 2). Both groups displayed a preference for wh-in situ, but this was much stronger for the monolingual group than the bilingual group.

Table 2 Monolingual versus bilingual wh-questions across all ages

Group	Wh-in situ	Wh-in situ (%)	Wh-fronting	Wh-fronting (%)
Monolingual (all ages)	962	82.08%	210	17.92%
Bilingual (all ages)	103	56.59%	79	43.41%

4.2 Linear regression analysis

Separate linear regression analyses (Table 3) were conducted for the monolingual and bilingual groups to examine whether MLUw predicted the percentage of wh-fronting used by children. For the monolingual group, MLUw significantly predicted wh-fronting (%) (R^2 =

0.142, F(1,45) = 7.461, p = 0.037). However, for the bilingual group, MLUw did not significantly predict wh-fronting (%) (R^2 = 0.274, F(1, 7) = 2.642, p = 0.212).

Table 3 Regression analysis results

Predictor	Monolingual	Bilingual
MLUw	0.102 *** (0.037)	-0.345 (0.212)
Intercept	-0.111 (0.109)	1.320** (0.478)
Observations	47	9
R^2	0.142	0.274
Adjusted R^2	0.123	0.170
Residual Std. Error	0.184 (df = 45)	0.339 (df = 7)
F Statistic	7.461 *** (df = 1, 45)	2.642 (df = 1, 7)

Note: *p<0.1; **p<0.05; ***p<0.01

Figure 1 displays a weak correlation between MLUw and proportion of fronted wh-questions in the monolingual group. Interindividual variation is present. For example, Théophile's proportion of wh-fronting is 16.67% at his lowest MLUw (1.127) and does not surpass this as his MLUw increases, with the exception of 63.64% wh-fronting at 3.271MLUw. Additionally, Anae, Julie and Madeleine exhibit substantial intraindividual variation. Each of them showed fluctuations in wh-fronting of over 30 percentage points across at least two intervals between successive MLUw measurements. Julie experienced the greatest degree of fluctuation, with two-thirds of successive data points showing changes in proportion of wh-fronting exceeding 30 percentage points. However, the monolingual group nonetheless display a shared developmental trajectory with usage of fronted wh-questions increasing as MLUw increases.

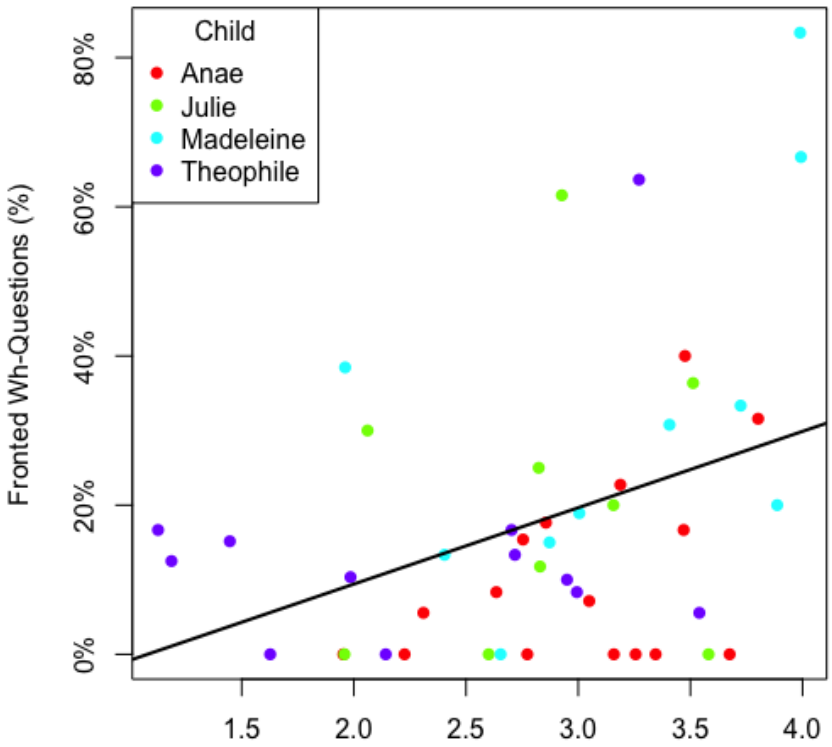

Figure 1 Monolingual use of Fronted wh-questions (%) versus MLUw

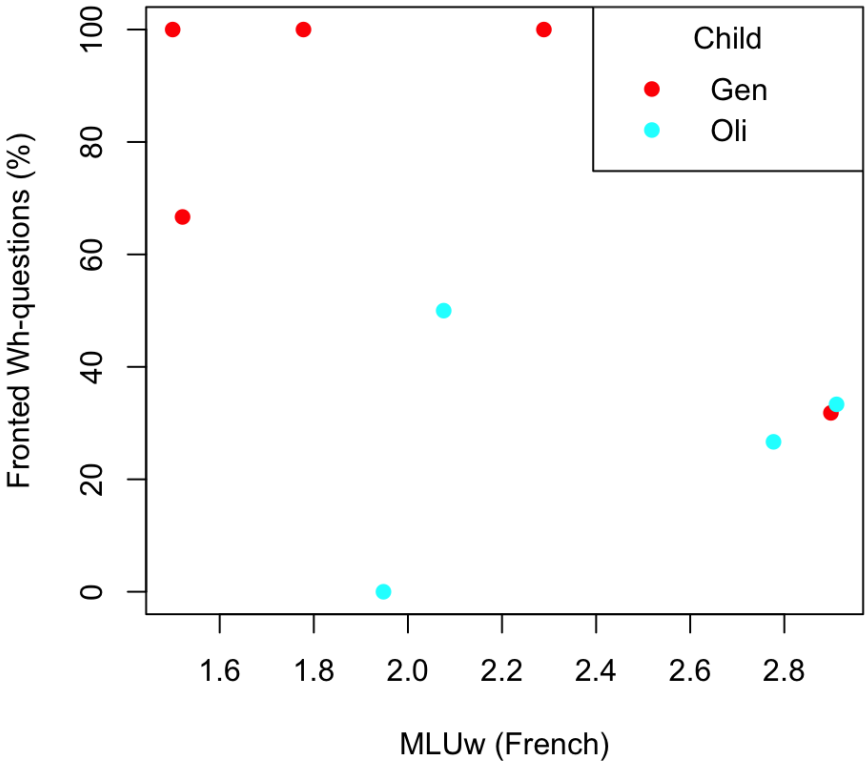

Figure 2 Bilingual use of Fronted wh-questions (%) versus MLUw

In contrast, the bilingual group (Figure 2) display significantly greater interindividual variation when wh-fronting (%) is plotted against MLUw. Oli used wh-fronting in 0.00% of questions at 1.948MLUw. After this point, it is unclear whether Oli followed an upwards trajectory similar to monolingual children, with 26.67% wh-fronting at 2.777MLUw being an anomoly, or whether he does not exhibit a relationship between MLUw and wh-fronting. It is evident that overall Oli used a higher proportion of wh-fronting than monolingual children. For instance, at 2.911 MLUw, Oli used wh-fronting in 0.33% of questions, whereas the linear regression analysis predicts that a monolingual child with the same MLU would use wh-fronting in 11.45% of questions. There does not appear to be a relationship between wh-fronting (%) and MLUw for Gen. Overall, Gen's usage of fronted wh-questions was much higher than Oli's, with 100% of wh-questions being fronted in three out of the five recordings.

4.3 Dominance and wh-fronting in bilingual children

Gen and Oli's MLUw differentials (English-French) are compared with the proportion of fronted wh-questions used at different ages in Figure 3 and Figure 4. When the child's MLUw differential is a positive value, they are assumed to be dominant in English, whereas dominance in French will be reflected by a negative MLUw differential.

Oli is dominant in French in all recordings, with an MLUw differential varying between -1.145 and -0.294. There does not appear to be any correlation between Oli's MLUw differential and the proportion of fronted wh-questions. Gen's MLUw differential ranges from -0.153 to 0.616 and they exhibit dominance in English at three out of the four data points. There does not appear to be any correlation between Gen's MLUw and proportion of fronted wh-questions. They diverge entirely from the monolingual acquisition path. Notably, Gen is also the only bilingual child to show dominance in English.

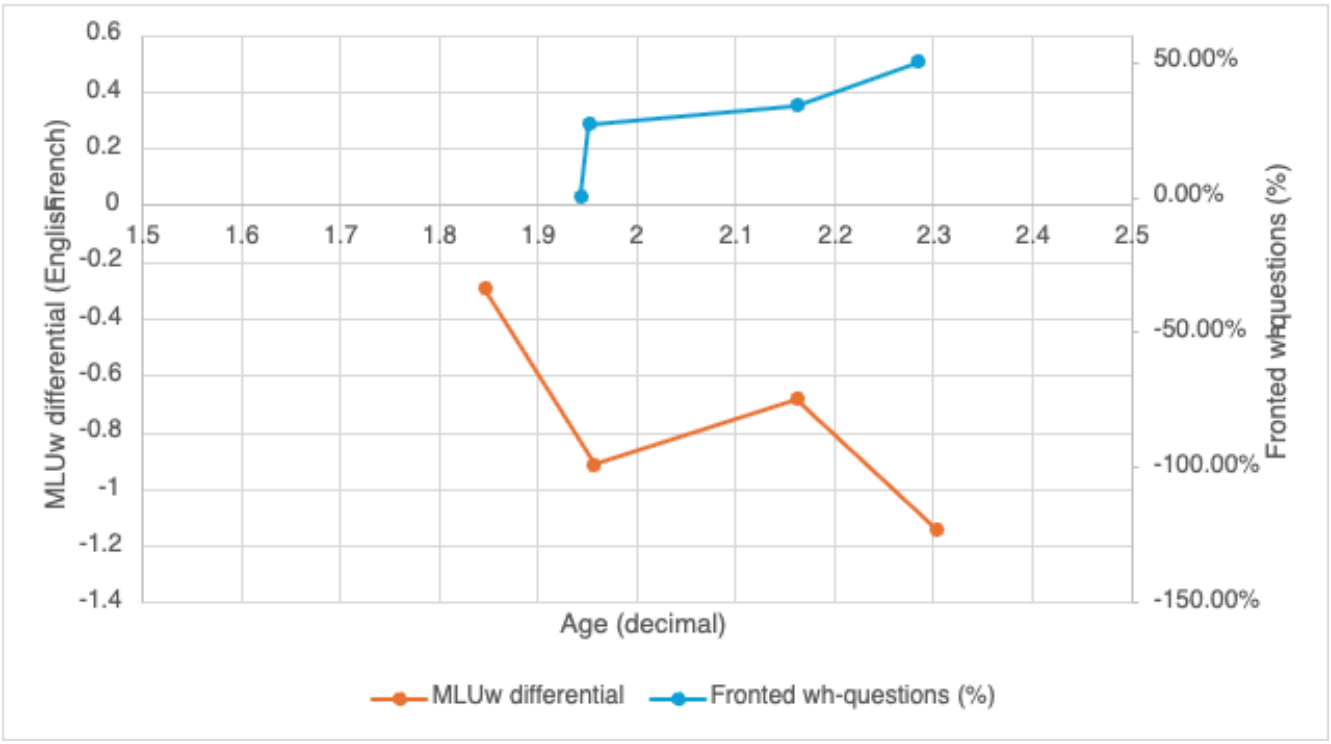

Figure 3 Oli's MLUw differential (English-French) and percentage of fronted wh-questions from 1;06-2;06

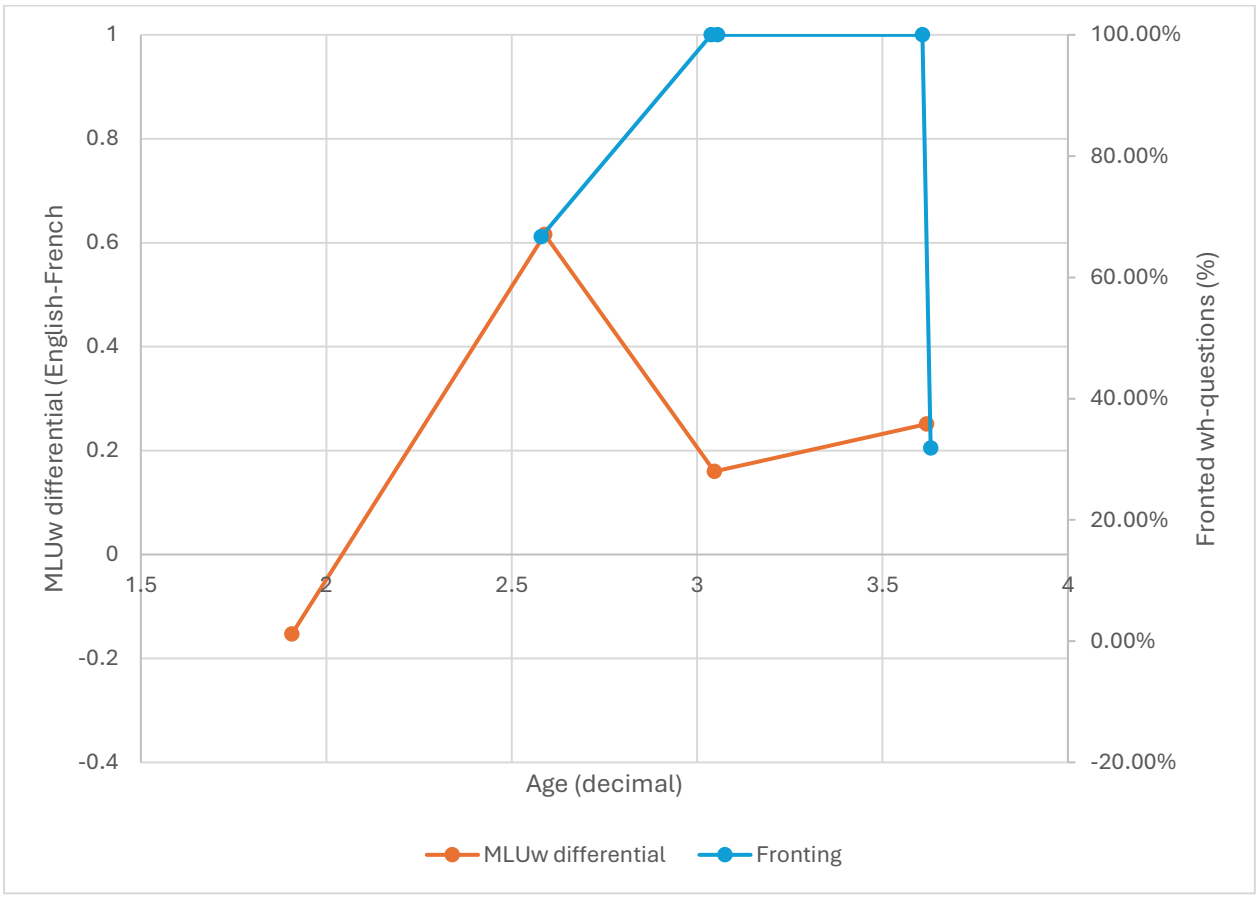

Figure 4 Gen's MLUw differential (English-French) and percentage of fronted wh-questions from 1;06-4;00

Children typically avoided wh-fronting with inversion. The two instances of wh-fronting with inversion were produced by the monolingual group (Table 4).

Table 4 Wh-fronting with inversion

Child	Group	Age	Utterance
Anae	Monolingual	4;00.12	j'ai [/] j'ai fait aller deux noirs et maintenant où sont ils (.) les (.) jaunes ?
Madeleine	Monolingual	2;11;02	Christelle où es tu passée ?

5 Discussion

5.1 Monolingual acquisition of wh-questions

In line with RQ1, the present study examined longitudinal corpus data to assess use of wh-in situ versus wh-fronting as language development progressed. The results mirrored overwhelming evidence in the literature (Hamann, 2006; Prévost et al, 2014; Zuckerman & Hulk, 2001): monolingual children overused wh-in situ and gradually increased their use of wh-fronting as their language developed. Their use of wh-fronting was significantly predicted by their MLUw. The present section will compare figures for wh-fronting found in Section 4 with other corpus studies rather than elicited production tasks due to the increased use of wh-fronting in elicited production tasks as discussed in Section 3.1. While the overall developmental trajectory described in Section 4 mirrors existing literature, monolingual children in the present study used wh-fronting less than other corpus studies. Methodological differences provide an explanation for this.

For instance, Hamman (2006) found that children aged 1;08-2;09 used wh-fronting in 19.96% of wh-questions. Monolingual children within this age range in the present study used wh-fronting in a comparable 16.36% of wh-questions. It is possible that the slight difference in exact rates is due to the small sample sizes of both studies (Hamman included 3 children). Additionally, a key methodological factor influencing results is the inclusion of different wh-elements in each study. Hamman excluded *quoi* and *pourquoi*, arguing that these elements can only be found in situ and fronted, respectively. However, Becker and Gotowski (2015) state that *pourquoi* is grammatical in-situ when used to ask, ‘for what purpose?’. One use of

'purposive' *pourquoi* was identified in the Paris corpus (Table 5 (a)). Additionally, the present study found that *quoi* was fronted by both bilingual (Table 5 (b)) and monolingual (Table 6 (c)) children. While fronted *quoi* is ungrammatical in adult French, it is still important to include this data in an analysis of child speech. Therefore, the present study opted to include both *pouquoi* and *quoi*. More instances of *quoi* were recorded than *pourquoi* (681 *quoi* to 151 *pourquoi* for monolingual children). Therefore, it is possible that the higher proportion of in-situ *quoi* resulted in the present study recording a higher rate of wh-in situ than Hamann for children of the same age.

Table 5 In-situ pourquoi and fronted quoi

Question	Child	Age
(a) Et moi j'ai des cadeaux pourquoi ? and me I have some presents for-what-reason "Why (for what reason) do I have presents?"	Théophile	2;11.28
(b) *Quoi c'est ça? what this is that?	Gen	3;00.14
(c) *Quoi faire moi? what do me?	Théophile	2;11.28

Another comparable study is Palasis et al (2019), who examined children ages 2;06-4;11 and found wh-fronting in 42.7% of their wh-questions. The present study did not analyse data from French children over 4;01.17. However, children between 2;06-4;01.17 used wh-fronting in 19.21% of wh-questions. This is substantially lower than the figure from Palasis et al, despite the lack of data from 4;00-4;11. Furthermore, no sudden increase in wh-fronting has been reported in the literature in this age range, suggesting that there must be another factor leading to this stark difference in results. A likely explanation is the difference in recording environments: the Paris corpus recorded children in their natural environments. On the other hand, Palasis et al recorded semi naturalistic data in a kindergarten classroom, encouraging children to play a game which was likely to elicit questions. It is possible that an organised activity in a classroom context was sufficient to increase rates of wh-fronting (Nguyen & Legendre, 2022). This highlights the importance of naturalistic data when investigating a construction so highly sensitive to register variation (Rowlett, 2007).

The present study provides further evidence to suggest that Philippe's (Crisma, 1992) exclusive use of wh-fronting was an anomaly which can be explained by his unique lack of wh-in situ in his parental input. Becker and Gotowski (2015) argue that Philippe's behaviour is evidence against children's preference for economy (see Section 2.2). However, it is clear that Philippe's use of wh-fronting is due to the complete lack of wh-in-situ in his input. The overuse of wh-in-situ by all children in the present study demonstrates that when children are aware that a more economical structure is grammatical, they will overuse it. Philippe was not aware that wh-in-situ was available as it did not exist in his input. Therefore, these results support the DCH.

Children's minimal use of the more derivationally complex wh-fronting with inversion may also support the DCH. However, given this structure's rarity in colloquial French (Elsig, 2009), it is unclear whether this is the result of children's preference for economy or a result of low input frequency.

5.2 CLI in bilingual use of wh-questions

To investigate RQ2, the present study compared French-English bilingual children with French monolingual children in their use of French wh-questions. As predicted, both Gen and Oli used wh-fronting at a higher rate than monolingual children overall. Therefore, CLI impacted the bilingual group's French wh-questions. Furthermore, the French-English language pairing has facilitated investigation into Hulk and Müller's (2000) SOH. Wh-in-situ and wh-fronting are both available in French and English, but use of wh-in-situ is substantially more pragmatically restricted in English. The present study has demonstrated that CLI occurs when a bilingual child's languages both offer two isomorphic options. These findings support the proposed modification made to the SOH (Hulk and Müller, 2000) (Section 2.4). Additionally, this is evidence for the Independent Development Hypothesis as there is clear influence from bilingual children's English system on their French system.

Conversely, bilingual children did not use subject-auxiliary inversion at a higher rate than monolingual children, as the SOH predicted. On the contrary, no instances of subject-auxiliary inversion were recorded for either bilingual child. It could be the case, given the rarity of subject-auxiliary inversion in the input (Elsig, 2009) and the bilingual's relatively reduced input per language (Unsworth, 2016), that bilingual children were not aware this option is available in French. If children did not have subject-auxiliary inversion available in

French, no surface overlap was present between their language systems and no CLI would occur.

5.3 The effect of dominance on CLI

RQ3 asked to what extent language dominance impacts CLI, and whether children's disfavour for gap structures may counteract this effect. Firstly, the increased use of wh-fronting in both bilingual children compared to monolingual children suggest that CLI directionality is not dictated by a preference for more economical structures, as suggested by Yip and Matthews (2007). In particular, Gen's overuse of wh-fronting demonstrates that CLI can result in bilingual children preferring more derivationally complex structures. This is in stark contrast with the monolingual preference for wh-in-situ and demonstrates the complexity of bilingual language acquisition: the DCH is insufficient in explaining bilingual use of wh-fronting.

Secondly, it is evident that dominance modulates the extent to which CLI occurs, but that it does not dictate CLI's directionality. Gen, who was generally more dominant in English, displayed a much greater usage of wh-fronting than Oli, who was French-dominant. Oli's use of wh-fronting was more comparable to the monolingual development trajectory than Gen's. Nevertheless, CLI clearly impacted Oli's use of wh-questions despite his dominance in French. Contrary to findings from Argyri & Sorace (2007), this suggests that CLI can occur from a less dominant language into a more dominant language, albeit to a lesser extent.

6 Conclusion

6.1 Concluding remarks

The present study has demonstrated that monolingual French children overuse wh-in-situ, supporting the DCH. Monolingual children used lower rates of wh-fronting compared to prior corpus studies (Hamman, 2006; Palasis et al, 2019), which can be explained by methodological differences.

Overall, the bilingual developmental trajectory was less clear than that of the monolingual group as MLUw did not significantly predict use of wh-fronting. Nevertheless, it is evidence that CLI impacted the bilingual group as they used a higher proportion of wh-fronting than

the monolingual group overall. This finding supports the proposed modification to the SOH (Hulk and Müller, 2000) (Section 2.4): pragmatic restrictions on one option in Language A can result in the alternating option being overused in Language B. Additionally, the presence of CLI supports the Interdependent Development Hypothesis.

It is evident that when CLI occurred, it was modulated by dominance. However, dominance in a language was not a prerequisite for CLI from it: Oli was dominant in French in all recordings, yet experienced CLI from English into French. Furthermore, the increased use of wh-fronting in both bilingual children demonstrates that CLI found by Yip and Matthews (2006) was not the result of children disfavouring gap structures.

Despite subject-auxiliary inversion in wh-questions fulfilling the constraints of the SOH (Hulk and Müller (2000), bilingual children did not use this construction. It is possible that children did not have this structure available in their French grammar due to a lack of input. Therefore, no surface overlap occurred between language systems, resulting in no CLI.

6.2 Limitations and areas for further research

The greatest limitation of the present study is its small sample size. Given that only two bilingual children produced sufficient wh-questions to be included in the study, the conclusions drawn from these data are tentative. Additionally, some monolingual recordings were excluded from analysis. While this served to increase the precision of the data, it also limited longitudinal conclusions. A larger sample size with longer recordings at each age would have helped to reduce the impact of interindividual variation and create more robust conclusions.

The findings from this study call into question the SOH (Hulk and Müller, 2000). Further research is required into how pragmatic restrictions impact CLI. Additionally, results suggested that the directionality of CLI was not restricted by language dominance. This finding warrants further exploration into the influencing factors on CLI.

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Appendix

Monolingual: Anae

Age	MLUw	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
2;00.01	3.159	5	0	100.00%	0.00%
2;01.05	2.226	23	0	100.00%	0.00%
2;02.16	3.345	22	0	100.00%	0.00%
2;03.29	1.953	28	0	100.00%	0.00%
2;04.28	2.31	17	1	94.44%	5.56%
2;05.29	3.47	45	9	83.33%	16.67%
2;06.26	3.802	13	6	68.42%	31.58%
2;08.04	2.635	33	3	91.67%	8.33%
2;09.23	2.856	14	3	82.35%	17.65%
2;10.23	2.754	22	4	84.62%	15.38%
2;11.22	3.476	9	6	60.00%	40.00%
3;01.07	3.256	13	0	100.00%	0.00%
3;03.00	2.773	54	0	100.00%	0.00%
3;05.22	3.049	13	1	92.86%	7.14%
3;08.09	3.188	17	5	77.27%	22.73%
4;01.17	3.675	6	0	100.00%	0.00%

Monolingual: Julie

Age	MLUw	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
2;01.22	1.958	10	0	100.00%	0.00%
2;04.24	2.061	7	3	70.00%	30.00%
2;05.21	2.824	6	0	75.00%	25.00%
2;06.22	2.927	8	1	38.46%	61.54%
2;08.27	2.601	30	4	100.00%	0.00%
2;09.24	2.83	5	8	88.24%	11.76%
2;11.01	3.157	12	3	80.00%	20.00%
3;00.30	3.581	7	4	100.00%	0.00%
3;07.19	3.512	22	7	63.64%	36.36%

Monolingual: Madeleine

Age	MLUw	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
1;11.13	1.961	8	5	61.54%	38.46%
2;01.02	2.404	13	2	86.67%	13.33%
2;02.06	3.005	48	0	81.08%	18.92%
2;03.03	2.872	34	6	85.00%	15.00%
2;04.15	3.407	30	7	69.23%	30.77%
2;05.12	3.724	9	4	66.67%	33.33%
2;06.10	2.654	8	4	100.00%	0.00%
2;08.05	3.887	14	0	80.00%	20.00%
2;09.17	3.989	2	10	16.67%	83.33%
3;09.07	3.993	9	3	33.33%	66.67%

Monolingual: Théophile

Age	MLUw	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
2;07.04	1.187	7	1	87.50%	12.50%
2;07.29	1.127	10	2	83.33%	16.67%
2;09.07	1.627	9	0	100.00%	0.00%
2;10.01	1.447	28	5	84.85%	15.15%
2;10.27	1.985	26	3	89.66%	10.34%
3;02.00	2.994	11	1	91.67%	8.33%
3;03.02	2.718	13	2	86.67%	13.33%
3;04.10	2.703	10	2	83.33%	16.67%
3;05.11	2.95	9	1	90.00%	10.00%
3;07.08	3.54	17	1	94.44%	5.56%
3;08.15	2.142	8	0	100.00%	0.00%
3;11.15	3.271	4	7	36.36%	63.64%

Bilingual: Oli

Age	MLUw (French)	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
1;11.10	1.948	2	0	100.00%	0.00%
1;11.13	2.777	44	16	73.33%	26.67%
2;01.29	2.911	20	10	66.67%	33.33%
2;03.13	2.076	4	4	50.00%	50.00%

Bilingual: Gen

Age	MLUw (French)	Wh-in-situ questions	Wh-fronted questions	Wh-in situ questions (%)	Wh-fronted questions (%)
2;06.29	1.521	3	6	33.33%	66.67%
3;00.14	2.289	0	25	0.00%	100.00%
3;00.20	1.5	0	2	0.00%	100.00%
3;07.09	1.778	0	2	0.00%	100.00%
3;07.17	2.899	30	14	68.18%	31.82%