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Héloïse Clain

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## Abstract (English version)

The will and need to understand bilingual children's use of their languages, and their overall development, usually compared to their monolingual peers, has been spilling a lot of ink for many decades now. The present research aims at deepening the understanding of this evolution and use, with an added analysis of the Code-Switching (CS) phenomenon. Thanks to the deep investigation of the speech on transcripts of a sample of bilingual children, through the analysis of multiple dimensions of language use, and by comparison with a sample of monolingual children, we managed to both confirm previous research that concluded to an absence of delay in bilingual children's overall language development, although we found a slight delay in specific parts of the language such as pronunciation and word types use, and we found how great of a help CS is for these children, thanks to their ability to call on either languages to compensate any lack of words in their speech production. Our research also contributes to the literature on the importance of bilingualism starting before the age of 5, as we found it leads to positive outcomes for the children's language development, when focusing on some details of the language such as errors and language production, for example. Apart from understanding child bilingualism and CS, another goal to this research is to present the possibility of a bright future to the parents and caretakers who will be confronted to bi-multi-lingual children. Indeed, we give them access to a study that also presents long term results, well into adulthood, and the opportunities that are offered to people raised with two or more languages. Finally, this research is only the beginning of a broader study aiming at understanding and presenting the positive role of bilingualism and CS in children, not only under 5 years old, but well after that age too.

## Summary (French version)

La volonté et le besoin de comprendre l'utilisation des langues dont font usage les enfants bilingues ainsi que leur développement global, généralement comparé à leurs pairs monolingues, font couler beaucoup d'encre depuis de nombreuses décennies. La présente recherche vise à approfondir la compréhension de cette évolution et de son utilisation, avec une analyse complémentaire de la méthode du Code-Switching (CS). Grâce à l'investigation approfondie du discours bilingue par l'analyse de multiples dimensions de l'usage de la langue avec pour support des transcriptions d'un échantillon d'enfants bilingues, en comparaison avec un échantillon d'enfants monolingues d'âge identique, nous avons réussi à confirmer des recherches antérieures concluant à une absence de retard du développement global du langage chez les enfants bilingues, bien que nous ayons trouvé un léger retard dans des parties spécifiques du langage telles que la prononciation et l'utilisation des types de mots. Nous avons par ailleurs constaté que le CS est d'une aide avérée pour ces enfants, grâce à leur capacité à faire appel à l'une ou l'autre langue pour compléter leur production de parole. Notre recherche contribue également à la littérature sur l'importance du bilinguisme commençant avant l'âge de 5 ans. Nous avons non seulement confirmé les résultats issus d'études antérieures sur le développement du langage des enfants, mais nous avons également mis en lumière de nouveaux résultats en nous concentrant notamment sur certains aspects du langage tels que les erreurs et la production du langage. Outre la compréhension du bilinguisme et du CS chez les enfants, un autre objectif de cette recherche est de présenter la possibilité d'un bel avenir aux parents et aux tuteurs qui seront confrontés à des enfants bi-multi-lingues. En effet, nous leur donnons accès à une étude qui présente également des résultats à long terme, jusque dans l'âge adulte, ainsi que les opportunités qui s'offrent aux personnes élevées avec deux langues ou plus. Enfin, cette recherche n'est que le début d'une étude plus large visant à comprendre et à pré-
senter le rôle positif du bilinguisme et du CS chez les enfants, non seulement avant 5 ans, mais bien après cet âge également.
> "The child's thought is non-deliberate and unconscious of itself. Gow, then, does the child eventually reach awareness and mastery of his own thoughts?" (Tygotsky, 1986: 169)

## General Introduction

What is the nature of linguistic knowledge? Is there a distinction to be made between language and speech? These questions have been asked for centuries now, leading to the development of a wide range of theories. Many studies have enabled the different domains that are linguistics, sociology, psychology, and so on to sometimes come together (e.g., psycholinguistics or sociolinguistics) and work on these theories. By the end of our research, we hope to be able to understand what bilingualism and Code-Switching (CS) are, how they work, as well as their use, results which would also contribute to improving our knowledge on language and speech. A great number of the world's population being at least bilingual, at best multilingual, it is crucial to bring awareness and knowledge on the use of CS in bilingualism, since it is commonly used by children who are brought up bilingual. As a brief reminder, CS is the well-known phenomenon used by bi-multi-linguals involving switching from one language to another. The subject of bilingualism comes back again and again in the different fields in linguistics and many publications claim that the use of CS is voluntary and completely conscious, while others believe that it is unintentional and unconscious. Before going into a more detailed discussion on CS, it is important to look at how bilingualism has been considered in the last decades. In Chapter 1, we will start by analysing a few theories, starting with the one postulating innate linguistic knowledge, the Universal Grammar (UG) developed by Noam Chomsky, followed by constructivists such as Jean Piaget who believe
in the development of language over several years, going in tandem with the child's experience about their environment and surroundings (parents, relatives). His theory focuses on the development of the child's language "depending on the social and physical relationships with the world surrounding us" (Dubuc, 2002, our translation). These will be followed by the theory of complete influence of cultures or language on the mind, developed by Edward Sapir and Benjamin Lee Whorf. Finally, last but not least, we will present the theory describing a system of marked codes, and developed by Carol Myers-Scotton (1993/1995) who looks into the origin of CS. She theorises the existence of filters allowing the speakers to choose how and in which language they will be speaking. We also mention the innateness hypothesis, for which the ability of learning and speaking multiple languages at once could come from a heritage left in our genes by our long-gone ancestors.

After detailing what CS is, as well as how and why it is used and the involvements towards the different phonological systems of the languages used, we have included the study for during our Master's thesis (Clain, 2015), based on recordings selected from the CHILDES ${ }^{1}$ database. We chose to include this study since its results were promising, and since we believe they still could be improved and detailed in the current study by observing whether children do deliberately use CS with full awareness, or, on the contrary, use a phenomenon that is fully instinctive and unintentional.

In Chapter 2, the focus will be on our own field study in which thirtysix transcriptions of twelve bilingual children, thirty-three transcriptions of twelve English- and French-speaking monolingual children are analysed. This will allow for the analysis of the bilingual children's level of awareness on their own language, by comparing the children's language use according to which parent or adult is present. This field study will be made comparing the bilingual children under study with monolingual children of similar age. This chapter will be divided into

[^0]three sections: the acquisition of language of bilinguals before the age of 5, that is supposedly the age where the Critical Period for Language ends; the development of bilingual children's language(s) between 5 and puberty, seen as the period of time where the plasticity of the brain is still somewhat good, allowing for the acquisition of interesting language learning skills; and finally, the language acquisition of bilingual children after the beginning and the end of puberty, that is between prepuberty until the end of puberty. Further analyses should be done on adult language acquisition with the same pattern, in order to see if people who grew up bilingual have a better use of language than monolingual people. Different results will be brought about the language development of bilingual children in comparison to their monolingual peers. Various parts of the language acquisition will be analysed, from children's language awareness, to their use of diverse parts of the language and their errors. We will also mention the transfers occurring between the languages, leading to a comparison of the results on second-language learners' as well as bilinguals' language development. We will develop this section into more details on acceleration and delay transfer, as well as balanced and unbalanced bilingualism, which will provide answers regarding difference between transfers and CS.

We also try to answer the question about whether there is an overall non-skill in languages regarding simultaneous or sequential bilinguals by reporting research on receptive-expressive gaps.

In order to project the study in the future of bilingual subjects, we analyse the advantages of being bilingual, what it can bring in a person's professional or personal life, to international companies seeking globalised growth, but also in a country's sociolinguistic evolution, taking the example of Canada and the United States.

Our study will take several points of view successively: the sociolinguistic point of view (in Chapters 1 and 2) and the biological and cognitive points of view (Chapter 3). Our method will be a
comparison between bilinguals and monolinguals, on several parameters, including their performance at school and in jobs.

# I. CHAPTER 1: STATE OF THE ART ON BILINGUALISM AND CODE-SWITCHING 

## Introduction

Languages and their evolution have been studied and analysed for centuries. In their time and age, Greeks and Romans had started to wonder about essential questions on the evolution of languages and the differences between languages. Centuries later, Saussure (1916/2005: 125) wrote that:

> "If words were meant to represent given concepts, they would each have exact matches for meaning purposes from one language to the other; yet, this is not the case"."

Following this, we can see why it is interesting and important to analyse the acquisition of languages, differences and similarities alike. For the past forty decades, studies on bilingualism have multiplied and many theoretical, or formal responses have emerged from questions raised several years before, leading to new interrogations and new theories. In this first chapter, we will go into detail about CodeSwitching (CS), providing definitions of the different types of switchings that exist, and looking at borrowed and loan words too. We will present the possible motivations for CS, whether it be a sign of confusion or a phenomenon for completion in the case of unbalanced bilingualism, which will also be explained in the first chapter, as well as its opposite, balanced bilingualism. Moreover, we will also go into details about the phonological systems, but also the difference that exist between CS and code-mixing. Then, we will detail and analyse the studies of some of the most famous linguists and we will see their connection with our current study. We will start with Noam Chomsky's Universal Grammar (UG), then move on to Jean Piaget's

[^1]Constructivism, to the anthroponymic Sapir-Whorf Hypothesis of Jean Sapir and Benjamin Lee Whorf, and, last but not least, to Carol Myers-Scotton's "Markedness Model" and closely related research, the 4-M Model.

Several definitions of CS have been developed over the years, for example by Myers-Scotton (2006: 44/234), for whom bilingual speech in "bilingualism is the ability to use two or more languages sufficiently to carry on a limited casual conversation", allowing for the inclusion of all types of languages, as well as several levels of language proficiency. This definition separates bilingual speech into three types of switches, starting with the well-known CS, defined as the use of the parameters of two or more languages in the same utterance; followed by convergence, and the related Pidgin and Creoles, which are seemingly chaotic alignment of words or, as stated by Sampson (2008: 57), a "crude communicative system which sometimes comes into being when speakers of different languages have dealings for limited purposes". On the other hand, CS's clear definition would be as follows: "the successive use of two linguistic systems in one utterance or conversation".

Bullock et al. (2017: 218) clarify the term of convergence in comparison with divergence. In the field of CS, they are both phenomena appearing in a bilingual context. The authors state that CS is "characterized by divergence: [as] the alternation between linguistic systems that are kept distinct". As for convergence, the distinction is harder to tell, as the two systems become so close together that their structures also become more similar, "sometimes to the extreme point that the boundaries between languages collapse". Consequently, thanks to the use of conversation by bilinguals, "the 'structural constraints' that once functioned to preserve the autonomy of the languages while a speaker code-switches between them are gradually abandoned" (2017: 218). This leads bilingual speakers to more freedom in mixing between their languages as they "perceive more overlap between languages".

Myers-Scotton (1993) claims that there might be different levels in bilingualism where an utterance can be named bilingual, with the use of "surface-level words from two languages" which are rather "abstract rules" than "actual words".

Another major linguist, whose ideas will be developed in more details as an opponent to Chomsky, is Gumperz (1982: 59) who has developed his own definition of CS as an utterance in which a "juxtaposition of passages of speech [is made,] belonging to two different grammatical systems or subsystems". It seems as though the speaker expresses the same idea in both languages, even though in this case, they are put side by side to assert one single concept.

Finally, we tend to follow Poplack's definition (1980: 583) in which CS is "the alternation of two languages within a single discourse, sentence or constituent". Poplack develops a simple, yet precise definition of CS, narrowing it down to discourse, sentence and constituent.

If we were to give our own definition of CS, it would be "the use of the parameters of two or more languages in the same utterance or conversation" including all the different types of CS such as "codecopying", "code-alternating" and "code-meshing", for example.

Explaining CS has become tricky over the years and even decades as more people have tried to define it by using new terms and increasingly dissecting the different languages and their usage by bilinguals. In order to understand the definitions and develop our own theories, we need to understand those of past and present linguists.

We will also present Levelt's Model of Speech Production and the model it inspired for bilingualism. We will look at how the systems provide an insight to understand the use of bilingualism, in comparison to monolingualism.

For the present study, we stopped our analysis with children up to 5 years old. Here is the reason for such a choice: we follow the Critical

Period of Language (CPL) learning which supposedly finishes at 5 years old. We do however mention some studies which have analysed the language development of children up to 7 or 10 years old, as possible CPL, in order to show that if our analyses disprove our hypothesis, there is still a possibility for it to be confirmed for children after 5 years old. There is a detailed description of the research and studies on children's language development before 5 years old, between 5 years old and until puberty, and finally after puberty and into adulthood (cf. Chapter I.8.). We are planning to proceed to further research on the analysis of bilingual children's language development between 5 and 10/13 years old, and then later on from 10/13 to adulthood. If the current study contradicts our hypothesis that bilingual children have a greater language development than monolinguals, it would be interesting to see if children after 5, and then teenagers and adults, catch up with a possible delay that would be found in this study, or on the contrary, if a positive development remains while the CPL decreases. Finally, we will present a preliminary analysis which was part of our Masters' thesis, which results showed relevant information regarding bilingualism and language awareness and development.

## I.1. What is Code-switching?

Contrary to previous belief, CS is no longer considered as having negative effects on the mind and on language development. Instead, it is now seen as an important part of the bilingual's language evolution process in each of their different languages. It has been proven that it brings out the speaker's cognitive aptitude to go from one language to the other and that it reflects the intelligence.

In order to illustrate the different types of CS, Poplack (1980: 615) has developed Illustration 1 :

a. Inter-sentential switching

b. 'tag'-switching

c. Intra-sentential switching

Illustration 1: Different types of CS according to Poplack (1980: 615)

## I.1.1. Inter-sentential (or extra-sentential) Switching

There are several types of CS. One type of CS appears outside a sentence as can be seen in Figure $a$. on Poplack's summary (1980: 615) in Illustration 1. This is when the changes occur between the different utterances in a single conversation. For example:

1) Va te laver les mains s'il te plaît, ou tu n'auras rien à manger

Mais maman, je suis trop petit, can you come and help me?

As we can see, in example 1, CS appears at the boundary between two sentences.

## I.1.2. "Tag"-switching

Tag-switching is visible in Figure b. on Poplack's summary (1980: 615) in Illustration 1. This appears when the person includes a "tag", a word, an onomatopoeia, "interjections, fillers, [...] and idiomatic expressions" (Poplack, 1980: 605) from another language within a sentence.

For example:
2) CHI il dit il dit euh how do you say treasure?

FAT un tré
CHI un trésor ! ribit ribit Oh ah c'est juste un une grenouille

As we can see in example 2, an onomatopoeia from English ("ribit ribit") is included in the sentence in French.

Poplack (1980:589, 606, 613) describes intra-sentential CS and intersentential CS (which will be detailed later on) as both being used by fluent or "true" bilinguals. On the other hand, tag-switching (extrasentential CS) is mostly used by less proficient bilinguals. According to her, these tags have the possibility to be used anywhere in an utterance "without fear of violating any grammatical rules", hence the fact that less proficient bilinguals favour it.

## I.1.3. Intra-sentential Switching

CS, or code-mixing, can also appear inside a sentence, as shown by the Figure $c$. in Illustration 1 (Poplack, 1980: 615). It appears inside the sentence itself as in the following example:
3) FAT pourquoi, qu'est-ce qu'il a comme la même chose que Squicks

Comment il est par rapport à Squicks?
CHI mm parce que of his whiskers

As we can see at the end of the child's utterance in example 3, the changes appear inside the sentence.

Regarding the skills and grammatical proficiency of bilingual children (and adults) who make use of any of the different CS, Poplack (1980) believes a certain degree of proficiency of both languages' grammar is needed to use intra-sentential CS. In comparison, inter-sentential CS or tag-switching are mostly used by speakers with less fluency and knowledge in both or one of their languages, as illustrated by Poplack (1980: 602). In Illustration 2 below, intra-sentential CS calls on many different aspects of grammar (determiner, nouns, subject nouns phrase, object noun phrase, auxiliary, verb, verb phrase, independent clause, subordinate (and relative) clause, adjective, predicate adjective, adverb, preposition, phrases, conjunctions), whereas extrasentential CS only is used with a smaller number of syntactic categories (sentence, filler, interjection, idiomatic expression, quotation, tag).


As seen with examples 1 to 3 , our sample of bilingual children does also use the different types of CS. However, researchers such as Weinreich et al. (1968: 73) believe in the "ideal bilingual switches" made according to specific rules for the place of switch, which is, for him, "certainly not within a single sentence", but rather with purpose and mind, meaning that the children would choose the ideal place to CS. The observation made in the current study clearly distances us from the ideal posed in 1968 by Weinreich et al. (1968).

## I.1.4. Within a word itself

A switch can occur within a word itself, as in the boundary between two morphemes.
4) CHI ton tour (english $/ \mathrm{r} /$ )

FAT pardon?
CHI is it your turn?
FAT $x x x^{* 3 ' s ~ t u r n ~}$

In example 4, the child has made a switch in the word "tour", starting it in French and ending with an English /r/.

The evolution of the new technologies has allowed for the creation of many of these words now used by everyone, monolinguals and polyglots alike, as seen in the following example (5):
5) J'ai Skypé avec mes parents hier soir.

This phenomenon can also be seen with words such as "Googler", "Scroller", "Swiper", "Twitter", un "gamer", etc. These words possess

[^2]the English base with the French ending and can be conjugated just like a French verb.

## I.1.5. Other Code-Switching phenomena

## I.1.5.1. "Code-meshing"

A phenomenon called "code-meshing", and described by MichaelLuna \& Canagarajah (2008), and Sanchez Martin (2013), has drawn our attention. Unlike CS, which "refers more to the lexical level of [verbal] language interaction, [...] code meshing is embedded in discourse, the pragmatics of these two phenomena also vary a lot". It is claimed that "[w]hile code switching is employed to 'negotiate identities', code meshing is an act of resistance (2008: 58)".

According to Michael-Luna \& Canagarajah (2008) and Sanchez Martin (2013), "code-meshing" requires more cognitive effort than CS, but is also not used the same way and for the same reasons as CS. "Code-meshing", "as an act of resistance", can be used to purposefully exclude someone from a conversation or a written text. This is why it supposedly requires more intellectual effort not only to produce the discourse, but also to understand it. In order to give a clear definition of "code-meshing", we may reuse Forgione \& Radcliffe's words (2006), as quoted by Canagarajah (2006): "code-meshing" is really mostly used to introduce, or "merge" dialects and "local varieties with Standard Written English". The purpose is to go towards an acceptance of different styles in English academic writings and "develop[...] multilingual competence for transnational relationships". We can find different academic documents written in "code-meshing" for the purpose of contradicting the "oppressing" traditional and standard English writing, such as Hancock \& Kolln's "Blowin' in the Wind: English grammar in United States schools" (2010), in Locke's Beyond the Grammar Wars: A Resource for Teachers and Students on

Developing Language knowledge in the English / Literacy Classroom (2010: 21-37) ; or full books such as Talkin and Testifyin: The Language of Black America by Smitherman (1977); or Terry's, Afrovegan, Farm-fresh African, Caribbean \& Southern flavors remixed (2014: Vii-viii; Harris "Permission to speak"), as stated by researchers at the University of Rochester.

## I.1.5.2. "Code-swapping"

This phenomenon comes in parallel with CS as it simply shows the possibility to include words from a dialect inside a conversation in English, or any other language.

The goal is to focus on the use of dialects in a conversation in order to understand or be understood assuming one would speak the main language fluently enough. Certainly, populations who use their dialect every single day such as Irish, Welsh or Scottish had to call on this phenomenon for many years now, probably since the arrival of the "Britons" on their lands. This applies to French as well of course, with the different Creoles found in the French Overseas Department, or the regional languages.
6) "Your face is my heart Sassenach, and the love of you is my soul" (Jamie Fraser, Outlander)
'Sassenach' is a Scots term used in the English sentence.
7) Ou lé obligé d'aller à l'école !
'Ou lé' is a Reunionese Creole term inserted in the French sentence.

In examples 6 and 7, we present only two of the many different examples existing within creoles, dialects, regional language, and so on, used with standard languages.

This phenomena in question mainly emphasises the importance of dialects at an academic level, but it is still rarely heard of.

Moreover, it could also be used as a means against English supremacy. The reason being that although English was forced onto other languages and cultures during the dominion era, people with dialects in return force their very own languages onto English, in order not to be drowned under Standard English. That is another reason why a new English is currently developing, including "slang", or borrowed words, from dialects and creoles, creating new 'languages' such as Hinglish or Frenglish (as already briefly mentioned):

## 8) Hinglish:

CS version: "You are pooching Hinglish kya hai?"
Translation: "You are asking what is Hinglish?" (Online forum Quora)

In examples 8 above, Hindi and English are part of the same conversation, supposing that the other person understands both languages, or it can be done on purpose to exclude the non-speaker of one or the other language.
9) Frenglish:
"Je vais te destroy, tu verras !"

In example 9, the English word "destroy" is included in the French sentence in order to provoke, or accentuate the threat, weather the interlocutor understands both languages or not.

## I.1.5.3. "Code-copying"

Johanson (2002: 251/261), who developed the term "code-copying" claims that it can nowadays still be confused with "interference [which] has negative connotations, implying deviations from
monolingual norms, and suggesting phenomena that cause impaired communication". He explains that the term "code-copying" could also be seen as the more common term "borrowing", even though there is a difference between the two. A copy usually describes something that "can be distinguished from the original" and, compared to borrowing, "there is nothing given up and nothing given back".
10) Global (semantic) "code-copying":

J'adore me mettre du nude sur les ongles, c'est trop classy ${ }^{4}$
"Code-copying" is increasingly used in the younger generation with the development of the internet and cross-cultural communications. In the example 10 above, the words "nude" and "classy" are regularly used in these specific cases. Their origin is obvious, which makes them copies.

Johanson (2002) also explains that there can be "different degrees of copying" according to the different properties which can possibly be copied ("semantic, combinational and frequential"). They can however be "copied entirely", or also called "global", and mostly seen as borrowing, or "partially" / "selective", also described as loans, while each type attracts different properties that can be copied accordingly.
11) Combinational "code-copying": "Je l'ai shooté !"

The English verb "to shoot" has become a gallicised version "shooter", which has changed the structure of the verb: the English transitive verb (to shoot someone) changed into an intransitive verb in French: tirer sur quelqu'un ("Je lui ai tiré dessus"), because of the inclusion of a "code-copying".

[^3]12) Frequential "code-copying": "The ready-to-wear collection is superb this season!" copied onto the French "prêt-à-porter" which are both used indistinctly in the fashion world.
13) Selective "code-copying": "Les étudiants sont très effectifs" ${ }^{5}$ where the term "effectifs" was copied into the French sentence from the word "effective" in English, and is becoming more mainstream.

## I.1.5.4. "Code-alternating"

Auer (1995: 116) introduces the term "code-alternating" to cover all the types of CS we have previously described, but mostly CS and code-mixing. While he explains that "code-alternating" can have different definitions according to the context of use, it can be assumed that they are sensibly the same: "a relationship of contiguous juxtaposition of semiotic systems, such that the appropriate recipients of the resulting complex sign are in a position to interpret this juxtaposition as such".

He then explains that "[a]s Poplack (1998: [130-132]) mentioned, code alternation tends to have different functions in different communities. In a multilingual community, code alternation serves as a communicative device, by which the bilingual's creativity is put to advantage".

As broader as "code-alternating" may be in its use, including all linguistic forms, CS is more about context. If explained in the way of Gumperz (1982: 131), contextualisation is about "how each sentence relates to what precedes or follows" which he calls "contextualization cues". These cues are not openly mentioned and remain subtle, being mostly part of how the conversation is perceived.

[^4]In order to bring some more details to the explanation of code alternation, Gumperz (1982: 66) sees that "code-alternating" can also be seen "as a contextualization cue signalling contextual information equivalent to what in monolingual settings is conveyed through prosody or other syntactic or lexical processes". It shows that while monolinguals make use of prosody and syntactical parameters as well as lexical processes, bilinguals can also make use of "codealternating" in order to bring all the information into context. It would seem that code alternating can be visualised as a more socio-linguistic phenomena, involving inter-communicative reasons for its use. Auer's definition (1995: 116) of "code-alternating" can be recalled "as 'a relationship of contiguous juxtaposition of semiotic systems' [...]". Auer (1984: 24-25, 1995), has also made the distinction between "discourse and participant related language alternation". When it is discourse-related, his claim is linked to Gumperz' (1982) contextualisation cues, as he states that the use of "code-alternating" is to organise the conversation for all speech acts. He compares it to monolinguals who will also proceed to these adjustments in context. Bilinguals however have access to two linguistic repertoires, and can therefore use "code-alternating" as a "contextualization strategy". The second one is more likely participant-related alternation as the speakers must come to an agreement about the language needed to be used in the conversation. It should also be adequate for all involved parties. There should therefore be a use of a bilingual medium where the conversation will be organised between two available languages. This one is located in place of an intrasentential switch without switching the whole language. In this case, the word, or section of words, from the other language is included, to then resume the conversation in the original language.

These allow us to understand the different types of code-alternations that can be assessed, and the complexity of CS in general, according to the place, the type, or the context.

## I.1.6. Borrowing from one language to another

In our daily life, something borrowed is something that is to be given back. In CS, certain items from one language are used in the other language once, while keeping most of their phonological properties. They might never be used again in this very way as the word does not belong and is not fully integrated into the borrowing language. This phenomenon is the first step on the way to having a "loanword" - a phenomenon that naturally happens when there is contact between two languages, two cultures, and where the words from language A are integrated into the lexicon of language $B$. At this point, it is hardly possible to distinguish if it is a foreign word or a word from the host language (e.g., "pyjama", "tornado", to name only a few). The very pronunciation of the word changes to adapt to the host language. CS, code-mixing, tag-switching, and others, only make a temporary use of the words - at the time of the conversation. People using this phenomenon do not necessarily use the same switched words in each and every conversation. However, if we were in a loanword situation, the used words would always be the same ones, at the same place, no matter the conversation, the context, or the interlocutor. A few loanwords from French are "café", "hors d'oeuvre", "lingerie", "genre", "faux pas", which are words that are regularly used in conversational English and which pronunciation is more or less adapted for the English tongue, even though it is still very clear that they were taken from another language.

To summarise the difference between borrowings, loanwords and CS, we can firstly take the example of Pfaff (1979: 296) who emphasises the specificities between two types of borrowings: "spontaneous borrowings" and "incorporated borrowings". The first ones are borrowings integrated to a language's sentences, but that can be distinguishable when encountered as it does not take the grammatical and lexical forms of the host language such as the word "terrace" for example. This specific word was borrowed from the French "terrasse"
and is used in English, and is also transformed into "terraced" for example. The second ones however are integrated into the language and are transformed with the grammatical and syntactical rules of the host language as in "pyjamas". Pfaff (1979: 296) then explains that "[s]witches [...] are characterized as beginning at 'clearly discernible syntactic junctures' and 'having their own internal syntactic structure'", making the switched words more noticeable in a sentence. While they keep the linguistic structure of the original language, they cannot be part of the most used language.

Labov (1971: 457) came first when he explained that "bilingual speakers do produce strange mixtures of the two languages [...]". He emphasises on the fact that, despite a great amount of research, how "such rapid alternation is [or is not] governed by any systematic rules or constraints" remains a mystery. According to him, this is why it should be "describe[d] as the irregular mixture of two distinct systems", in order to make the difference with any other definition which would eventually define CS as having a specific pattern.

This can also play the role of an accurate definition of CS developed by Grosjean (2008: 119). He firstly states, as has Weinreich (1966), that the first definition is "a borrow[ed] lexical item from the guest language [...] integrate[d] phonologically and morphologically into the base language". The second definition is then "to shift completely to the guest language - for a word, a phrase, a sentence, for example". Labov (2008: 161) also gives a brief definition of loanwords, as words that used to be borrowed words, but have become integrated into the host language over time. These words are used by both bilinguals and monolinguals, such as "'weekend', 'jazz' in French; 'fiancé', 'croissant' in English". The tricky issue is to determine if it can be a borrowed word, a loanword, or if it simply is CS.

Indeed, it is shown that a borrowed word is a word always used at the same place which is obviously taken from a foreign language:
14) I'm going to the café, with a bouquet of flowers ("café" and "bouquet" being French words inserted into an English sentence, while keeping the stress pattern of the original language).

A loanword is a formerly borrowed word which has progressed over time to the point of being a foreign word used in a language. It has however lost its foreign connotation, even though some of them do keep certain features of the original language:
15) Darling, put on your pyjamas. ("pyjamas" coming from the Hindi word "pāy-jāma", included into an English sentence).

Only to picture the difference, the word "cafe" in example 14 above was included into the English language at the end of the $19^{\text {th }}$ century, while the word "pyjama", in example 15, was first used in English around the $18^{\text {th }}$ or early $19^{\text {th }}$ century.

CS is different, as one word or a suite of words is randomly used from one language to another, at the speaker's discretion. Its origin is obvious, as it does not sound nor look like it is from the host language. Moreover, it does not keep a specific place in the utterance, as can be seen in the following example (16):
16) Come, I'll tell you all about it! Trop marrant and romantic! (where "trop marrant" is taken from French and only inserted into the English sentence for the purpose of this very conversation).

In order to conclude on borrowings, it seems interesting to add Haugen's view (1953: 373) stating that when a borrowed word is used, the language usually already possesses its translation, meaning that it does not need the foreign word to be inserted, in theory. In practice, it is much different as he wonders when a word really is needed more
than another one in speech. This explanation allows to draw the difference because "speakers who use the borrowed word feel the need [to do so], or they would not use it". Haugen (1953: 373) explains that there is no one to make the decision of the value and worth of the words. In which case, it would lead to no language needing any foreign word "since every language [...] can make up new ones at will, either by changing old ones (cf. Spam) or by combining them (cf. Atombomb)".

If we distance ourselves from the how and focus on the why of borrowing, or CS, necessity could be on the list, but not exclusively, at least for "perfect" bilinguals. There could be many more reasons as to why they use CS, such as excluding someone from a conversation, or being part of a small group or a community. As for unbalanced bilinguals, necessity is the answer, as it could be used to fill in gaps and avoid making a mistake.

As a matter of fact, as Grosjean (1982: 136) explains, every bilingual has "an 'agreed-upon' language" used according to the interlocutor, the situation or the context. We have all made the experience of ourselves, or someone else, violating this 'agreed-upon' language, leading to "an unnatural or even embarrassing situation, [usually ending] with the question 'why are you speaking language X to me?'".

A designated language, as a designated switch, is most of the time crucial to follow a conversation. If one would change the pattern of language that is used, they can completely shift the atmosphere into one of awkwardness.

In an interview by Grosjean, Poplack (2017) explains that even though borrowing is usually disregarded in comparison with CS, it often happens in the different processes of linguistic switches. She shows that " $[i] n$ n the French-English materials [they] studied, it outweighs CS by a factor of 20 ", meaning that borrowing is used twenty times more often that CS, which is considerable. She makes the specific
difference between CS and borrowing by the fact that CS requires a great deal of language proficiency and knowledge of both languages. On the other hand, borrowing does not necessarily require any type of knowledge of the other, "donor", language. Each language has its own list of borrowed words (some have already become loanwords), as we can find in English words from "Italian, Spanish, French and Japanese every time [we] say 'espresso,' 'arroyo,' 'diamond,' or 'tsunami' respectively" of which most of the time, speakers are not aware. There is another dimension to the difference between CS and borrowing, which is the phonological difference. When they code-switch, people will tend to use the phonology of the other language, whereas loanwords words are adapted to the "host" language, losing all trace of the "donor" language. One example could be the word "pāyjāma" coming from Hindi, as aforementioned, which has become the words "pyjamas" (GB English) or "pajamas" (US English) we all know. It would seem that the term and definition of borrowing (and loanword) is viewed through a monolingual spectrum. According to Poplack in Grosjean (2017), when a borrowed word is used by a bilingual speaker from his second language, it is named "nonce borrowing". This latter term is specifically used when bilinguals borrow a new word from their other language, that is for example when a French-English bilingual uses words in English such as "terrace", "court" or "boil" (Poplack, 2017). Poplack then states that these types of words used by bilinguals or monolinguals remain the same, such as "terraces", "criminal court" and "boiling". They also explain that the same chances happen to nonce-borrowings happening in languages needing gender marks for example.

As such, Poplack (2017) states that:

[^5]They also surprisingly found that nonce borrowings become loanwords by bilinguals' own language choice, since "they imbue the word with the full complement of recipient-language grammar". They state that it really is the social integration of a loanword which takes time with its regular use by the community, and that it will gradually be integrated into the language as a loanword.

Most of the time, the origin of the loanwords is forgotten as these words have taken all grammatical value from the "guest" language, as explained by Poplack (2017):
> "Such integration of donor language material to the morphology, syntax and optionally, the sound system of the recipient language is the major mechanism underlying borrowing".

Myers-Scotton (2010: 37) shows the greater number of similarities over differences between the two phenomena that are borrowings and loanwords. Of course, morphological and syntactic differences are worth noting, but the morphosyntactic similarities let her conclude that borrowing "forms arise originally as CS forms; [... borrowing] forms and CS forms fall along a process continuum".

Moreover, CS can, at times, also reveal the child's dominance in one language. Poplack (1980: 583), for example, presents the definition that CS is - "the alternation of two languages within a single discourse, sentence or constituent" - which allows for a question to be raised: how to know, in a bilingual situation, which language is preferred to the other one? She states that "the alternation of elements from two or more languages" would mean that in a bilingual conversation, one language would be prioritised over the other. Myers-Scotton (1993: vii) provides a definition for CS towards which we tend to lean, as it does not imply that one language is indeed "superior" to the other one: "the use of two or more languages in the same conversation". She also provides a detailed analysis of bilingual people's language dominance, which will be detailed later on.

Meisel (1994: 414) emphasises the "specific skill" that is CS. When it is used by bilinguals, they possess this ability to make the choice of which language to use "according to the interlocutor, the situational context, the topic of conversation, and so forth [...]". He also emphasises the fact that bilinguals are able to manage all of the above still by following the different grammatical and sociolinguistic rules of each language and culture. In his conclusion, he claims that "language differentiation is a necessary prerequisite for codeswitching", therefore leading to his definition that "one can only switch from one system into the other if the two are distinct".

It is indeed hard sometimes, or even impossible, to distinguish borrowing and CS in an utterance, and it is important to let go of this unattainable goal of finding and understanding the difference between both systems with the sole purpose of labelling them. The risk is to lose sight of what truly matters: the cultural and social backgrounds and the reasons for CS.

A further study could focus on children's potential awareness of using borrowed words.

## I.2. Motivations for Code-Switching

There is not one single explanation as to "why Code-Switching?", but Myers-Scotton (1999: 1260) and Myers-Scotton \& Bolonyai (2001: 2/4) have developed a model, originally thought of by Elster (1986) and called the Rational Action Theory. It is a model to be followed in order for the speaker to reach their goals as easily and quickly as possible. Myers-Scotton (1999: 1260) has adapted it to linguistics and CS to explain that simple and fast communication in inter-linguistic exchanges are the main goals for CS, and she states that bilingual speakers consciously select one of their languages over the other. Myers-Scotton (1999: 1260) states that the choice mostly depends on the interlocutors' answers. However, the definition speculates that
there would be "cognitively based calculations" when code-switching. Do bilingual children possess such intellectual capacities? Moreover, to quote Elster (1997: 761; italics in original) in Myers-Scotton \& Bolonyai (2001: 2/4), "[r]ational choice models are subjective through and through... To be rational does not mean that one is invariably successful in realizing one's aims: it means only that one has no reason to think that one should have acted differently, given what one knew (and could have known) at the time". Remaining in a monolingual exchange would require more efforts since the bilingual child has access to two linguistic systems which exposure was divided between the two languages, whereas CS proves to be more effective as regards costs and benefits, leading to a reward of time, and efficiency.

The common thought amongst monolinguals is that bilinguals use CS due to their deficit in mastering both spoken languages. Many studies had come to a similar conclusion up until the 1970s when researchers started to proceed by analysing bilingual children as well as adults' language who used CS every day in their natural environment. In second-language learners or in sequential bilinguals, speakers can call on CS in order to compensate the gaps in the second language (L2) with the source language (L1). As for simultaneous bilinguals, their mastery of CS has a totally different role. Does the bilingual child (or the adult) who uses CS mix both their languages, as it is commonly thought?

We could consider that children do not have all these questions on their minds when they speak, but, according to Grosjean (1982: 136), there are many different "factors influencing language choice". He makes a separation between participants, [including] language proficiency, language preference, socioeconomic status, age, sex, occupation, education, ethnic background, history of speaker's linguistic interaction, kinship relation, intimacy, power relation, attitude towards languages, outside pressure; situation [with]
location/setting, presence of monolinguals, degree of formality, degree of intimacy; content of discourse [as in] topic [and] type of vocabulary; and function of interaction [which is] to raise status, to create social distance, to exclude someone, to request or command, as summarised in Illustration 3.

## BOX 3.4

## Factors Influencing Language Choice

## Participants

Language proficiency
Language preference
Socioeconomic status
Age
Sex
Occupation
Education
Ethnic background
History of speakers' linguistic interaction
Kinship relation
Intimacy
Power relation
Attitude toward languages
Outside pressure

Situation
Location/Setting Presence of monolinguals
Degree of formality
Degree of intimacy
Content of discourse
Topic
Type of vocabulary
Function of interaction
To raise status
To create social distance
To exclude someone
To request or command

Illustration 3: The different factors influencing language choice according to Grosjean (1982: 136)

Perhaps indeed children are not consciously thinking of all this, as adults could be. But what if they were doing it without even realising it? Would this not be (several) good enough reasons to use and let them use CS, as it is for adults?

It is said, in the case of English, that CS is used by people who are unable to "speak the normative or 'pure' form of English", therefore creating all those new languages in '-glish' (Spanglish, Franglish, Hinglish) "already mixed forms of English", acquired by newer generations instead of "bilingual behaviour agentivity or creativity".

## I.2.1. The confusion theory

As previously explained, a bilingual speaker calling on CS was long thought to be mixing up both his languages. Back then, a bilingual child was seen as less intelligent than their monolingual peers, as it was believed that the former could not master either of the languages they were using. Yet the vision of bilingualism has changed over the last 50 years. Many recent studies have shown that there is no confusing between languages in bilingual children's speech, but instead there is a clear reason why they use one rather than the other language in specific situations, whether it be consciously or not. These studies have proven that bilingual children using CS have a good language development, which is an important step in the analysis of these specific children's language development as the situation is different with second-language learners. Recent results show that instead of being synonymous with confusion and mix up, CS actually is a proof of the "perfect" mastery of two mother tongues. The child uses the appropriate word in a given situation, even if this word exists in their other language.

For all these reasons, it is crucial to be aware of children's ability, from the youngest age, to switch from one language to the other. It is a very useful and practical way when it comes to communicating with other bilingual people who use CS. It could, of course, be a challenge when facing individuals who do not perfectly speak one of the child's two languages, but it can drive the child to learn the correlation between language and context, or situation. The child must know that although this phenomenon is special, not everyone is capable of using it.

To understand that the use of CS is anything but confusion, one must see the bilingual child as being fluent in two languages. Their brain knows how to make the difference when they speak. Therefore, instead of an intellectual failure, it rather is a sign of great intelligence to be able to go from one system to the other without mixing
everything up. Indeed, as we may remind, CS is not just about lexicon, it can also be about grammar and sub-grammars as well as phonological and phonetic systems. When they use CS, some children (and even adults) do indeed use the words of each language with the required phonology and tone.

Grosjean (2011) makes a list of the different reasons why children use CS: maybe these children are in the process of becoming bilingual. Bilingual children (and adults!) often have a dominant language which then influences the weak language. For a bilingual child, CS is an important step that should not be stigmatised. This phenomenon will become increasingly rare without actually disappearing at the adult age, but the child, and then the adult, will know, thanks to a good linguistic upbringing, when, where and why, or in some cases, why not, to Code-Switch.

Because they naturally have fewer resources than adults in their language development, bilingual children use CS as a means to communicate: more efficiency, fewer frustrations. Therefore, instead of being seen as a sign of confusion, CS could be seen as a sign that the child is starting to master their languages. The use of CS rather shows the child's ingenuity and intelligence for the sole purpose of reaching fast and accurate communication.

Kuhl (2016) explains that very young children, just like adults, can already make the difference between languages. She found that children, at birth (or even before birth), make the distinction, without any sign of confusion, between both their mother tongues, having heard it from the $6^{\text {th }}$ or $7^{\text {th }}$ month of pregnancy. Children are sensitive to the variations existing between languages such as Chinese and French, for example. They are able to discern the suprasegmental features of the different languages, and more particularly if those are very different in rhythm, such as French and English. By the age of 4 months, children are able to discriminate between languages with similar rhythms, such as French and Spanish. Current studies are
trying to show that bilingual babies could have more sensitivity to language differences than their monolingual peers. According to Khul (2016), at 4 months of age, infants, bilingual and monolingual alike, are able to discriminate between two languages' rhythms, but by 8 months, monolinguals have lost this ability. Bilingual children's level of language awareness is described in Khul's study (2016), and their attention to languages' differences makes them more sensitive to a greater amount of data than monolinguals. Moreover, Garcia-Sierra et al. (2011: 547) have studied infants of 4,8 and 12 months old infants and found that 4 and 12 months old "were able to discriminate the acoustically similar sounds" while the 8 months old infants were not able to. They state that "even though the vowels $/ \mathrm{o} /$ and $/ \mathrm{u} /$ are phonemic in both languages [Spanish and Catalan], 8-month-old bilinguals appeared to perceptually merge the two sounds into a single phonetic category". They also gathered that in other studies, "bilingual infants discriminate phonetic contrasts in their native languages in the same way as monolingual infants", that is up to 8 months, the monolingual infants were able to discriminate sets of consonants in a foreign language while monolingual infants between 8 and 20 months old were not able to do so. The comparative group of bilingual infants up to 20 months were capable of discrimination for the same set of consonants. Garcia-Sierra et al. (2011: 547) conclude that "[a]daptively, bilingual infants could remain more "open" - that is, less neurally committed - when compared to monolingual infants at the same time point in development". According to their conclusions, bilingual infants do indeed remain "open" for longer in comparison to monolingual infants, "neurally committing to the languages they hear at a later point in time".

It can be concluded that bilingualism, and therefore CS, actually raise children's sensitivity to other languages' sounds instead of bringing confusion to the brain. This result proves that bilingualism, and the access to different languages' sounds, do help the child to remain aware beyond the "normal" age of around 8-months-old, where
monolingualism is seen as the norm. It can also be said that bilingualism does indeed make a child more proficient regarding language acquisition. Their brain remains "open" to their own languages' phonemes as well as other languages' phonemes, whereas a monolingual child's brain will "close" to this other world and remain focused on the only one phonological system they are used to.

Bullock et al. (2017: 213) have indicated that CS is used for "social and interactional" purposes, therefore giving way to "a diversity of structural patterns within the same language pairing and across different speakers within the same communities". This opens up greater linguistic and cultural possibilities to the bilingual community. They put a halt to the conclusions stating that CS is only a "random admixture of two languages", as it was proven to be "rule-governed and systematic", making bilingual children linguistically very proficient, rather than intellectually delayed.

These studies prove that CS can have an intentional or non-intentional purpose in bilingual children and adults' minds. The mere fact of CS demonstrates great mental skills. Bullock et al. (2017: 213) and Poplack (1980) go even further by stating that "bilinguals, irrespective of their degree of proficiency, are able to switch languages in midsentences while remaining faithful to the grammatical constraints of each". This statement goes against some studies concluding that only simultaneous bilinguals are able to use CS without making errors in the grammar of either of the used languages.

A similar question arises regarding the use of CS between structurally similar languages such as English and French. Bullock et al. (2017: 212-214) however answer this question as well by showing that CS between Japanese and English for example - two languages with clear structural differences - is possible. They explain that one language, Japanese, is head-final (the object is placed before the verb and has a postposition), allowing "the doubling of the verb and the preposition":
17) Japanese-English:

CS version: We bought about two pounds gurai kattekita no The literal translation: We bought about two pounds about bought The translation: 'We bought about two pounds'
(Nishimura, 1985: 139)"

They also introduce the possibility of the "nativization of English verbs using an auxiliary frame", leading to the incorporation of part of the native word inside the other language's word:
18) "Hindi-English:

Credit card accept karte ho?
Do you accept credit cards?
(Pingali 2011: 474)"

## I.2.2. Compensation of one language with the other one

CS is used by bilinguals for many different reasons. Their mind is supposedly "more open" than monolinguals' in the way that they have access to a wider range of data. This skill must be learned from childhood on, as they also seem to be more sensitive to the different phonemes of different languages, and the cultures around them.

The child who uses CS then calls on all data available to them in order to produce an utterance. This means that the child uses their two languages, as well as all the cultural background linked to the language, with great balance.

Unlike bilinguals, second-language learners use CS to fill in the gaps found in their target language. One of the reasons why secondlanguage learners do so is the fact that they do not master their
languages equally and, at times, need to compensate one language with the other. Bilinguals' reasons for using CS are specific and supposedly intentional, as seen in Baker (2011: 108-109) who collected no less than thirteen of these reasons:
> " [1] emphasis[ing] a particular point in a conversation [...], [2] substitut[ing] a word [...], [3]express[ing] a concept that has no equivalent in the culture of the other language, [4] reinforc[ing] a request, [5] clarify[ing] a point, [6] shorten[ing of] social distance, [...] [7] relating a conversation held previously [...], [8] interjecting into a conversation, [9] eas[ing] tension and inject humor, [10] chang[ing] of attitude or relationship, [11] exclu[sion of] people from a conversation, [12] [introduction of certain] topics [...], [13] copying peers and adults".
19) [1] I'm not sure that's the right solution, ne sois pas bête !
20) [2] Donc tu peux faire un link ici et ensuite follow cette adresse, et enfin tu vas trouver le bon website.
21) [3] Oh j'ai trop envie de manger des crumpets and shortcakes !
22) [4] No way! I don't believe it! J'y crois pas !
23) [5] Alors il faut ouvrir cette page et cliquer sur ce lien et c'est ici que vous trouverez l'information. OK? You open this page, click on this link and you will find the information.
24) [6] Yes I had a good first day at Uni, it was interesting. Qu'est-ce qu'on mange ce soir?
25) [7] - $\ldots$ and do you remember what he was saying yesterday?
26) Oh yes! Qu'est-ce qu'il faisait pendant les vacances encore, tu te rappelles?
27) [8] - I do remember him, but I didn't like him so much, you know?
28) A quelle heure est la réunion ce soir? Je ne suis pas sûre de pouvoir venir.
29) [9] - Non mais la politique en ce moment, c'est du grand n'importe quoi ! Je comprends pas comment tu peux soutenir ces imbéciles !
30) Everyone has a different opinion on everything anyways, we'll see what happens in a few days.
31) [10] Oh! I saw you come from Montpellier in France? Me too! That's why I brought some chocolatines!
32) [11] Two English-speaking people at a restaurant in France decide to speak English when talking about private matters.
33) [12] - Do you want a piece of chocolate cake?

Of course not! Tu sais bien que je peux pas en manger parce que j'essaye de perdre du poids !

It is possible to classify these ways: some are pragmatic (cf. reasons number [6], [9], [10], [11], [13]), others are purely linguistic / cognitive (cf. reasons number [1], [2], [3], [4], [5], [8], [12]), others are discursive (cf. reason number [7]). In addition to the reasons seen previously, we may add that some children will also code-switch in order to compensate one language with the other: unbalanced bilinguals. These children will use strong language to fill in the gaps when they use their weak language, as we can also see in secondlanguage learners.

## I.2.3. Positive and negative aspects of this process

As explained by Baker (2011: 140), the thought by scientists, teachers and parents that bilingual children's use of CS was synonymous with a lack of intelligence, or a restricted brain capacity, lasted for many years (up until the 1960s). Baker takes the example of Saer (1923) and Saer et al. (1924) who came to the conclusion that bilingual children using CS were "mentally confused and at a disadvantage in thinking compared with monolinguals". These results came after proceeding to similar "verbal" IQ tests with both bilinguals and monolinguals.

Moreover, Baker (2011: 139) also quotes Laurie (1890) who states the following:
> "if it were possible for a child to live in two languages at once equally well, so much the worse. His intellectual and spiritual growth would not thereby be doubled, but halved. Unity of mind and character would have great difficulty in asserting itself in such circumstances".

Baker (2006: 144) also mentioned a study by Jones (1960) who proceeded to experiments concluding to a connection between monolinguals and bilinguals' IQ levels and socio-economic backgrounds. The important fact is that this dimension was not accounted for in the early studies. It would actually show that bilinguals and monolinguals' comparison studies should not exclusively be made on a purely linguistic background, as any socio-economic variations should also be included. At the beginning of the 1960s, researchers such as Peal \& Lambert (1962) based their study on a certain number of tests emphasising the differences between monolinguals and bilinguals according to the aforementioned factors. The first positive results in favour of bilingual children therefore came in, and the conclusion showed that children "had a superior mental flexibility, an increased and more independent faculty of abstract reasoning of the words, which would lead to advantages in the creation of concepts". Moreover, it was finally found that a bilingual (linguistic and cultural) environment was favourable to a better cognitive development, in comparison with monolinguals.

Many studies followed showing that children using CS (bilingual or multilingual children) are not less intelligent than the ones who do not use it. It is quite the opposite, rather, as proven that bilingual children have a better memory, making it easier for them later on to learn new languages. Their being brought up with a broader linguistic system allows them to develop much more information than children who are raised with only one linguistic system. We will see how CS works with phonological systems, the "mixing" of linguistic systems, then
leading to a more detailed explanation of the difference between CS and code-mixing.

Two of the obvious benefits of CS are the possibility of having greater cultural experiences and the ability to choose between languages. Additionally, bilingual or multilingual children having more than one language gives them a wider perception of their own languages in comparison with their monolingual peers. Their using more than one lexical and linguistic systems allows for an awareness of the existence of many different languages as well as the possibility to go from one to the other. They are therefore able to adapt to their environment, the context, and their interlocutors. This linguistic mindfulness allows for picturing the different possibilities provided by each of their languages.

A very detailed description of the advantages of CS, and by extension of bilingualism is developed by Lüdi (2001: 15-16). According to him, and as aforementioned, bilingual children's creative mind is greater than their monolingual peers' as they thrive in situations where their creative mind is put forward. They also seem to possess a better analytical mind, providing them with greater cognitive development and awareness of their languages as well as other existing linguistic systems altogether. Bilingual children are also more contextually sensitive regarding situations, which is good for problem solving and context reaction. They also seem to possess "superior cognitive clarity and analytical capacit[ies]".

However, according to Lüdi (2001: 17), one of the problems, or drawbacks of bilingualism and the use of CS in children would be the unbalanced and non-symmetrical development of bilingual children's linguistic systems. Illustrations 4 and 5 exemplify the general vision of the "positions" of languages in a bilingual child's mind in comparison to how it should be seen in reality:


Illustration 4: Current representation of bilingualism in terms of divided competences (Lüdi, 2001: 17)

In Illustration 4 above (in which $L a$ is the $L 1$ or first language and $L b$ the $L 2$ or second language), Lüdi (2001) represented the way "most people think of linguistic competences" in a bilingual's mind: divided. Lüdi (2001: 17, our translation) has however also developed the following comparative image showing how bilinguals' languages should actually be pictured. He explains that "in general, specialists (Cummins, 1980, 1981) prefer more integrated competitive models" (Illustration 5):


Illustration 5: Integrated competitive model of bilingualism (Lüdi, 2001: 17)

The problems that can transpire are the insufficient skills in the L1 ( $L a$ ), therefore leading to acquisition problems in the L2 (Lb). It has
been proven that the full mastery of a first language is essential to learn a second language, as the systems are not always completely separated, making the acquisition of an L2 being based on the skills acquired in the L1.

These examples can clearly be seen in everyday life, and especially with the arrival of migrants and refugees. Young ones arriving in the host country will not always master their parents' language - their mother-tongue - making it even harder for them to learn the language of the country as their second language (L2).

As concerns "balance", Ludi (2001: 18) refers to Baker (1996: 156) and presents the types of communications in Illustration 6, as "the communicative tasks performed - and the competences to solve them - can be of different kinds":


Illustration 6: Types of communications and their realisations according to Baker (1996: 156) in Lüdi (2001: 18)

In Illustration 6 above, a (more or less) balanced bilingualism is depicted, in which the linguistic competences - called "low cognitive level" (Communication à exigences cognitives peu élevées) - are drawn. These low cognitive levels are the ability to talk about the weather, or to greet someone, in opposition to "high cognitive competences" (Communication à exigences cognitives élevées) such as explaining one's opinion in a debate, or writing an essay. A distinction is also made between context and out of context communication, which also appear in the CEFRL (The Common European Framework of Reference for Languages), a competence test used to evaluate second-language learners' language progress. All these tasks must be adapted according to the child's age, or to the adult. The ability to "accomplish demanding cognitive tasks [...] in both languages" can be found in balanced bilingualism, whereas they only exist in one of the two languages of non-balanced bilinguals. However, as aforementioned, these skills are not developed in either of an unbalanced bilingual's languages, therefore being "reduced to basic interpersonal communicative skills".

Lüdi (2001) and Baker (1996) state that much research has shown greater cognitive skills only in balanced bilingual children's results, while unbalanced bilinguals have similar skills as monolinguals of equal age. In the case of unbalanced bilinguals, they "are at a disadvantage in their cognitive development" if compared to balanced bilinguals.

An unbalanced bilingualism manifests itself by "a restricted vocabulary, an inaccurate grammar, an accumulation of hesitations in the production, and difficulties of expression in both languages" (Lüdi, 2001: 19). Moreover, if the bilingual child (most often coming from minorities) learns a language at the expense of their mother tongue, the L1 can give its place to the L2, or to faulty bilingualism (semilingualism ${ }^{6}$ ). We will expand more on the subject in the third chapter. A

[^6]problem of loyalty between the two cultures can be created as can be seen in the USA with American-born Mexicans, or in France with French-born Algerians.

Moving on to the drawbacks, they do not always come from a linguistic point of view, and are situated in a rather larger sphere in the affected linguistic community. The close link between bilingualism and social, economic, and family contexts can be clearly noticed as these problems tend to happen more often in immigration contexts. Some children are indeed forced or encouraged to abandon their mother-tongue (the L1 they have always known) for an unknown L2. If a child does not acquire a balanced and correct bilingual system, the emphasis should also be put on the analyses of the child's surroundings and their socio-economic context.

An important question is whether the obvious positive sides of bilingualism - better access to travels, employments, cultures, histories, and friendships - do really make bilingual children smarter, as opposed to monolinguals. The notion (smartness) can be divided into two different categories where "school smart" and "street smart" are distinct. The former can mean that bilingualism may actually help the child with being sharper in mathematics, history, grammar, biology, and any other school subject, while the latter can mean that they may have an easier time than monolinguals to apprehend their daily life. For example, this would make employment research or making new friends easier in their later life. The "openness" provided to them can therefore be assumed thanks to their greater abilities in assessing their interlocutor's feelings, desires and perspectives. This is located beyond the simple linguistic fact, and on a different level such as the body language. Bilingual children specifically seem to have a greater awareness of their surrounding community and their environment, making them more capable of understanding other people's intentions and reacting to them.

Some researchers believe that CS possesses a grammar of its own, a "third grammar", an idea that is certainly not followed by the majority. Yet, as CS is the alignment of two grammatical systems coming together, always differently according to the speaker or the situation, the two grammatical systems do not seem to fuse to provide a third, hybrid grammar. Cantone (2007: 72) and MacSwan (2005: 69) both state that a "third grammar" would still require to take into account the grammatical rules of each of the spoken languages, as "it reflects the convergence of these two languages and how they interact" (Cantone, 2007: 72). For them, "no 'control structure' is required to mediate contradictory requirements of the mixed systems. [Therefore] it makes sense to formalize the grammar used for code switching as the union of the two lexicons, with no mediating mechanisms" (MacSwan, 2005: 71). They both mention the artificial and unnecessary constrains created by this possible "third grammar" on CS, which Cantone (2007: 72) believes to be "originally and widely based on pragmatical rules", and that "[n]othing constrains code-switching apart from the requirements of the mixed grammar" (MacSwan, 2005: 69).

## I.3. Balanced and unbalanced bilingualism

As previously stated, transfers, a cross-linguistic influence, mostly happen due to the type of bilingualism that has been developed, for example with an unbalanced bilingualism, which is more common than balanced bilingualism.

But what exactly is an unbalanced bilingual? We define them as a person who has a greater access to one of their two systems. An unbalanced bilingualism usually occurs when the child grows up in an environment where one language is not used or praised as much as the other language. Kinberg (2005: 1191-1192) develops three different types of bilingualism. She explains that they all depend on each of their uses in the child's environment. First of all, there is the situation
in which the "L1 is the dominant language. Here, the bilingual's L1 will be maintained, but his or her L2 may not be as strong". Then, "the bilingual operates in a mostly L2 environment. [...] we would [therefore] predict that the bilingual's L1 would be less likely to be maintained, although his or her L2 would be strong". Finally, "the balanced bilingual, [...] functions equally well in both languages". Kinberg (2005: 1191-1192) uses the word "symmetrical" which is properly depicted in Illustration 7 where both L1 and L2 are equally used.



Illustration 7: "The use of L1 vs L2" (Kinberg, 2005: 1192)

According to Kinberg (2005), the L2 has a lesser effect on the L1 when this one is dominant (cf. Chapter I.1.5. for a definition of dominant language), which is also true for the opposite, the L1 has fewer effect on the L2 when this one is dominant. And of course, in the case of equal, or balanced, bilingualism, both languages would have an equal effect on one another, "influenc[ing] each other equally".

## I.4. Phonological systems

What happens to the phonological systems of the switched languages during CS? Is there a strict distinction between the two systems at the place of the switch, or is there an overlapping period, whether it be the end of the pronunciation of Language x overlapping the beginning of the pronunciation of Language $y$, or the pronunciation of Language $y$ starting to appear at the end of the pronunciation of Language $x$ ? One tool was created to precisely measure these to the nearest millisecond (msec.), and help answer these questions: the Voice-Onset Time (VOT), which is "the measure of the time between the release of the oral closure and the onset of vocal fold vibration", therefore creating voicing (Olson, 2016: 273). It was studied by Piccinini (2016) and Olson (2016) who describe it as "a significant acoustic correlate of the voice-voiceless distinction across the world's languages, and probably the most widely reported measure" (Piccinini, 2016: 97). English and French are both said to possess a different Voice-Onset Time where voiced consonants are $\mathrm{b} / \mathrm{d} / \mathrm{g}$ and voiceless are $\mathrm{p} / \mathrm{t} / \mathrm{k}$. English has a VOT between 30 and 120 ms - long-lag voiceless stop - while French's VOT is between 0 and 30 ms - short-lag voiceless stop (Olson, 2016: 265).

Vouillamoz (2000, our translation) focused on the lag in msec. "between the pronunciation of the phonemes $/ b / \mathrm{et} / p /$. The point 0 [in her study] represents the unavoidable but clear release between the two phonemes" ${ }^{7}$.
"In French, the duration is -40 ms for the pre-voiced (which is located between the end of the silence of non-sounded occlusives and the beginning of the silence of the sounded occlusives); 0 ms for the voiced; +40 ms for the non-voiced. In English, the duration is -20 ms for the pre-voiced; 0 ms for the voiced; +60 ms for the non-voiced" ${ }^{8}$

[^7]She explains that there is a "neuronal system capable of treating the quick transitions that exist, in the left part of the brain" ${ }^{\prime}$.

This explanation makes us wonder if children who consciously use CS make the difference between the two types of consonants and between the two languages (here French and English). It also raises the question if this awareness is extended when they use CS. A final question would also be if the cross-linguistic difference of VOTs can change simultaneous and sequential bilingual's reactions when codeswitching.

MacSwan \& Colina (2005) as well as Grosjean \& Miller (1994: 203) have found that "'the basic language' has no impact on the production of Code-Switching for VOT'. If analysed at the place of the switch, it is therefore complete and immediate, leading to a possible involvement of all transformational aspects of speech where the lexical, grammatical and phonetical dimensions happen at the exact moment of the switch. MacSwan \& Colina (2005: 1) have mentioned some research, especially by "Botero and colleagues (2004) [who] found a trend towards convergence in the VOT values of voiceless stops in Spanish/English codeswitches, and concluded that there are perseverative phonetic effects in codeswitching contexts". There might thus be, at least in Spanish/English CS, a brief transfer from one language's phonetical system to the other, at the place of the switch.

Moreover, Bullock et al. (2017: 219) mention that Bullock \& Toribio (2004: 91) have tried to define convergence in bilingualism "as the enhancement of inherent structures similarities found between two linguistic systems". Moreover, as explained by Myers-Scotton (2002), convergence can be seen both as process and outcome of language contact and bilingualism, since it is not only inherent to the process of CS, but it also has consequences. As Myers-Scotton (2002) states, the more balanced a speaker's bilingualism is, the more their languages'
ms pour le non-voisé (/p/). En anglais la durée est de -20 ms pour le pré-voisé, 0 ms pour le voisé (/ba/), +60 ms pour le non-voisé (/pa/) » (Vouillamoz, 2000)
${ }^{9}$ Nous avons un «système neuronal capable de traiter les transitions rapides qui se font dans le côté gauche du cerveau».
structures will converge towards one another to finally resemble each other more than for unbalanced bilinguals for example. This cannot be measured and it is only possible to evaluate according to the speaker's own appreciation of their languages and their own bilingualism. According to Myers-Scotton (2002), an effect of this appreciation is the possibility for the bilingual speaker to "create different patterns of convergence between their languages at different levels of the grammar"; or what Sebba (2009: 55) calls "'creat[ing] congruence' between the two existing languages, if necessary, by making adjustments to the monolingual norms", or creating a "hybrid" grammar.

From MacSwan \& Colina's experiment results (2005), we can postulate possible lexical and phonetic cross-linguistic effects when bilinguals code-switch. It seems to be more obvious in sequential than in simultaneous bilinguals, as simultaneous bilinguals' two languages appear to be more "ingrained" in their brain. Piccinini (2016: 10-11) confirms this statement by saying that simultaneous bilinguals do indeed have more ease "retriev[ing] the correct language-specific realizations of sounds" during CS. Piccinini (2016: 10-11) then moves on to a monolingual/bilingual comparison concluding that the latter, even the most skilled ones, do not manage to equalise the speech production level of their monolingual peers.

Sundara et al. (2006: 109) have found that simultaneous bilingual children have differences in the pronunciation of their languages between /t/ and /d/ in French. The main reason being that "bilingual children do not produce /d/ tokens with lead VOT even by age 10", which is also noticed even further on in bilingual adults. They have also found results proving the difference in language acquisition between bilinguals and monolinguals as "by adulthood, simultaneous bilinguals have mastered production of lead VOT, suggesting that differences in VOT production for voiced stops observed [...] are likely to reflect a difference in rate of acquisition".

## I.5. Possible differences in the use of systems between CS and code-mixing

If a bilingual child is equally exposed to both their languages while growing up, they will see their linguistic systems more or less equalised with the use of different words, and equally balanced between the two languages. Even though code-mixing might appear similar to CS, it is not. It differs from it by its structure as it is most often seen in young children during their language development. But we still cannot explain why bilingual children use one or the other language, and, as we have seen earlier, many researchers try to understand if the choice really is theirs, or if there is a part of unaware use of CS.

If the child is not equally exposed to both his languages, they will develop a "dominant" language - the one they use the most, the one they were the most exposed to - and a "weak", or "dominated" language. Therefore, in order to produce their CS, they will include elements of the "dominant" language into the "weak" language. Genesee \& Nicoladis (2006: 1) have however found proof of the use of code-mixing or CS of specific morphosyntactic features. ${ }^{10}$ This practice, without completely disappearing, slowly decreases as the child grows up and understands the use of both his systems. We should also remember that the bilingual child's exposure to each of his languages is less important, in comparison to a monolingual's exposure to his single language, sometimes leading to a slight delay in acquisition for the bilingual child, which should be stabilised by age 2 or 3 . However, the child's choice of code-mixing is not haphazard, it would seem that very specific syntactic rules exist involving lexis or phonology for example. According to Genesee (2006), code-mixing

[^8]only appears when the two syntactical systems are "perfectly parallel and stackable". The difference between dominant and dominated languages, the fact that one (the dominant language) is more "elaborated", more developed than the other (the dominated language), happens according to the degree of exposure to each of the child's languages, when there is no associated language disorder. The more one is exposed to a language, the more developed it will become. According to Grosjean (2008), as a consequence, "there might exist a statistical link between what will be perceived (as well as the frequency of each language) and what will be produced by the child". Genesee \& Nicoladis (2006: 1; 6-7) show that exposure to two languages rather than one has a different impact on the language acquisition of bilingual children, in comparison with monolinguals. They were able to show that young children in a process of language acquisition do "have two distinct lexical systems", hence supposing that they also do acquire two languages rather than one, thanks to what they call the "translation equivalent (words in each language that have the same referential meaning)" (2006: 7).

As seen in Genesee \& Nicoladis (2006: 1; 6-7), it is possible to notice that bilingual children actually assimilate the words of equivalent translations showing their true acquisition of two systems at once. These two lexical systems are used following a set of rules as "transfer is not simply a consequence of habit formation", it "is not simply interference", it "is not simply a falling back on the native language" and finally, it "is not always native language influence" (Odlin, 1989: 25-27). Instead, it is rather "the influence resulting from similarities and difference" which can be seen between any other language previously learned - fluent or not - and the target language.

The aforementioned explanations help us understand why codemixing is being used so often by linguistically developing bilingual children. The mere fact that their early language development is made on a "two in one" system lets them use the lexicon of both languages indistinctly, simply because they have not separated both systems yet.

The difference between CS and code-mixing can be visualised in Table 1 below. It summarises the factors of bilingualism, the different types of bilingualism and their definitions as regards the use of the L1 and L2 in a bilingual.

| Factor of Bilingualism | Type of bilingualism | Definition |
| :---: | :---: | :---: |
| Competence in both languages | 1. Balanced bilingualism <br> 2. Dominant bilingualism | Competence in $\mathrm{L} 1=$ Competence in L2 |
|  |  | Competence in $\mathrm{L} 1<$ or > Competence in L2 |
| Cognitive organisation of the language | 1. "composed bilingualism" <br> 2. "coordinated bilingualism" | One significant for two signified for L1 and L2 <br> One significant for one signified in each language |
| Acquisition context | 1. Endogenous bilingualism <br> 2. Exogenous bilingualism | 3 Presence of the L2 in the |
|  |  | Absence of the L2 in the community |
| Status of both languages | 1. Bilingualism with a neutral tendency <br> 2. Bilingualism with a hierarchical tendency | L1 and L2 are valued to the same level <br> L1 is valued at the L2's expenses |
| Age of acquisition | 1. Early bilingualism (acquisition) <br> (a) Simultaneous bilingualisms <br> (b) Consecutive (or sequential) bilingualism | L2 acquired before 6 <br> L1 and L2 = languages leaned before 3 <br> L2 learned between 3 and 6 |
|  | 2. Late bilingualism (learning) <br> (a) Learning outside of the familial environment <br> (b) Learning in teenage-hood <br> (c) Learning in adulthood | L2 learned after 6 <br> L2 learned between 10 and 17 and L2 learned after 17 |

Table 1: Summary board of the different types of bilingualism on criteria based on psychological, contextual and age of acquisition (inspired by Hamers and Blanc, 1990: 9)

As aforementioned, CS is the consecutive use of two linguistic systems in one utterance or conversation. On the other side, codemixing is the presence of elements of a spoken language (phonetic, syntactic, lexical) within another spoken language, where the grammatical structure of the dominant language will usually be kept intact, in order to avoid any ungrammatical structures that could be
created in the code-mixing process, such as "water, maman, water!", which can be translated as "water, mummy, water!". In the latter case, the child will tend to use the syntax of both linguistic systems more or less similarly. The use of code-mixing in linguistically developing children allows the visualisation of a possibly dominant language.

For Genesee \& Nicoladis (2006: 12), code-mixing is " $[t]$ he use of elements (phonological, lexical, morphosyntactic) from two languages in the same utterance or stretch of conversation". They present different types of code-mixing, the same way there are different types of CS, as previously mentioned (intersential CS (cf. Chapter I.1.1.) and intrasentential CS (cf. Chapter I.1.3.). They claim the presence of an "intra-utterance mixing" as inside a sentence (e.g., Look oiseau!) and an "inter-utterance mixing" as between sentences. According to them, there are different reasons and ways a child will decide to codemix such as "the form of mixing", as seen above, or the "nature of the mixed element (function versus content words)". The type of languages used in the current conversation also has a role to play, whether it be "the child's less versus the child's more proficient language", and of course "the context".

Volterra \& Taeschner (1978: 304-317) summarise the three different stages developed according to Ronjat (1913), which is also found in Genesee \& Nicoladis (2006: 3), where they say:

[^9]We can conclude the analysis of this complex phenomenon in which the bilingual child has to go through during his language development by saying that it requires strength of mind and linguistic proficiency to make use of CS in bilingualism.

The child grows up to understand when and how to use one or the other language according to the context and their interlocutors. They might continue to mix codes in the case where translated words are missing from their dominated language, but this phenomenon will be temporary. The main reason is probably that the more practiced and learned the languages are, the fewer interferences are visible. Codemixing slowly decreases, but can still remain at an adult age as it is hardly ever possible to have an exact translation of all the lexicon in both languages (Genesee \& Nicoladis, 2006: 15). On the other hand, CS usually remains as CS and code-mixing are different phenomena used for different reasons. Finally, another reason could be the promotion of code-mixing by parents, as seen in Genesee \& Nicoladis (2006: 18-19). The parents nourish this use of code-mixing because they "understood what the children are saying when they code-mix, tolerate and encourage further code-mixing". The child will therefore "learn to make appropriate language choices, at least with familiar interlocutors", which is explained to be one of the reasons why there are so many different types of code-mixing across families.

Moreover, if we have to deal with a mature bilingual child, hence a bilingual who has already understood the ways and techniques of code-mixing, he should be able to use it with purpose. In the words of Paradis \& Nicoladis (2007: 277), "[s]imultaneous bilingual children can use their languages differentially and with sensitivity to their interlocutor's language choice by the age of 2 years [...]", for which they explain that the principle of language sensitivity is when the child chooses to use the same language as their interlocutor.

This phenomenon is then linked to a certain pragmatic skill. It has been proven that the mature bilingual child is capable, very early, to
adapt their language according to his interlocutors and the different situations (Deuchar \& Quay, 2003: 89; Genesee \& Nicoladis, 2006: 15-16/18-19) as will also be detailed in our second chapter dedicated to our field study.

## I.6. Different approaches to language acquisition and how CS is dealt with by them

Since CS is a specific parameter of bilingualism, it is important to present different approaches in linguistics which have studied bilingualism over decades, in order to understand the place of CS in bilingualism, and its use by bilingual children in language development. We will see the justification for the use of CS through the theoretical work of several linguists, and we will look at the place that these theories grant to the context of CS.

## I.6.1. Chomsky and Universal Grammar (UG)

Chomsky's research has been essential for what was called the "cognitive revolution". According to Gale Encyclopaedia of Psychology (2001: 120), Chomsky went against the main theory of behaviourism put forward by Skinner in the late $19^{\text {th }}$ century. His primary claim is the one of the "universal innate ability", or what he calls LAD, Language Acquisition Device, "enabl[ing] each normal child to construct a systematic grammar and generate phrases". Although it was a new way of evaluating children's language learning, it was seen as "highly controversial, rekindling the age-old debate over whether language exists in the mind before experience" (2001: 121).

With the following quote from Chomsky's doctoral supervisor, Harris (2012: 201-202, original work published in 1970), we understand where the origin of the theory lies:
> "though the sample of the language out of which the grammar is derived is of course finite, the grammar which is made to generate all sentences of that sample will be found to generate also many other sentences, and unboundedly many sentences of unbounded length. If we were to insist on a finite language, we would have to include in our grammar several highly arbitrary and numerical conditions [...]"

Grammar allows to create sentences, the number of which is supposedly limitless, and Harris believes in the hopelessness of calculating or measuring grammar. According to Hauser et al. (2002: 1573), human languages have a potentiality for "discrete infinity" which is supposedly available to every speaker of every language as they use each finite means of their language(s). Moreover, the mere fact of speaking every day makes us users of recursion, hence of infinite grammar, where we freely create new sentences every day, and "... the rules of the grammar must iterate in some manners to generate an infinite number of sentences each with its specific sound, structure, and meaning" (Chomsky, 1980: 221-222).

Everett (2007) compares his very own notion of the human language with the one of Chomsky for whom it seems that it is "the ability of finite brains to produce [...] infinite grammars", which means that sentences can be infinite in all their aspects, words and length included. Everett however denies the existence of an innate language module, and denies that recursion is universal. He says that language is cultural, not biological.

Chomsky has challenged the most important behaviourist theories of the time according to which children were learning how to speak by mere imitation of their parents. His main explanation for an innate grammar is this ability children have to learn how to speak by
producing many sentences only with a limited number of words in their possession, even before having been taught the different grammars specific to each language. This supposedly enables these young children to understand and learn to create spontaneous linguistic expressions. During speech, there is a combination of a finite number of elements, the morphemes and the phonemes (Martinet, 1960, 1965), to form an infinite number of bigger structures, sentences. Dubuc (2016) explains the difference between the grammar of each language and generative grammar as a set of rules followed by all and of which we are completely unaware. This comparison to the former allows people to create properly formed sentences according to each language's own grammatical rules.

In the early 1960s, Chomsky introduced the "poverty of the stimulus", claiming that the stimulus, or input, to which children are exposed is so impoverished that the child could not acquire a language on the basis of that input. This theory revived the debates on language acquisition as it was fully attacking the empiricist theory that had taken grounds since the Enlightenment. UG came as an answer to children's aptitude to learn and understand the grammar of their own language without having been explicitly taught. They therefore assume that children have an innate system giving them access to their language's grammar, as if their brains had a natural "predisposition [...] for certain structures of language" (Dubuc, 2016).

Empiricism was a very popular movement from the Enlightenment up until the 1950s, hypothesising that experience was the only valid data from which human knowledge should be considered. From this statement, we understand that a child is born with a blank slate, or "Tabula Rasa" in Locke's words (1689), on which, from birth on, environmental and experience data would be written. Raeber (2012) reminds us that one of the biggest names of this time was Skinner, also known for being one of the founding fathers of behaviourism. He presents the possibility for each child to learn from "internalised conditioned reflexes" which would be acquired through mimicry of
their environment all along the learning period. This phenomenon would be working the same way parents act with their children, by positively rewarding them as they try to pronounce different words or sentences, that are then understood and internalised.

The problem is then to understand if this theory is valid for all languages, in which case it would show that all languages possess a basis, a common structure predisposing each individual from all languages to learn (a) new language(s). Chomsky has hypothesised that all six thousand languages existing on Earth possess similar structures based on an ensemble of rules and syntactic principles, claiming that " $[t]$ hese universal structures of language are apparently written in children's brain from birth: they do not have to learn a list of rules, but only to see what type of language they are in [...]". This innate grammar is supposedly biologically written in the human being, from before birth, making UG "a set of unconscious constraints that let us decide whether a sentence is correctly formed" (Dubuc, 2016). This applies to all language as they possess this ability to decide in which order the words go, despite the syntax, and paying no attention to the meaning of the words. Sentences such as "cat the mouse play with the" are created even though it is not grammatically correct but still unintelligible. On the other hand, there can be the example of "colorless green ideas sleep furiously" (Chomsky, 1957) which is grammatically correct but without any logical sense.

Since the 1950s, Generative Grammar has enabled the evolution of many fields of study such as cognitive sciences, neurosciences, psychology, and even social sciences. Despite having challenged many ideas considered then set in stone, the theory grew stronger over the years and brought large numbers of linguists to the path of naturally acquired languages, in opposition to the theory of them being learned from the environment.

UG's goal is to describe the way languages' rules are set in all the existing languages by explaining why those rules shape sentences the
way they do. That is, in the different languages, their reason(s) for existing and how they work, their common ground, beyond the visible differences of each of these languages.

According to Chomsky, the main common link between all languages is their recursion, allowing insertions one after the other in different sequences based on the same rules, such as "Pierre thinks that it will rain tomorrow" ${ }^{11}$ followed by "Marie thinks that Pierre thinks that it will rain tomorrow" ${ }^{12}$ (Raeber, 2012). As we can see, the first sentence is inserted into "il pleuvra demain", and the second sentence in inserted into the first one, a process which can seemingly go on for ever. Chomsky also claims the possibility of producing an infinite number of utterances with the limited number of rules available in any language, hence by the use of insertion. We rarely produce such infinite sentences, which is more "due to the limits of our memory than the ones of our syntax" (Raeber, 2012).

According to Chomsky, it is therefore thanks to this recursion, this "creativity", that human beings are capable of producing and understanding sentences that were never made before, unlike any other animal species.

Following this claim, Chomsky began to wonder how it was possible for a small human being, a child, to understand as well as produce utterances that were never heard or produced before. How are we capable of making the difference between two sentences, so early in our unconscious learning process, the one having a correct syntax without making any sense, and the other with the wrong syntax but unintelligible? The answer, specifically formulated to respond to this question is simple: UG. It is then that UG came to the forefront in the 1950s, stepping ahead of all the constructivists' and behaviourists' theories, in order to answer the question "how does this capacity of judgement appear?"

[^10]In his theory, Chomsky claims that it is impossible for children to learn to speak and understand their own language by pure imitation of their parents or by simple experience. His main explanation is that the child would sometimes make errors, which does not happen beyond the usual grammatical errors specific to his language's rules. Therefore, if we were following the behaviourists' or constructivists' theories in which the child learns by imitation and mimicry, they should also be making certain errors by reproducing a sentence's set of rules into another, which they do not do, syntactically speaking. Naturally, the child does not hear syntactically incorrect sentences from his surroundings, making it impossible for them to produce such false utterances. This ability to distinguish between correct and incorrect is UG's main claim, proposing that children simply do not have access, in their innate bank of information, to the incorrect rule.

We can now understand why, viewed from UG, it is not possible to follow the constructivists' and behaviourists' theories where children learn "on the only ground of utterances [they] hear" as those are "not enough to infer the correct rule". This sets aside the risk of a poverty of the stimulus, meaning that the child "does not hear a sufficient number of sentences in its learning period" as it is "by no means a matter of quantity, but rather of quality" (Raeber, 2012, our translation). It is then possible to draw the difference between the principles - universal principles - and the parameters - grammatical rules - specific to each language. Raeber (2012), presents our brain as an electrical board with many different unmodifiable junctions (the principles) and many changeable switches (the parameters). The learning process is to flip the correct switch to the proper junction in order to access the correct sentence, while keeping intact the basic structure.

UG therefore imposes to our brain certain unmovable and unalienable principles, stopping the human brain from misunderstanding or misproducing sentences following basic fundamental rules.

Dubuc (2016) claims that researches in cognitive sciences have presented "babies [of] only a few days old [who] could distinguish the phonemes of any language and [who] seemed to have an innate mechanism for processing the sounds of the human voice". This seems to prove that children, from birth on, have the ability to understand and, to later on speak, a complex language. He then exemplifies with children born from parents who speak a language called pidgin. Sampson (2008) has argued that these languages are far from chaotic and do follow rules, unlike what was previously stated. Not only were these children managing to speak this language like their parents, but were "spontaneously introduc[ing] grammatical complexity into their speech, [leading] in the space of one generation [in the] creat[ion of] new languages, known as creole". These were allowing them to show the flexibility of the innate system inhabiting their minds. This mind is capable of creating new grammatical structures, new parameters thanks to principles, universal basics, already biologically written inside their minds, according to Chomsky's theory.

However, one language brings a shadow over UG's theory as it does not seem to possess any recursion: Pirahã, spoken by the Pirahã community. Fitch et al. (2005: 203) have explained why, in their opinion, the existence of one language without recursion does not mean that recursion is not needed for languages. According to them, out of the six thousand languages existing on the planet which have recursion, the one not having it does not break down the whole theory.

Their main explanation is that if a "Pirahã child [was] raised in a Portuguese, English or Chinese environment [he] will master those languages with the same ease as his or her mother's tongue, just as the same child could learn the recursive embedding principle of parentheses in mathematics, or a computer programming language with recursive structure".

They take the example of Jackendoff (2002: 75) who introduced UG as the "'toolkit' that a human child brings to learning any of the languages of the world", it can therefore be possible to find one or a few tools of universality in a language. However, if one language, like Pirahã, does not use all the tools, then it also does not mean that UG does not exist. Pirahãs could still have an innate presence of recursion in their brains without necessarily using it in their own language, but they could however employ it when speaking another language.

Even though this explanation seems appropriate, it can also raise several questions, such as if a Pirahã child can learn another language later on in their life, and if it is so, does it confirm the presence of UG? In the case of a negative answer, does it show that UG is overrated and that the absence of recursion in this particular language does prove Chomsky wrong in the matter of UG? However, it is crucial to point out the possibility that Everett's translation of the Pirahã language is not as accurate or transparent as he makes people believe (2007).

About the Pirahã language, Fitch et al. (2005: 202) as well as Everett (2007) use the chess game theory, each explaining their own opposite views. The formers say that "[w]ords have qualities unique to language, just as chess moves have qualities unique to chess [...]" to defend recursion and the seeming lack of recursion in this very language does not interfere with the existence of UG. The latter claims that "chess, [...] has also got a finite number of moves, but chess is an enormously productive game" to explain the richness of the Pirahã language, a finite language, with a limited number of sentences, while remaining abundant and, indeed, rich. The ones take chess with its infinite possible moves - therefore with recursion, whereas the other takes chess as the game in all its richness despite its limited number of available moves. For Everett (2007), the abundance of the Pirahã language is threatened by the environment the speakers are brought up into, making it seem like a poor language, by restricting the topics of conversations. Moreover, the Pirahãs' very culture stops them from
being able to see beyond parents and siblings, or from counting, only having two words "hói" and "hoi" to say approximately "many" and "few" (which is however not exclusive to this very language, it has been seen in a number of others). Everett (2007) even failed to teach the community to count, despite trying to do so every night for several months. The Pirahãs are nomadic hunter-gatherers and have not developed the need to count specifically to a certain number, even though they can properly visualise the quantity that is presented to them. Everett (2007) discredits the claims made by Fitch et al. (2005: 182) who see recursion as "the essential property of language". The lack of recursion in the Pirahã language is a proof that this statement is not "all there really is to human language [which] makes it different from other kinds of systems".

Everett (2007) however differentiates the impossibility of "recursion [being] part of language" and the possibility that it might be "part of the brain's general processing". He explains that recursion can be found in the very way Pirahãs tell stories, with "ideas [...] built inside of other ideas, and one part of the story [...] subordinate to another part of the story". This belief came after reading a paper claiming the use of recursion by deer to navigate through the forest by "taking sides paths" which can be seen as recursion. According to him, "[...] rather than going from language to the brain, we have to have recursion in language, and then it starts to make its manifestation in other thought processes. It starts there and it might or might not jump to language", therefore not being "the essential property of language" (Fitch et al., 2005: 182). As a conclusion, Everett (2007) puts in opposition both facts that Pirahã does lack recursion and "the fact that Pirahã is a piece of evidence that there probably isn't a need for universal grammar". His counter-proposal to Chomsky's UG simply is in the way the human brain is made, its difference to the brain of other species, the way it is used differently - "human thinking and human problemsolving" for example - than other species thanks to its "greater intelligence". Recursion can most of the time come to solve those
problems of communication, in bigger societies where information is usually more explicit in individuals than in smaller groups.

Everett (2016: 116) explains his view on the reason why there is a lack of recursion in the Pirahã language. It is not so much about a "culture-independent grammar" as it would be explained by Chomsky, but rather "the result of cultural values". As aforementioned, this simply means that the Pirahã community does not need recursion in their daily life, as nomadic hunter-gatherers. Everett (2016: 116) puts forward the main problem posed by Chomsky's UG as it rests on unprovable, thus unfalsifiable theories, unlike the Greenbergian Universals (Greenberg, 1966). This latter theory lies on the ground that "either you see recursion, or it is not there" (2016: 116). He also describes one of the main problems of UG as the fact that it is "never directly observable". It may be derived from a language which possesses recursion, but which is not visible in the Pirahã language, for example. Being impossible to see also makes it "difficult to falsify", which he calls "empty categories", therefore making UG abstract.

According to Everett (2007), Pinker claims that "we have an instinct to learn language", an instinct which is completed by the environment as a shaper and a trigger, nothing more.

This is therewith an interesting point to move forward to the next subsection, on the critics and limits of the Chomskyan theory, as there seem to be plethora of them. The non-existence of recursion in the Pirahã language makes one of them, and required to be included in this section where UG was commented upon, being seemingly the main reason of its greatest flaw. The other critics will only add and confirm the limits of the Chomskyan theory.

The current study aims at showing that bilinguals languages should not be analysed separately, that CS is at the border between the two languages, and cannot be analysed through a monolingual spectrum
(as stated above). We also want to show that CS is indeed a special technique that requires great language abilities, unlike what was stated above.

The importance of mentioning Chomsky's work is that his theories are considered as being a turning point in the study of languages, language acquisition and development, and it is crucial, especially when studying child's language development, to understand where the literature is currently at, and where it began.

## I.6.1.1. Criticisms and adaptations of Chomsky's theory

On the opposite side of Chomsky's universalist ideas, Skinner (2014) believes in the sole influence of the environment on the linguistic learning process. These theories, called behaviourist theories, assume that the acquisition of language is a result of a child's interaction with the world, which have suffered the doubts of the scientific community after the development of UG on the linguistic market. The difference is made by Dubuc (2016) on a pre-organisation of the "brain's general abilities". He states that the approach should rather be on the evolution part of the development and the biological structures from which it resulted instead of a Chomskyan focus on its syntactical side.

Ginsborg (2006: 22) and Hoff (2006: 76) have both proceeded to experiments on the effects of the environment on language development. This is important to mention as it explains the reason why our own samples of children have a middle-class background with either one or both parents being highly educated. It gives the child an adequate environment for the acquisition of a language, without including parallel problems such as the socio-economic context, which can hinder the acquisition and learning of one or more languages by children. The former studied a group of children of both high and low social economic status (SES) ${ }^{13}$ to prove incorrect the research

[^11]concluding to a less sensitive action of the environment on language acquisition in comparison to the individual himself. The former discovered that a difference between high and low SES children exists, leading to the conclusion that each individual's specificity, such as "language diversity and context-dependent differences", does matter in the language learning process. There are of course many environmental factors playing an important role. Hoff (2006: 76) concluded that the environment provides the child with the required examples of speech needed to produce communication, therefore meaning that "the human language acquisition mechanism [does] require [...] these experiences". She nevertheless clarifies that these "universal properties of environments [come] in addition to reflecting genetic properties of the human species", leading to a combination of both systems' properties for language acquisition. Both Ginsborg (2006: 22) and Hoff (2006: 76) have studied the impact of different environmental contexts on children such as "poverty, level of maternal education; the home environment; the [nature of the] relationship between mother and child [...]; the quantity [and nature] of speech to which the child is exposed [...] and the language environment" (Ginsborg, 2006: 22). Both found that despite the great impact of environmental factors on a child's language development, only children who can cognitively make use of what their environment gives them will be able to learn efficiently. These innate capacities allow the child to make sense of what they hear, learn from this, to then communicate with their surroundings. Children cannot learn from their environment if they do not possess the capacity to do so (the innateness), as much as they cannot efficiently make use of this innate capacity without sufficient cognitive stimulation provided by the environment.

Lieberman (2001) prefers to take the example of the reptilian brain and subcortical structures as a counter-example to UG giving a base to his functional language system (FLS) in the "traditional 'language' areas (Broca's and Wernicke's areas)" of the brain. From here, the information goes through "cortical and subcortical structures". Far from thinking that language is an organ, Lieberman (2001) follows the theory according to which language is acquired in the neuronal circuits, as a bundle of knowledge acquired all along the Critical Period for language Learning (CPL) of early childhood. Knowing this will allow us to understand the different views on bilingualism and CS, and how they work. The third chapter will consider the impact of CS in the brain, and the analysis of Lieberman's theory (2001) will be an introduction to the changes that can happen in the brain when bilingualism and CS are involved.

According to "Lieberman (2013, 56ff, in Everett, 2016: 114), [...] UG predicts the opposite of what it is claimed to predict" that is "not everyone should be able to learn every language". However, the very fact of a grammatical plan being inside the human genome could mean that it "would be subject to mutations, presenting a non-trivial problem for UG", as the genes have indeed evolved over the centuries.

Among the linguists adhering to Chomsky's universalist theory, many still follow different positions such as Steven Pinker. Additionally, to languages complexity and social differences according to classes, Pinker (2003: 22-23), in an article published in Christiansen \& Kirby' Language Evolution, puts the emphasis on "the ontogenetic development of language" according to which children all do go through the same stages of language learning. They must all make up a full grammar from the small sample given by the parents, hence confirming an aforementioned statement that children all learn their languages despite their parents' errors, showing a pattern resembling universals that were not specifically "taught" by the parents.

Moreover, Pinker (2003: 23) believes in the self-development of a language when children with no "culturally transmitted" language would be put together. As previously mentioned, this very fact can be proven with a made-up language composed of a mix of different languages called Pidgin. It was created naturally and spontaneously among the slaves, through their children who developed a Creole language with its own grammar, with the sole purpose of communication. Pinker (2003: 24) offers a possible additional explanation in the evolution, or mutation, of a gene of language. It could be possible that "the genes promoting language may have become fixed by random genetic drift or by genetic hitchhiking (i.e., genes that were near other genes that were the real target of selection)", or that "it may have arisen as a by-product of some other evolutionary development such as a large brain, [...]". There is a similarity between Pinker (2003) and Chomsky's UG, as he tallies the environmental phenomenon to the initial UG hypothesis. Thanks to the evolution of sciences, it was demonstrated that the mere capacity of speech in humans is the result of anatomy, in comparison to other species, as "only the [one] of Homo Sapiens enabled to articulate sounds. [...] Homo Erectus could still articulate a palette of sounds identical to the ones of a two-year-old child. Yet, with only a few phonemes, we can already produce a very varied vocabulary" (Christophe, 2006). The point where Pinker and Chomsky diverge is on the behavioural aspect of language. Indeed, while S. Pinker is part of the behaviourist branch, Chomsky has explicitly stated that language is not constituted as behaviour or dispositions to behave. Moreover, Pinker (2003: 21) takes the example of Darwin's vocal canal which explains the human being's specific feeding and speech anatomy. It is explained that "every mouthful of food has to pass over the trachea, with some chance of getting lodged in it and causing death by chocking", which appears to be a lower risk compared to "rapid, excessive communication" (Lieberman, 1984). This specific anatomical design with a "low larynx" is what gives us the ability "to articulate a large range of vowels sounds". This however does not
undermine Chomsky's theory since this is just a matter of speech, not innate linguistic knowledge.

Christophe (2006) has reused the words of Tomasello (1990), codirector of the Max Planck Institute of Evolutionist Anthropology of Leipzig, who made a comparison between children and great apes' communication. According to him, humans' will for communication, cooperation and learning is what makes the difference between humans and animals, which seems to come from culture rather than nature, in other words, it would be non-biological. This is specifically Tomasello's intentionality, with the emphasis on the acquisition of social norms that are learned. The very fact of being in contact with a certain environment pushes the child to acquire and develop a certain grammar, even though grammar in itself is not part of the child from birth. The specific social interaction a child has with his parents and relative leads him to use grammar, becoming ingrained by default in his mind. This can be an explanation of children's use of incomplete communication such as 'meow' to say 'I want my cat soft toy' (our translation). According to Tomasello, the child's goal is a quick, efficient and intelligible communication, which he will rapidly discover through the use of a proper grammar. This confirms the importance for our study to be done in the presence of the children's parents, in order to understand how the children's environment can lead them to use CS, and to develop their bilingualism, but also how a restricted environment can hinder a bilingual's language development leading to the use of CS, not as a language skill, but rather as a compensation phenomenon because of limited bilingualism.

As we have seen, many linguists accept the theory of UG developed by Chomsky, while several others, such as Pinker, slightly divert from the initial path. They however retain the general universalist idea. Others again, such as Tomasello (1995), completely discredit the theory, as reported by Christophe (2006). Yet, although Tomasello's
theory has been developing since the 1980s, grey areas linger in comparison with the Chomskyan theory. It is considered that Tomasello's depth of thought was not sufficient enough compared to Chomsky's therefore leading many researchers to conclude that Tomasello's study was incomplete.

Thinking of CS in a Chomskyan approach could be interesting in order to understand the "properly syntactic principles underlying CS patterns" (Gumperz \& Toribio, 1999: 119). Amongst many researchers, MacSwan (2005) has already introduced "CS constraints within Chomsky's (1993) Minimalist Program". His interest lies in the way CS can help understand the syntactic theory by using Chomsky's Minimalist Program. It can also be useful to see the possible limits carried by UG. The understanding of the presence of two or more syntactic systems in bilinguals and multilinguals could help further the research on UG. MacSwan (2005: 86) has found that the only visible constraints of CS considered under the Minimalist Program are exclusively the ones of each language's grammar.

As stated on the back cover of Chomsky's Minimalist Program (1995), there is an "attempt to situate linguistic theory in the broader cognitive sciences. In these essays, the minimalist approach to linguistic theory is formulated and progressively developed. Building on the theory of principles and parameters and, in particular, on principles of economy of derivation and representation, the minimalist framework takes Universal Grammar as providing a unique computational system, with derivations driven by morphological properties, to which the syntactic variation of languages is also restricted. [...]".

Furthermore, MacSwan (2005: 86) has found, as have several others, that the statement explaining that "syntactic operations [which] should not be sensitive to the identities of particular languages but to lexically encoded language's particular parameter settings", is not always true. He (2005: 87) also claims that the Minimalist Program assumes the
invariance of "the operations of the computational system [...] across languages, and language-particular facts are encoded in individual lexical items". Chomsky separates his system into two categories: the "computational system for human languages" which is said to remain the same "across all languages; and a lexicon", enabling the observation of characteristic differences for each language. Another explanation brought on by a few researchers is the possibility of CS having its own grammar, also called "third grammar" taking the minimalist data - or elimination of all mechanisms that are not necessary and essential on conceptual grounds alone - of each language's grammar to produce CS communication. MacSwan (2005: 69) claims that everything happening while code-switching "may be explained just in terms of principles and requirements of the specific grammars used in each case, including principles and requirements of Universal Grammar". In CS then, both languages' lexis may be joined, leading MacSwan (2005: 69) to simplify his own definition of CS's grammar as "the union of the two lexicons, with no mediating mechanisms".

Finally, MacSwan (2005) explains that if Chomsky's Minimalist Program was to be followed, which would extol the simplest and fastest way for communication, CS would be no fault, as it clearly follows the following definition: "Nothing constrains code switching apart from the requirements of the mixed grammars" (MacSwan, 2005: 69). As a reminder, bilinguals who code-switch make use of both available systems, hence going to the simplest and fastest way for communication which answers the question "why Code-Switching?", but not "how Code-Switching?".

It appears that CS seen in a Minimalist approach is also seen through the monolingual spectrum. Even though elements from the lexicon of both languages are drawn together, the same system should be used to analyse bilingual utterances as it is to analyse monolingual utterances (MacSwan, 2005: 69). In this very case, and despite the existence of many different CS, there is a focus on lexicon, which supposedly
carries the complete weight for the whole linguistic switch. This seems, for lack of a better word, 'minimalist' per se, if not reductive, as it does not consider the other spectra of CS, such as phonology, for example.

In our current study, we postulate that CS is a specific technique used by bilinguals to either compensate - in the case of sequential bilingualism -, or to adapt to the situation, context and interlocutor in the case of simultaneous bilingualism. However, as regards the Minimalist Program developed by Chomsky as part of the UG, Macswan (2009: 325) states that under the Minimalist Program, "nothing constrains code-switching apart from the requirements of the mixed-grammars", meaning that "all of the facts of CS may be explained just in terms of principles, and requirements of the specific grammars used in each case". Indeed, Macswan (2009) claims that it would bring unnecessary and unwanted constraints to CS. In this study, we wish to cut from the standard way of viewing bilingualism, and evaluating CS, through the monolingual spectrum, but Macswan (2009:325) states that under the Minimalist Program, "ungrammaticality in CS is understood to relate to mechanisms motivated for the analysis of monolingual language, or which are conceptually necessary for reasons of optimal design". One of the main problems in the Minimalism theory in that case is the fact that it focuses mainly on a lexical approach to CS, whereas our current analysis has been focusing on several layers of the language (phonological, semantic, morphological, to only name a few). Macswan (2009: 326) explains that:

[^12]In order to visualise the Minimalist Program's language framework, Macswan (2005: 68) has reported the Illustration 8 below.


Illustration 8: "The Minimalist Framework" (Macswan, 2005: 68)

Macswan et al. (2005: 7) have developed a minimalist approach to CS (Illustration 9), sketched as if "the lexical items in a bilingual's repertoire are mentally compartmentalized in some sense, with a specific set of phonological and morphological rules associated with each 'lexical compartment'", in comparison to the original version based on monolinguals' linguistic system.


Overt Component



PF
LF

Illustration 9: "A minimalist approach to code-switching" (Macswan et al., 2005: 7)

## I.6.2. Piaget and Constructivism

In an archive system dedicated to Piaget's life, we can find that Piaget built "his first experimental studies of the growing mind" in Paris in Alfred Binet's laboratory. He studied his children's language development, as early as 1923, in order to understand "the development of the intelligence since birth to the language period". His main study about "the construction of knowledge" contributed to the revolution of the conception of the child's thinking pattern. Indeed, he discovered that the child builds his logic gradually along his entire life, passing through several stages until reaching the fully developed
adult speech system. It is Piaget who has proposed that children and adults' minds are fundamentally different from one another.

Constructivism was developed as a clear opposition to behaviourism as it studies the subject with the effects of both environmental situation and personal learning development, which is the basis on which we produced our analyses, since we analyse the language development of both bilingual and monolingual children in their environment, and how their environment's modification can change their bilingualism and use of CS (i.e., their use of the language when in the presence of only one parent, both parents, or a stranger).

First of all, we must answer the following question: what is behaviourism? The analysis of this concept is also essential in order to make the distinction with constructivism aforementioned. It is a theory that takes both human and animal behaviours side by side in order to understand how both behave, enabling the statement of observable facts (as opposed to the subjective verbal descriptions). Behaviourism hence excludes mentalism, since it excludes the postulate of mental states, on the grounds that they are unobservable. This stems from the positivist view that scientific theories deal only with observables.

As for constructivism, Piaget was interested in the thinking subject with all the emotional, environmental and psychological issues that come alongside them. By comparing this definition to behaviourism's, the line is clearly observable as Piaget could not take the subject and his thinking mind while leaving aside all that makes an individual, but considering him as a whole, environment and experiences included. When learning their mother-tongue, children adapt their experience to something specific, showing the importance of the three areas considered by Piaget: emotional, environmental and psychological. These were developed to "define the different cognitive stages" (Complido, 2014) which are not related to the child's age but rather to the different "level[s] of schematic organisation of consciousness". The first one is the consistency of the order of their acquisition which
is then developed, regardless of the age of access to cognitive stages; the second one being the integration of the skills from one level to the next one; the third one is the respect of the structure of completeness for each stage. As clarified by Complido (2014), these stages' changes "are always the same (assimilation, accommodation, balance, abstraction, ...) [and they] match the making of a structure of actions and operations, of a short-term balance between the assimilations and the accommodations".

In the constructivist theory, intelligence is a form of adaptation to the surrounding, the environment, like a biological state. The creation of a link between all states of the human experience is supposedly observable in the outer state of the environment: the culture, the physical experiences, the subject's life; as well as the inner state of the psychology: consciousness, everything biological is depicted. The child is no longer seems a passive learner, he is no longer born with a blank slate as he builds his mind, from birth on and learns from his surrounding: his parents. He is also active in practicing and experiencing, to move, to walk, and as he grows older, to talk, and to make more complex sentences. He practices and experiences more complex movements and actions. A lack of movement and practice can lead a child to different types of deficiencies. Actions can be separated into two types of conclusions, the ones that are interiorised and become thoughts, or exteriorised and become physical actions.

Piaget (1967: 14) makes the distinction between two adaptative mechanisms of intelligence: "assimilation" and "accommodation". "Assimilation" is the name given by constructivists to the integration of external elements to personal structures, such as a child's repetition of an action or a word. "Assimilation" may occur when creating "synonymous objects" in relation with one theme, for example a child's ability to extend their knowledge on a subject, such as dinner time, which starts with eating (first stage), is then linked to family time, or television time in the later stages. The broad meaning of this mechanism is what allows the "action of the organism on objects surrounding him [...]".

Piaget (1967: 14) then states the following claims:
> "psychologically, it is the same, but the modifications, rather than being substantial, are solely functional [...] The mental assimilation therefore is the incorporation of objects in the schemes of conduct, these schemes being nothing else but the canvas of actions likely to be actively repeated".

The "accommodation" mechanism, however, is an effect of the environment on the organism, seen as a "reverse action" explaining the different actions of the environment on living beings. In other words, accommodation is used as a vector to a modification made by the environment on the assimilation cycle.

It is important to note that a child's mind evolves continuously, and the meaning of objects changes as he actively participate to the acquisition of new knowledge. Failure will lead the child to adapt and modify this knowledge to new elements all along their evolution and into their learning.

For Piaget (1970, our translation), "there is no cognitive structure $a$ priori or innate: only the functioning intelligence is hereditary and it produces structures only by an organisation of successive actions practiced on objects". ${ }^{14}$

Piaget agrees that the processing of information by a child cannot be called innate or preconceived. He is however sure of the transmission of structures of intelligence from generation to generation in which only experience and environment can actively help a child's information, integration and assimilation.

Constructivism allows research to focus on everything that makes the individual: from his character to his intelligence. Everything one learns is built like a block on top of which more blocks (knowledge) are stacked through the changes made by experience. For constructivists, errors are useful experiences used to construct new

[^13]knowledge which will be learned all along a child's cognitive and motor development. The brain adapts, allowing the child to evolve and adjust to the environment and their growing cognitive skills.

## I.6.2.1. Criticisms and adaptations of Piaget's theory

However, we can notice the limits of this theory especially in classrooms. Nowadays, teachers who wish to use constructivism in class situate the limits of the theory in its entire complexity, seeing constructivism in all its vastness, making it hard to gather all the required information about its concrete use. Like any other theory, the base has been divided into three other branches with their very own vision, as explained by McLeod (2019): "Cognitive constructivism based on the work of Jean Piaget, social constructivism based on the work of Lev Vygotsky, and radical constructivism" developed by Ernst von Glasersfeld (1974). McLeod (2019) reports that the first one is said to "state [that] knowledge is something that is actively constructed by learners based on their existing cognitive structures. Learning is relative to their stage of cognitive development" (GSI Teaching and Resource Center, 2015: 5). Social constructivism, states that "learning is a collaborative process, and knowledge develops from individuals' interactions with their culture and society" (McLeod (2019), and Vygotsky (1978: 57) suggested that "[e]very function in the child's cultural development appears twice: first, on the social level and, later on, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)". Finally, in radical constructivism, "all knowledge is constructed rather than perceived through senses" (von Glasersfeld, 2014, preliminary publication in 1974). McLeod (2019) also states that "the knowledge individuals create tells us nothing about reality, and only helps us to function in your environment. Thus, knowledge is invented not discovered".

As aforementioned, constructivism is a theory depicting the child as an actor in their own development, their own learning process, by showing the shaping of their learning and their own adaptation to their environment. Children's reactions and thoughts are taken into account in constructivism, leading them to their development, as it is believed that everything done by a child leads one way or another to learning something new. It is a difficult theory to comprehend and even more difficult to apply to a daily life situation, as it seems to be reserved only to the trained minds, who fully understand children's thought processes. The theory's biggest flaw is to perceive environmental information through the child's vision. The incompleteness of the theory is therefore explained by the fact that children do not have a clear vision of reality. This leads to an uncertainty of a possible environmental effect on children's development, or an ability of children's biology to help them develop. In other words, we can wonder whether children's development is made through culture and social interactions, or if their development itself leads to culture and social interactions. The meaning behind this questioning is not only is the child an actor in his own development, but is he also an actor in the evolution of his surroundings. This would however not make sense as children's development remains conditional to the development of their environment.

## I.6.3. The Sapir-Whorf Hypothesis

A brief explanation that could be given of the Sapir-Whorf Hypothesis is that language is not only a means of orally expressing ideas but that it also allows us to transform these ideas. No one can think outside of the limits of their own language. Of course, one could also say that language cannot be created outside the limits of thoughts. In both cases, the results coming out of these processes are the existence of very different visions of the world and the elaboration, by the speakers, of languages which are themselves very much varied.

Sapir is considered as one of the greatest linguists of his time thanks to his theories on linguistics as well as his numerous articles and publications. As explained by Calvet in Encyclopaedia Universalis (2016):
> "In the phonological domain firstly, most possibly influenced by Whitney (who already has a strong influence from Saussure), he steadily comes to the notion of phonemes in an autonomous approach (he does not know either Saussure nor Baudouin de Courtenay who were, in Europe, the originator of phonology)". ${ }^{15}$

His studies of the native American languages led him to "separate the formal approach of sounds in languages (phonetics) from its functional approach (phonology)", where form and function remain his principal focus. He studies language and culture as independent from one another to the point that language becomes itself one of many "cultural fact[s]". Culture and language can therefore be studied in parallel, as two cultural facts, leading Sapir to study them simultaneously in order to know the possible influence one has on the other. In Sapir's belief (1921: 69), language has its own way of moving over time, "[i]f there were no breaking up of a language into dialects", it would stay strong and consistent, drifting "away from any assignable norm", and changing itself slowly over time to become a new language.

According to Calvet (2016: 2, our translation), after the analysis of language on experience, Sapir (1921) made a link between the two, concluding that each language could provide new information about different experiences. A lot could be understood from different cultures, tribes, and so on, only by analysing their languages, because they provide "a certain vision of the world", as "language is the

[^14]specific translation of a given culture, of the social reality; the real world does not really exist, it only exists through what our language gives us a vision of".

Whorf is mostly known for his studies on the relationship between language, thought and cognition, already noticed in Wilhelm von Humboldt's work around the $18^{\text {th }}$ century. His theory according to which culture is determined by language allows him to claim that the very way a language is structured has an impact on the thought process of each language's speakers, meaning that they have a different vision of the world.

Whorf also details the visions of the world people possess in the same way that they conceive and express time (with verbs and time markers for example). The hypothesis of language having an influence on the conception of the world has been a topic of discussion for decades in the linguistic world, and debates are still very vivid regarding its veracity - or possibility. Whorf came to the conclusion that language's evolution, in all its complexity, cannot simply be about survival.

For Whorf, humans are shaped from birth by their mother-tongue as their vision and apprehension of the world is gradually modelled according to the structures that are internalised from the beginning. Lines seemingly impossible to cross are built by our mother-tongue, as our very own way of thinking erects these barriers and structures of how we know the world and what we know of it.

In Sapir's vision (1929: 209), there is a difference between all the societies in which human beings live as their visions have all been shaped by the various linguistic habits that have moulded the individual's reality. Language helps to "adjust to reality" and it is not simply reduced to a "problem of communication or reflection". According to Sapir (1929), the difference existing between languages
will create a different vision of the world and of society, putting the emphasis on each individual's specific language interpretation of his own society, of his own world.

This vision was later extended by his student Whorf (1940: 6) claiming that "[...] the world is presented in a kaleidoscopic flux of impressions which has to be organized by our minds - and this means largely by the linguistic systems in our minds". Therefore, the society, with all its concepts and labels in which we live, is an interpretation of our minds, or rather of our language. Speakers of two different societies will supposedly have two different ways of organisation depending on their own specific rules and codes, which would be broken if a speaker of another language was to come and interpret them with his very own vision.

For example, if we take the deaf community of a country who would be using Sign Language: they have a nationality, they are part of a society (French, English, German, etc.), they have grown in a certain country with a certain culture, a certain language, specific political, economic and societal rules. They also have their own language, Sign Language, providing specific rules, as well as their own vision of the society, therefore their own reality that hearing people cannot comprehend or imagine. They follow both the rules of their countrycommunity as well as their specific-community. The deaf people of a country are one people but two communities speaking two different languages having two different visions of the same world. The deaf community is aware of the hearing people's vision of the world, while the hearing people is unaware that another view can possibly exist for people coming from the same country.

To define the Sapir-Whorf Hypothesis, we can start by defining what representation means. It is the way a subject is able to determine an object, or one's understanding of the said object. By this definition we can see that representation is subjective, as is the way languages allow a subject to represent his world. The Sapir-Whorf Hypothesis assesses
the action of the language on the representation and interpretation of society.

The Sapir-Whorf Hypothesis postulates which type of vision a community has of its surrounding world depending on the language it uses. Indeed, Whorf, after Sapir, proposed the possibility of an influence of language on the vision we have of the outside world, language which might then have an influence on our way of thinking. We use a specific language to explain the symbols of our daily life and the way we conceive them. This language can be used differently if we are French or English or Chinese, meaning that the conception of symbols is different as well, according to the Sapir-Whorf Hypothesis. A given society does not put the same emphasis on the same aspects of itself as another society does.

Whorf has discovered that a language used by a community change according to its culture and its own environment. He centred his research on Inuits who supposedly have a wider range of words to say "snow" according to its different forms and consistencies, in comparison to English or French for example that only have one word to express these ideas, respectively "snow" and "neige". It is however possible in both these languages to express the same ideas as the Inuits, but with longer sentences, which still reflects the idea itself.

Bruner (2017) has described two positions on the link between language and thought: the mould theories and the cloak theories. The former is supposedly "a mold in terms of which thought categories are cast", while the latter is "conforming to the customary categories of thought of its speakers". The Sapir-Whorf Hypothesis is a mould theory as a language provides codes, shaping an individual's representation of his own culture and society. The previous statement therefore means that, as aforementioned, speakers of different languages will tend to think of the world that surrounds them differently according to which language they speak. For Bruner (2017) it is a "mould in which infant minds are poured", rather than a "cloak
following the contours of thought". The Sapir-Whorf Hypothesis is said to have two different versions where "strong" and "weak" have each their own definition. The former supposes a complete effect of language on thoughts while, for the latter, a language determines thoughts to some extent only. Moreover, "influence" and "determine" are two different notions, drawing a clear distinction between strong and weak versions of The Sapir-Whorf Hypothesis. The weak version also separates the different ways of speaking that can exist within a language. This is assuming that they, too, have an impact on the way an individual thinks. It is therefore not the language per se which influences thoughts, but rather $a$ language.

Von Humboldt (1999: 60), Sapir's predecessor and influencer makes the following statement:
> "[...] [t]here resides in every language a characteristic worldview. As the individual sound stands between man and the object, so the entire language steps in between him and the nature that operates, both inwardly and outwardly, upon him. [...] Man lives primarily with objects, [...] he actually does so exclusively as language presents them to him".

The Sapir-Whorf Hypothesis can hence be described firstly after Sapir, for whom our thought processes are determined by language: there is linguistic determinism; or after Whorf for whom the speakers of different languages will interpret and view the world differently: it corresponds to linguistic relativity.

The example of translators can be provided as they experience this phenomenon daily. It is indeed challenging to translate from one language to another while keeping the main meaning, and it is sometimes complicated to explain something even in the same language while keeping the original message, because words all carry their own signification. According to Sapir, there is a need to identify the link between language and thought, that is if languages determine and/or influence thoughts. According to Kihlstrom \& Park (2018), " $[t]$ he former is a much stronger view because it states that one is
incapable of understanding a concept for which the language has no name (it also implies that there is no thought without language)" which is also the strong (less plausible) version. "[T]he weak version plausibly suggests that different languages can 'carve up' the world into different ways -- or, put another way, that conceptual thinking can be shaped and constrained by available linguistic categories". It is also crucial to understand in which way languages have an impact on the different individuals living in a society who are unaware of the aforementioned rules.

The analysis of the Sapir-Whorf Hypothesis is relevant to help us understand to impressive skills bilingual children who use CS go through when switching. We notice that there may be some outside adaptation to the CS phenomena and it helps us confirm the great proficiency bilingual children have of their languages, especially when CS.

Understanding the influence language can have on our way of thinking has always been important, as is the influence on the way in which we see the world. This study has been, for several decades now, the centre of attention of many researchers in these areas with the intent of solving this mystery.

## I.6.3.1. Criticisms and adaptations of the Sapir-Whorf

## Hypothesis

Some researchers do not believe as intensely as Sapir and Whorf in languages as having an influence on thoughts, but rather believe that, up to a certain limit, there is indeed an influence of languages on how different people envision the world.

The "neo-Whorfians" were the first ones to develop this idea along with Levinson (1997) when he notes that the human language's specificity is that it is the most evolved communication system in the animal kingdom, especially thanks to recursion which has not been
proven to exist in other species' communication systems (although we have already mentioned deer who use side paths, which can be seen as recursion). Not only is it true for all means of existing communication, but inside the human language itself, there are thousands of different types of languages.

Levinson's research on time and space has given the field much to work on, and more particularly his study with the Guugu Yimithirr and the Dutch, showing that some cultures view space as left and right, while others rather see it as up and down. As developed in Evans \& Green (2006: 100) "speakers of Guguu Yimithirr must be able to dead-reckon their location with respect to the cardinal points of their system, wherever they are in space". Moreover, the psychologist Boroditsky has discovered that English and Chinese people do not use the same model. Their perception of time in their representations are different, leading yet again to a Whorfian effect in their experience on time. Boroditsky's research (2001: 1) has indeed presented that each community has its own way of speaking about time, "English predominantly talks about time as if it were horizontal, while Mandarin also commonly describes time as vertical", concluding that their vision of time is ultimately not the same, but it is very unlikely that children would experience time differently when switching from one language to the other. It is however important to wonder if the difference mostly comes in the language shaping the thought of time as in horizontal or vertical, or if the vision itself led to an evolution of these languages that is different one from the other.

Boroditsky's main conclusion (2001) showed her adherence to the Whorfian hypothesis where language does have an effect on shaping thoughts "about abstract domains". She even went as far as to say that the mother-tongue is important in the way people will shape their vision of society as well as abstract notions (such as time and space). She adds that it "does not entirely determine one's thinking in the strong Whorfian sense" (2001: 1), therefore following the "weak" version of the Sapir Whorf Hypothesis. Boroditsky however presents
her vision with monolingualism as the norm as she does not once imply the possibility of someone having two or more mother-tongues.

In fact, if we ourselves proceeded to the experience (as speakers of English and French) and tried to think of time as "higher" or "lower", as on the vertical axis, instead of "earlier" and "later", as in the horizontal axis, it may feel strange to our mind. Our vision, or our pattern of thoughts regarding time and space is proven to be different in English and in Mandarin, or in Dutch and in Guugu Yimithirr. The words used in the point of view of their own language prove that the absence of a word to express something makes it impossible for a person to even think or imagine it.

As a final example, Gilbert et al. (2006: 489-490) have centralised their studies on the lateralisation of the brain suggesting that colour perception may be affected by language. It "may [indeed] affect perceptual discrimination through the spontaneous but unspoken use of lexical codes".

However, in comparison to any other research on language and perception, they hypothesise as follows:
> "these lexical codes are likely to be more strongly represented in the left hemisphere ( $L H$ ) of the brain because a preferential involvement of the LH is observed for almost all language task, including those requiring lexical access".

Their experiments' results proved consistent with their hypothesis as "linguistic categories [indeed] selectively influence color discrimination in the RVF (Right Visual Field). Color names modulated color discrimination, enhancing between-category and perhaps reducing within-category distinctions, but only when the target appeared in the RVF".

Gilbert et al. (2006: 489 and 492) postulate the difference of reactions of both hemispheres according to the lexical categories of the colour words they will be using, if they are identical or different. In the first
case, the Left Hemisphere should have a faster reaction whereas it should be the opposite if they are from identical categories. In the second case, the Right Hemisphere's reaction should be the faster one "because the lexical distinction [...] enhances [the] perceptual difference". They came to the conclusion that there was indeed a Whorfian effect for the visual tasks in the Left Hemisphere as "color names influence color discrimination in the RVF but not the LVF". This therefore develops into thinking that when colours bear different names, there is a faster discrimination in the Left Hemisphere than in the Right Hemisphere. They also showed a contrary effect in which the colour names falling in a similar category were leading to a slower reaction in the Left Hemisphere than in the Right Hemisphere.

Two explanations were given as to why language would provoke a difference of reaction on colour discrimination: the first one postulates that "language affects perception directly [which then] alters the nature of the early visual response to colors, with this effect especially pronounced in the left hemisphere". The second one assumes that "language facilitates post-perceptual processes [therefore making] the effect of language on the decision process [...] much stronger in the left hemisphere, leading to categorical effects observed in performance".

According to them, both could be possible, and there is a Whorfian effect in both cases. This experiment led to conclude that " $[t]$ he [Left Hemisphere] sharpen[s] visual distinctions between [different lexical categories] whereas the right hemisphere does so much less, if at all" (Gilbert et al., 2006: 493).

The linguist Pinker, whom we have previously mentioned, does not believe in the "neo-Whorfian" hypothesis and does not trust the experiments done by "neo-Whorfians". He believes these experiments were targeted to provoke a "neo-Whorfian" effect, and were therefore not objective. This would discredit the possibility of a "neo-Whorfian" effect, as participants would be directed in the right direction.

Many researchers such as Lakoff (1987: 335) have adhered to the Sapir-Whorf Hypothesis, even stating that "Whorf was the most interesting linguist of his day". On the hypothesis, he does believe there is no denying that our understanding of experience is closely related to the way we think of different notions in our everyday life because "concepts that are spontaneous, automatic, and unconscious are simply going to have a greater (though less obvious) impact on how we understand everyday life than concepts that we merely ponder".

In Fitch et al. (2005: 186), it can be noted that language does indeed have an inter-communication purpose with other members of the community. They clarify that it is with no doubt "one of the primary selective forces that influenced the evolution of [the faculty of language]". However, they also emphasise the internal and private use of language, located in the mind. They distinguish between the use of language in intra-species communication for "social interactions [...], aggressive interactions [...], caring for offspring, sharing information with kin, etc.", and its use for personal thoughts including "problemsolving, enhancing social intelligence by rehearsing the thoughts of others, memory aids, focusing attention, etc.". These examples show the "compl[exity of] the relation between [the faculty of language] and thought". And most especially if there is indeed an effect of language and thought across cultures, as found in some areas of the Whorfian Hypothesis.

Going against the Whorfian results of cognitive differences according to the spoken language, Chomsky claims that there can be no cognitive differences between human beings, as per the UG's definition.

Taking a different direction, Pinker (2003: 30) mentions that if language had indeed exclusive internal purposes (which is not claimed here by Chomsky), the brain would not need all the superfluous
grammatical information. He therefore claims that "rules for definitive word orders, case makers, phonological strings, adjustment rules, and so on", as private thoughts, are coded by the brain without properly built sentences, it does it "to itself silently" and uses "networks of variables and pointers".

As a conclusion to this sub-section, we can wonder if people with speech disorder also have problems producing thoughts. Or if they have a different thought process as people without any speech disorder. Moreover, would this mean as well that people with more simple languages (those with fewer phonemes, or words for example) also have simpler or non-accurate thoughts, such as the Pirahã mentioned earlier (cf. Chapter I.6.1.)?

However, one more question that arises is if people from the same society, speaking the same language but with different socioeconomic backgrounds have the same approach to reality. Our answer would be by the negative, since languages, socio-economic backgrounds, places of upbringing, can all have influences on one another.

Sapir and Whorf were long gone when people started putting constructive and positive thoughts into CS and bilingualism. It is however interesting to wonder what extension to CS could be envisaged from their theory.

In our opinion, with a 21 st century set of mind, Sapir and Whorf could have had troubles seeing if bilinguals have different thought processes in each of their languages while CS. But if we follow the Sapir-Whorf Hypothesis, a polyglot would have a vision of the world that is broader than a person speaking only one language. Would this wider vision of the world adapt to the language the person is speaking, according to their interlocutor?

Projecting ourselves back in their time frame, Sapir and Whorf could have had ideas such as Epstein's (1915: 210) for whom bilinguals do not think as fast as monolinguals. Epstein (1915: 210, our translation) claims that both thought processes and language selection go on a par
and his conclusion is simply that "polyglossia is a social sickness" ${ }^{16}$. Polyglossia was considered as separating the children's mind in two, making them less intelligent in accordance with the amount of time they were spending on each of their languages. However, leaning towards the "weaker and more widely acknowledged version [of the Sapir-Whorf Hypothesis] suggest[ing] that language influences the way we make sense of the human experience" (Salomone, 2010: 71), CS could then lead bilinguals to a broader and expanded vision of the human experience. The vision of a speaker's cultural baggage going on a par with language seems plausible. This could therefore lead the speaker to adapt its way of thinking and speaking to the context. We can think of the simple example of the use of "you" in English and "tu" or "vous" in French: when starting a conversation in a certain context by using "you", a bilingual person will switch codes by adapting to "tu" or to "vous" according to their interlocutor. They possess the cultural pattern of using "tu" only in a familiar context while "vous" should only be used in a formal context. Use of the wrong word could bring criticism to the speaker. It is however unlikely that people, children and adults alike, really switch from one cultural way of thinking to the next in the middle of a sentence, or conversation. This is the reason why the overall linguistic vision and feeling while speaking provides bilingual speakers with a larger and broader perception of their surroundings, rather like a blend.

Salomone (2010: 71) also mentions that whether we use languages within a community or across communities, it can "produce real effects on people, creating multiple expressions of the self [...]". This would mean that according to the language one intends to speak, it is one who is different, and not the perception of the world, but rather the perception one projects to others. We can conclude that the latter statement finds itself true as "bilinguals occupy two distinct 'monolingual worlds'", where they sometimes come in parallel.

[^15]Of course, this all remains hypothetical but it is interesting to wonder towards which thoughts Sapir and Whorf would have leaned.

## I.6.4. The "Markedness Model"

According to Myers-Scotton (1998: 34), "the structural features that organize discourse" are added to the "first filter of structural constraints". Myers-Scotton (1999: 1261) developed the Markedness Model theory when studying CS in conversations.

According to her, the notion of subjective motivations and objective opportunities are important to show people's previous behaviour and beliefs as well as their "goals and desires" in the current conversation.

Myers-Scotton (1998: 22) claims that each and every speaker has an inbuilt "markedness evaluator" in order to control what is marked and what is not, following two different abilities which are:
> "(1) the ability to identify that linguistic choices fall along a multidimensional continuum from more unmarked to more marked and that their ordering will vary, depending on the specific discourse type, and, (2) the ability to comprehend that marked choices will receive different receptions from unmarked choices, [which is subordinate to] the exposure to the use of unmarked and marked choices in actual community discourse [...]".

As can be deduced from above, it is important to differentiate between marked and unmarked codes. Myers-Scotton (2002: 206) has also developed the counting in frequencies in the languages for finding which code is marked. A lower number would signify a marked code while a higher number would show an unmarked code. The use of a marked or unmarked code entirely depends on the speaker's choice.

## I.6.4.1. The Matric Language Frame Model (MLF)

Developed by Myers-Scotton, the Matrix Language Frame Model (MLF) exclusively relates to bilingual situations. The MLF Model comes as a complement to the Markedness Model in order to explain CS, but Myers-Scotton \& Jake (1995: 1015) confirm their hypothesis stating the voluntary and chosen different speech decisions. MyersScotton (2008: 26) declares that MLF "differentiates both the participating languages and morpheme types at a number of abstract levels". It makes a clear difference between both languages in a bilingual speech pattern. It chooses one language, the Matrix Language (ML), as having a "dominant role", therefore claiming an asymmetry between a bilingual's languages. Myers-Scotton \& Jake (1995: 1015) also state that "asymmetry under the model [...] differentiates content and system morphemes and their participation in CS", therefore giving both these aspects of language a separate role in the production of bilingual speech. In the MLF, it is widely supported that "these two asymmetries [do] apply universally" in "Classic CS". It can also apply in a CS with empirical evidence showing "abstract grammatical structure within a clause com[ing] from only one of the participating languages", therefore confirming the theorised asymmetry.

In Myers-Scotton \& Jake's definition (1995: 338), in "lexical vs. functional [...] or [in] the open vs. closed class distinction [...] the MLF model has always defined content and system morphemes differently". As a conclusion, Myers-Scotton \& Jake (1995) state that " $[t]$ he MLF model contains two principles that can be interpreted as hypotheses about the differing roles of the participating languages". In this case, "[s]pecifically, system morphemes are not the same as the functional elements or closed-class items in other linguistic models. They are defined in opposition to content morphemes. Content morphemes are defined as assigning or receiving thematic roles; system morphemes do not".

In their model, there are two sorts of CS: the one appearing inside sentences, also called intrasentential CS or Code-mixing, and the one appearing outside sentences, also known as intersentential or extrasentential CS (Cf. Chapter I.1.1.).

MLF is interested in priority in the type of CS appearing inside sentences, of which Myers-Scotton (2002: 55) considers the possibility of separated grammars.

## I.6.4.2. The 4-Morpheme Model (4-M Model)

According to Myers-Scotton \& Jake (2009: 340-341), the 4Morpheme Model (4-M Model) cannot replace the MLF Model, as "it offers a more precise description of morpheme types by viewing them in terms of their syntactic roles and how they are activated in language production". They state that the 4-M Model "separates out three types of system morpheme: early [system morphemes], and two types of late [system morphemes], bridges and outsiders. [...]". In the 4-M Model, "the division between content and system morphemes" remains the same, while it also "recognizes significant divisions between morpheme types".

Myers-Scotton \& Jake (2009: 341) therefore explain the following (as shown in Illustration 10 below):

> "It]he primary division is between morphemes that are conceptually activated (e.g., nouns and verbs) and those that are structurally-assigned (e.g. AGR elements). Content morphemes are conceptually-activated. They are based on the speaker's pre-linguistic intentions; recall the semantic/pragmatic feature bundles that speakers' intentions activate. But early [System Morphemes (SMs)] (e.g. plural affixes) are also conceptually-activated; they flesh out the meaning of their content morpheme heads that 'indirectly elect' them (see Bock and Levelt 1994: [953/975]). Because they are structurallyassigned, late Sms contrast with both content morphemes and early SMs in an important way with many ramifications for both monolingual and language contact data."


Illustration 10: Classification of morphemes in the 4-M model (Myers-Scotton \& Jake, 2000: 1062)

## I.6.4.3. Criticisms and adaptations of Myers-Scotton's theory

The main shortcoming which can be pointed out is the assumed capacity of every single speaker to possess this inbuilt "markedness evaluator", as well as the ability to use it. Such a capacity in language awareness seems to be utopian as not every speaker of every language has access to this skill.

The main criticism which can be drawn about the Markedness Model is its very close relationship to the speaker's own knowledge and understanding of his language. The theory is also too subjective, therefore removing a great number of accurate answers, while relying too much on assumptions. Myers-Scotton seems to have put an excessive amount of trust on the speakers and their knowledge of their different languages. The researcher needs to know what the speakersubject's own internal situation is in order to be able to start his study. One of the major critiques of Myers-Scotton's Markedness Model is

Auer (1998) for whom CS can be called onto even if the speaker is not aware of everything that surrounds its use, as developed in the Markedness Model. His criticism therefore rests on the fact that the Markedness Model relies too much on external elements and on the analyst's suppositions on the speakers' own social information.

There are other researchers such as Blommaert \& Meeuwis (1994) for whom the main issue in Myers-Scotton's Markedness Model is located in the fact that Myers-Scotton's Markedness Model does not see beyond a certain fixed system of codes. According to them, the Markedness Model does not leave any room to "variety" and is confined to the passage from one language to the other. Blommaert \& Meeuwis (1994) point out that Myers-Scotton always sees CS and bilingualism as "something special by contrast with the non-symbolic, referential layers of monolingual language use" (1994: 409). It therefore seems that Myers-Scotton's research regularly visualises bilingual communication through the monolingual norm.

Finally, one of the other possibilities to present itself against the Markedness Model is that CS is possibly not always used with complete awareness. Nevertheless, despite the different criticisms, the Markedness Model remains to this day one of the most realistic theories on CS, as it has brought awareness on bilingual research, in relation to CS.

## I.6.5. The innateness hypothesis

The apparent misleading similarities between Chomsky's UG and the innateness hypothesis lead us to ask a few questions: would it be possible that language development be present in our genes? Could our genes have mutated and therefore enabled language evolution? Or could our communication-requiring environment have made our genes evolve in order to create language? If so, was it then an inner
evolution creating larger human bonds, or was it an adaptation to the surrounding environment?

There are different branches of this theory, and one of these, proposed by Kunert et al. (2013: 2), claims the existence of a difference taking ground in some sort of genetic dissimilarity. They put this evolution, or mutation process, "sometime after the human and chimpanzee lineage diverged", stating that it must be "the basis for the development of speech and language". Researchers started to develop this theory after the discovery of the gene FOXP2 which supposedly "play[s] a role in successful language use", therefore acquiring the nickname of language gene. The interesting fact about this specific gene is its presence also "in chimpanzees but with two changes in the DNA sequence", which may be the beginning of the evolution process for language. The appearance of "some type of language [...] proved to be beneficial for humans", therefore permitting a better adaptation to their environment "as it allowed for the development of culture".

The FOXP2 gene is exactly "[...] the 'Forkhead box protein P2' [which] is responsible for regulating many genes involved in the development of the brain and lungs". A mutation of this gene is usually seen in people suffering "from speech and language disorders, and hav[ing] difficulties expressing and articulating language" (Kunert et al., 2013: 2).

A British family (hereafter known as the KE family), is a good example for describing the FOXP2 gene. Dubuc (2002) states that "out of 37 members distributed across 4 generations, 15 suffered from some form of specific language impairment" leading scientists to assume that this alteration was the fault of one single gene passed on over generations through the "standard dominant/recessive pattern and [...] not located on a sex chromosome." as shown in Illustration 11 below. The following illustration is the "[g]enealogical tree of the KE family. Black shapes represent persons with specific language
impairments. Circles represent females, and squares represent males" (Dubuc, 2002).


Illustration 11: Genealogical tree of the KE family. (Dubuc, 2002)

Dubuc (2002) sees the FOXP2 gene as "the first scientific connection between heredity and language", which he calls a "transcription factor" as it can stick itself to "DNA molecules to regulate the expression of other genes". This also includes the ones related to "the development of the brain areas associated with language". For him, the FOXP2 gene is the very basis "of all the genes [...] contribut[ing] to language [...]".

According to Dubuc (2002), more studies were done regarding this specific matter, and it was found that the defect of "one of a person's two copies of this gene" will lead to what is called "specific language impairment (SLI)". The link was made between the FOXP2 gene, SLI and the defect of areas of the brain specific for language. Dubuc (2002) explains that "[i]n particular, [...] both caudate nuclei, [a structure involved in motor control, which could explain the difficulty of elocution some people have when the FOXP2 gene has mutated]
and Broca's area were smaller, and the left caudate nucleus was hyperactive during tasks involving oral expression".

After analysis of this gene, with its mutated presence in chimpanzees, as well as the troubles found in people with a mutated version of the gene, Dubuc (2002) concluded that "it is the human version of the FOXP2 gene that enables the fine mouth and facial movements that make articulate language possible".

Agreeing on a possible relation of this gene with language, they still do not confirm its relation to the development of language, assuming the potentiality of it being "a gene in which defects can cause motor disorders serious enough to prevent the use of language" (Dubuc, 2002).

Another way of interpreting defect in the FOXP2 gene could be the diminished intellectual faculties of people "to such an extent that language became impossible", therefore disconnecting the possible direct impact the FOXP2 gene defect could have on language. It however involved an indirect effect, as it would have a negative action on other parts of the brain, therefore leading to the inability to produce speech.

Kunert et al. (2013: 3) offer a conclusion that can be drawn from the studies on the FOXP2 gene that a "[...] proposed chain of evolution [which] is: first genes, then language and finally culture".

Kunert et al. (2013: 4) also offer an interesting interpretation of language evolution by Baronchelli et al. (2012) for whom rapid language change and language diversity are closely related for means of survival. They take the example of the regular appearance of new words in parallel to the evolution of our surroundings (e.g., "googling", "chillaxing"). For Kunert et al. (2013: 4), "[t]his in turn favours generalist language learners who are able to learn any language equally well" because of the slow evolution of genes, "[1]anguage presents a moving target for evolutionary mechanisms". According to Kunert et al. (2013: 4), this means that there is a great
advantage to being able to learn different languages, since the speaker has access to more than one linguistic sytems since plurilinguals therefore already have all the needed resources for thriving into a constantly evolving language environment.

The conclusion developed by Kunert et al. (2013: 5) was the clear existence of a constant and rapid change in lexical and general structures of language, but they note "exceptions, for example among the very common words". This would hence show a possibility for "genes - which are quite stable - [to] influence at least those language features which have been found to be consistent for thousands of years".

Bishop \& Leonard (2001: 37-38) lengthily explain their own opinions and results on a possible theory of the genes. One of their goals is to shift the general focus from universals and similarities to differences and variations. For them, the very fact of language being used by every single (healthy) human being on the planet leads them to think that "[a]t this level of analysis, language is so important that natural selection tolerates no genetic variation". They however point out the difference of speed in language acquisition in children "and in their ultimate facility with language". They do agree that the fact of language is "deeply rooted in genes which have been selected in evolution", but they also note individual differences they do not believe are part of genetic differences. They mention the contrast existing in the study of universals and the one natural difference representing different levels of analysis where both have the same value and importance according to each research sector.

It can be understood thanks to the above statement that the very fact of an individual's exposure to a normal environment using languages would be proof enough to affirm the involvement of genes in the language evolution process. They nevertheless do take into consideration the many variations present in all of the human beings' language developments on the planet. We can mention, for example,
the acquisition rate, but the development itself remains intrinsic to human beings. The existence of a clear difference can therefore be noted between acquisition and development as two different stages and levels of language learning. The former one being more inscribed in the genes while the latter happens all along the individual's life.

Finally, Bishop \& Leonard (2001: 37-38) state that although language acquisition remains the same in the universals' analysis, the differences can be seen through each child's environment. They return to constructivism where lexicon learning comes with each personal experience, deducting that "differences in experiences must therefore be responsible for language differences among individuals". This shows that the study of language development, and more particularly in psychology and linguistics, seems to be erroneous. If you look at a child's language development from their lexical learning, the environment plays the main part. Children will tend to learn the words their parents and surrounding community pronounce every day, which is why one child's lexis is different from another's. But the rates of learning are not different, contrary to what could be expected. A child's language development is made through their environment, as their environment is their parents, who also happen to share the same genes... The different studies made over the past few years have shown a mix of "nature (genetics) [and] nurture (environment) for individual differences in cognitive, especially verbal, abilities and disabilities" (Bishop \& Leonard, 2001: 37). In this statement, nature (genetics) provides the steady ground for learning through nurture (environment). This means that one's memory and each person's learning skills, whether it be fast or slow, are given by their DNA, where differences create people with different skills. Bishop \& Leonard (2001: 38) mention that a child's language development is a direct consequence of the "quantity and quality of parental language". Maybe the two - nature and nurture - should not be separated since they might need to coexist for the speaker to thrive linguistically speaking.

This would provide convincing explanations as to how and why some children take so much longer to learn a language than others whereas they are provided with the same environment. However, the environment can never be exactly the same from one child to another, as it changes between school, home, and extracurricular activities, for example. The quotation above is Bishop \& Leonard's first explanation of the rate of language learning (2001), whereas the following one states that "genes do not only come from the parents". For them, the fact that we are a mix of our parents' parents, and their parents, generations over, could bring the possibility for two siblings to take the genetic code of different people in their family.

In the light of confirming the previously stated theory, Araki et al.'s early results (2016) can serve as an example, as they prove the following statement:
> "[the power of low] ERDs: Event-Related Desynchronisations [which] are attenuations of brain activities in specific frequency band and have been associated with language processing [...] in the left frontal area of monozygotic and dizygotic twins using a quantitative genetic analysis called structural equation modelling".

These low ERDs have shown to be "equally affected by genetic and environmental factors". Araki et al. (2016) also noticed that "the genetic control of ERDs in the left frontal areas [remained the same] even after the siblings had been living apart, in different environments", which we could assume means that there is in fact a genetic effect on "power of language-specific ERDs. [...]".

## I.7. Levelt's Model of Speech Production

If we mention Levelt's Model of Speech Production, it is because it allows us to understand the production of language in a general way. We will then see an adaptation of this model to bilingualism to comprehend the basic difference between bilinguals and monolinguals, as we focus on the comparison of the language development of bilinguals with monolinguals. Levelt's Model of Speech Production, originally published in 1989, was based on a monolingual speech production and details how language works through three different systems as seen in Illustration 12 reported by Cribb (2021).

## I.7.1. The case of monolingualism

In Illustration 12, we have a representation of the "conceptualizer", "formulator" and "articulator". Cribb (2021) describes that "[t]he preverbal message from the conceptualizer is not spelt out in words", thanks to a general common "knowledge on the world (encyclopedia) of the current situation (situation knowledge) and of the rules of discourse".

Cribb (2021) then explains that in the following step:

> "the message arrives in the formulator. Here three main things happen to the message. Lexical content words are selected from the lexicon (lexicalization), the message is given a surface form (i.e., grammatical encoding) and the message is phonologically encoded (phonological encoding). It is assumed that these three parts are autonomous and work independently of each other".

The final step is the articulator which "is the part of the production process where the phonetic plan is converted into muscle movements for the articulators (tongue, lips, larynx, etc). This then produces overt speech which a listener will hear coming out of the mouth of the speaker". The articulation can be either internal or external. Internal articulation allows for any "errors in the utterance (e.g., grammatical,
phonetic) [to] be corrected" while an external articulation lets the speaker hear that he made an error, and "will involve the speaker hesitating briefly and then replacing the erroneous part of the utterance with the correct form before moving on" (Cribb, 2021).

This accounts for the left part of the system. The right part involves the auditory system, as explained by Cribb (2021) since we still call on our auditory system when we are producing speech.


Illustration 12: Levelt's Model of Speech Production (Levelt, 1995: 14)

## I.7.2. The case of bilingualism

De Bot (1992: 2) updated Levelt's Model of Speech Production to bilingual speakers. He states that there has not been at his time any model made for bilingual speech production, and taking Levelt's Model as a starting point is good since it is "based on several decades of psycholinguistic research and [it] is based on a wealth of empirical data, obtained through experimental research and the observation of speech errors". De Bot (1992: 6-7) states that there must be rules to follow for a bilingual Model of Speech Production:
"- The model must account for the fact that the two language systems can be used entirely separately or mixed depending on the situation [...];

- Cross-linguistic influences have to be accounted for in the functioning of the model [...];
- The fact that a bilingual uses more than one language should not lead to a significant deceleration of the production system [...];
- Assuming that people seldom achieve 'total' bilingualism, the model should be able to deal with the fact that the speaker does not master both language systems to the same extent [...];
- the model should be able to cope with a potentially unlimited number of languages, and must be able to represent interactions between these different languages. Typological differences between the languages should therefore not cause problems [...]."

In order to visualise the previous rules, here (Illustration 13) is The Model of Bilingual Speech Production subsequently published in Kormos (2014: 168):


Illustration 13: "The Model of Bilingual Speech Production" (Kormos, 2014: 168)

This model, based on Levelt's Model of Speech Production, is developed especially according to the bilingual speech development. Kormos (2014: 166) states that, just like the original model, she "assumes that bilingual speech production is modular in the sense that it consists of separate encoding modules: the conceptualizer, the formulator, and the articulator, which work with their own characteristic input".

In order to properly understand how this specific model works, Kormos (2014: 167) explains that:
> "it is not a strictly serial model in the sense that the cascading of activation is allowed from the lexical to the phonological level. In other words, activated but not selected word nodes can pass on activation to lower-level phonological nodes. On the other hand, the model does not permit the backward flow of activation between levels, and monitoring is done with the help of the speech comprehension system".

Moreover, Kormos (2014: 167) states that regarding the memory stores, also found in the original model, her update model "contains one large memory store, called long-term memory, which consists of several subcomponents: episodic memory, semantic memory including the mental lexicon, the syllabary, and a store for declarative knowledge of L2 rules". Kormos' (2014) model was developed for both simultaneous and sequential bilinguals, whether the bilinguals were brought up with two languages early on, or if they became bilinguals later in life. In the rules developed by De Bot (1992: 6-7) (cf. Chapter I.7.) for a bilingual model for speech production, we can visualise the specificities of bilingualism compared to monolingualism. Indeed, the first rules mentions how this model should allow for a separate use of language as well as CS "depending on the situation". Linguistic interferences, the ability to maintain a production system despite the use of two or more languages should be accounted for, and the difference in linguistic proficiency between the languages should be considered. All these rules allow us to visualise the subtle differences that undeniably exist between bilinguals and monolinguals, and allow us to consider which analyses will be necessary for our own study, in order to go into detail concerning the development of the language of bilingual children, compared to their monolingual peers.

## I.8. Essential criteria to be taken into account for the current study

In a recent study, Hartshorne et al. (2018) separated all the possible interferences that could come in the way of understanding languagelearning ability according to age. They state that "we must disentangle it from age of exposure, years of experience, and age of testing". Hartshorne et al. (2018: 269) found interesting results supporting "a critical period for language acquisition", and their "estimate of when the learning rate declines ( 17.5 years old) is likely to be reasonably accurate". We will also develop on the CPL since this is the ground for choosing to analyse the speech of children up to the age of 5. Like for Hartshorne et al. (2018), in our study, the children are in the same age range (between $2 ; 02.24$ and $5 ; 05.07$ ), the parents of bilingual children also use the OPOL, or "One Parent One Language" method, and they have been tested at the same age period as well. This method originates from the Grammont-Ronjat principal (Ronjat, 1913). There are also a few other linguists such as Crain \& Thornton (2012) and Pinker (1994), who had "observed that by 3-5 years of age, most children show above-chance sensitivity to many syntactic phenomena", they noticed in their own study the proficiency of children under 7 when answering their quiz (Hartshorne et al.; 2018: 269).

In all the studies mentioned above, the results came back with early learners doing significantly better at their tests than late learners (Hartshorne et al., 2018: 270). According to them, language acquisition has a lot to do with the duration of learning. When language acquisition is mentioned, it means that a child has the ability to piece together the words from one or more languages, in an understandable order, either one language or both languages together. Therefore, Hartshorne et al. (2018: 270) explain that a learner is capable of reaching "native-like proficiency" until he is $10-12$ years old, as the time for learning decreases significantly if started too late
"before the sharp drop in learning rate at around 17-18 years of age". Moreover, they have confirmed the earlier results stating that it is still possible to "reach similar levels of ultimate attainment as native bilinguals" as late as 10-12 years old. This is placed in comparison to native children who had a longer period of time to acquire the language than second-language learners who start later and therefore have a shorter amount of time to acquire their second-language. Hartshorne et al. (2018: 272) sum up by stating that their study shows proof of "a grammar-learning ability that is preserved throughout childhood and declines rapidly in late adolescence". It is worth reminding that language acquisition is very broad, as each part of a language (grammar, lexicon, phonology, etc.) is acquired at different periods of time and at different paces.

Taking into account all these criteria, our own research has focused on the transcripts of twelve bilingual children and twelve monolingual children, as it is the sum of children, we were able to find on the CHILDES database as having a sufficient number of transcripts over a certain period, and the families who were willing to participate in our study. We only analyse the language development of children under five years old, as five is the supposed age of the Critical Period for Learning Languages (CPL), as detailed later on. A further study on children between 5 and until the beginning of puberty, and on those from pre-puberty to $17 / 18$ years old is definitely required in order to either confirm our future results, or disprove them.

## I.8.1. Language acquisition before 5

From birth on, babies start communicating with their parents through body language and cries. After a few weeks, the baby starts cooing. Then they start to use their voice more and gurgle, squill, laugh and scream to get their parents' attention. Between the ages of 6 and 9 months, babies start babbling in syllables. By their first birthday, babies should have uttered their first word, leading to using around 50
words by the age of 18 months old. The sentences then start to appear, firstly by piecing together two words, then four or five by the age of 3 years old. Finally, between 3 and 5 years old, children usually start making longer and more complex sentences. By the age of 5 years old, a child should have mastered the use of about 2,500 words which should be used in proper grammatical sentences (Bloom, 1973). But how exactly does the acquisition of language work in children's brain before 5 years old?

The theory of a Critical Period for Language learning (CPL) appeared with Lenneberg (1967) at the same time as Chomsky's UG theory or Skinner's proposal of children learning languages (1957) thanks to a repeated and regular - that is with positive response from their surrounding community - exposure from their environment. Lenneberg (1967) took the example of the wild children Victor and Genie to feed his theory. Genie, a 13 -year-old girl, suffered from mistreatment her entire life and was unable to develop any spoken communication. She would express herself with barking and growls. Victor was a young boy who was found and captured by hunters in 1798: he was unable to communicate and had no social skills. After being found, he was entrusted to Jean Itard who failed to teach him to speak more than a few words and to use more than a couple of modern tools.

Lenneberg (1967), as quoted by Krashen (1973: 64), draws the following image of the link between brain lateralisation and the CPL at the age of five:
> "cerebral dominance for language is first detectable between ages three and five and becomes gradually stronger, the right hemisphere performing less and less of the language function until puberty, by which time the degree of dominance of the left hemisphere is permanently established".

Regarding the dichotic listening as seen in Krashen (1973: 66), a method in which "subjects are presented with competing simultaneous auditory stimuli, one to each ear", two schools have developed the
lateralisation-by-puberty theory and the lateralisation-by-five theory. In the former, "the degree of right ear superiority would gradually increase throughout childhood, reflecting the growing dominance of the left hemisphere", whereas in the latter, "the degree of right ear superiority would not change after age five". Krashen (1973: 66) explains the specificities of the right ear excelling for verbal material, therefore reflecting the work of the left hemisphere, while with a right hemisphere specialisation, the left ear is used for certain non-verbal stimuli. In his research, when comparing the results from children with the ones from adults obtained in the same conditions, Krashen (1973: 66) found no difference in the degree of lateralisation between 4 and 9 . He also adds that both children and adults who were tested under similar conditions show the same degree of lateralisation. Their conclusion confirms the possibility of brain lateralisation to be complete by five years old, even hypothesising that it might be complete by age four. However, whether it is located at four or at five years old, he mentions that "the completion of the development of lateralization" occurs long before puberty.

Subsequent to Lennerberg (1967), Krashen (1973) as well as Muñoz \& Singleton (2010) have argued that there is a correlation between the CPL and the lateralisation of the brain, which is supposedly complete by age 5. However, Muñoz \& Singleton (2010: 1) have indeed confirmed that "[i]t is undeniable that there exists a relationship between age and success in additional (L2) language learning. However, the precise nature of that relationship has long been a matter of controversy", although they point to other factors as an explanation for language acquisition. Krashen's study (1973: 65) was mainly referring to children who had suffered right-hemisphere injury before the age of five and others who had suffered the same injury after the age of five. In both cases language impairment was diagnosed. In the latter case (children suffering a right-hemisphere injury after the age of five), the results on the brain after healing was the same as the ones of adults suffering from the same injury. This could mean that brain
recovery was similar in children after 5 years old and adults. Does this mean that children after 5 years old have the same brain plasticity as adults? It would indeed seem so, regarding this specific area.

The example of Genie is the clear proof of what was stated earlier by Krashen (1973: 69), that is the possibility for children's brain's plasticity to be complete by the age of five, or at least before puberty. This would therefore leave no room for first language acquisition after this age, as the left hemisphere, which is responsible for language, is complete. The different studies regarding Genie showed that she seemed to be using her right hemisphere to learn language. It seemed that she was using her right hemisphere for mostly everything that she was learning. Thanks to different tests, researchers were able to place Genie's maturation back in the age range of her development, therefore placing her at 2 or 3.5 years old instead of her then current age of around 15 years old.

Regarding Genie's performance, she was tested at between age 8 and adulthood. The study of Genie's case was then useful to Krashen (1973: 72) as he came to the following conclusion:
> "while the normal development of lateralization may not play a role in the critical period, lateralization may be intimately involved in a different way; the left hemisphere must perhaps be linguistically stimulated during a certain period of time for it to participate in normal language acquisition. If stimulation does take place during this time, any language acquisition must depend on other cortical areas and will proceed less efficiently due to the previous specialization of these areas for other functions".

This explanation means that due to brain lateralisation being complete before puberty, and in the case where a child would not have been exposed to at least a first language, other areas of the brain would take over for language acquisition. However, any other part of the brain, except Wernicke's area, has a specific role, and cannot take over the
entirety of language acquisition and development, therefore leaving little room for a complete language acquisition.

Krashen (1973: 69) eventually comes to the possible link between brain lateralisation and language development before the age of 5 . He states that most children will have mastered their first language by the time they reach 5, which would mean (according to him) that both language acquisition and brain lateralisation either go hand-in-hand, or the first one depends on the second one, especially for certain functions. "Thus, the development of lateralisation may represent the acquisition of an ability rather than the loss of an ability".

Krashner's main conclusion (1973: 72) in relation to the current study is the fact that first language learning is indeed possible after Lenneberg's CPL of 5 years old, even pushing it up to after puberty. It will however never be as smooth and rapid as early acquisition, and "may depend of cortical mechanisms outside the left hemisphere". However, Strid (2016: 706) states that "[b]ecause a biologically determined critical period has rather specific characteristics, such as being species-wide and ending rather suddenly and without reprieve, language learning clearly does not fulfil the definition". Therefore, the term critical should be changed to sensitive since the language acquisition (of a second language) remains possible after the age of 5 , and, although challenging, not impossible. Moreover, if it were a critical period, it would be suddenly closed for all the members of the species, but this is not the case, since different studies (Kuhl et al. 2003; Bradlow et al., 1997) have shown infants, children and adults keeping their sensitivity past the CPL.

## I.8.2. Language acquisition after 5 and before puberty

As developed by Lenneberg (1967), the age of five is supposedly the beginning of the CPL, and Mayberry \& Kluender (2017: 886) briefly
explain the choice of words for "critical" and "period". They state that, "[b]efore the opening and after the closing of the CP, sensitivity to the stimulus is either diminished or absent, hence the notion of a PERIOD". They then take the example by "Lorenz (1965), [of] baby geese imprint[ing] on the first moving stimulus they see beginning at 13 hours and ending around 16 hours after hatching" explaining that "[t]ypically the first moving object is the mother, and gosling survival depends upon learning to follow the gaggle, hence the notion CRITICAL" since the babies have to be exposed to this first moving object in a critical period at the beginning of their lives.

Mayberry \& Kluender (2017: 887) have postulated that, regarding the comparison between Chomsky and Skinner, a CPL might be like a junction between the two theories, "one centered in the environment and the other centered in the mind and brain". The CPL may be used to explain how, thanks to the environment, language development can have a link to the development of language in the brain.

There seems to be no sudden drop in language acquisition from the age of 5 , as explained earlier. Instead, the ability to learn a first language remains possible from 5 years of age until prepuberty, to then start decreasing until the end of the puberty period, which is why we mentioned that the words "critical" should be replaced by "sensitive". Hurford (1991: 162) takes the metaphor of a curve "which rises early, maintains a high level before puberty, and then falls" at around puberty. It is also the common experience that the older a person gets, the harder it will be to acquire native-like skills in a foreign language. It is proven, thanks to Genie's case, that "some quite central aspects of grammar are difficult, if not impossible, to acquire after puberty, including interrogative structures, third person, relative, indefinite and demonstrative pronouns, and much of the structure of the auxiliary verb" (1991: 161). Moreover, it has been visible for centuries now that a very young child exposed to a language will automatically pick it just like a mother-tongue.

Hurford (1991: 161-162) details even more by stating that:

> "[n]o doubt the various facets and layers of the structure of a language have different, though substantially overlapping, critical periods. Acquisition of the low-level phonetic rules probably diminishes at a stage when acquisition of grammatical structure is still relatively easy. And acquisition of vocabulary is still relatively easy after the facility to acquire grammatical rules has dwindled or disappeared".

This shows that every single aspect of a language is useful for acquiring the next step. However, if one of those steps is skipped, it will be challenging, or even impossible, to carry onto the following step and proceed to a proper, efficient spoken communication, with a correct grammar, among other criteria.

However, and this is the ground base of the development of the CPL hypothesis, it is also well known that children acquiring a language in their first years will have acquired the language with little to no foreign accent, whereas a child who acquires it later than this age will have a slight or stronger foreign accent, among other characteristics, depending on the age of acquisition. One reported case however contradicts said fact, the one of Julie who immigrated to Egypt at the age of 21 with no knowledge of the Arabic language, which she learned by immersion (Strid, 2017: 705). After 26 years in the country, she "tested as virtually indistinguishable from a native speaker on advanced aspects of pronunciation and grammar".

Lenneberg's conclusion (1967) stating that the examples of wild children (Genie and Victor) who went all the way to puberty without developing any type of spoken communication, although "sketchy and unsystematic", seems to be evidence enough to (at least partially) support the existence of a CPL (Hurford, 1991: 160). According to Lenneberg (1967), "these people seem to have missed the chance to acquire language fully".

As a matter of fact, Ploog (1984: 88) even compared spoken language acquisition to the one of ASL (American Sign Language) learners and
came to the conclusion that "children who learn ASL after, say, 7 years of age, will have a sort of foreign accent phenomenon. [...] they will not speak like native signers". This is yet another proof that there might indeed be a CPL. The age mentioned above is slightly over the CPL we have previously mentioned. Nevertheless, if the CPL goes from five to prepuberty, seven remains close enough to the frame's borders.

Of course, if there is anything to remember here, it is the absolute fact that, in any study made on language acquisition since Lenneberg (1967), one must first and foremost know and understand where the native-like skills lie. It is crucial to know if they stand in the simple communicative skill, or in the true native-like speech. Indeed, we previously talked about foreign accents in the case of late language acquisition, but a foreign accent has never stopped a learner from speaking a language with native-like skills. Moreover, where do native-like skills start and stop? At which point is a language considered to be spoken with native-like skills and which part of the language can possess these native-like skills? Are some of these aspects peripheral to the notion of native-like proficiency, and if so, which ones are they? Moreover, to what extent can we consider them to be relevant or not? Hurford (1991: 164) mentions some of these aspects to be "vocabulary, pragmatic skills, proficiency in writing the standard language, conceptual and logical reasoning, memory, reading, and even scholarly productivity". This however does not confirm the need for native proficiency in a learned language, but rather a certain degree of native-like skills, for the purpose of communication.

Hurford (1991: 161) mentions Johnson \& Newport (1989: 63) who established from an unpublished study by Newport \& Supalla that, although children starting to learn a language after the critical age of 13 were not able to reach "as high a level of proficiency as the native or early learners", it was not impossible for them to learn the language. Their own linguistic skills were nowhere near native-like,
but were however good enough to be considered close to native, or at the very least intelligible.

Regarding the CPL on itself, Hurford (1991: 162) states that there are different phenomena to CPL, just as there are separate components to a language. But also, that " $[t]$ he gross phenomenon of the critical period is an aggregate of a number of roughly coinciding particular phenomena". Indeed, to temporise the use of the term CPL, he states the following:
> "no doubt the various facets and layers of the structure of a language have different, though substantially overlapping, critical periods. Acquisition of the low-level phonetic rules probably diminishes at a stage when acquisition of grammatical structure is still relatively easy. And acquisition of vocabulary is still relatively easy after the facility to acquire grammatical rules has dwindled or disappeared".

## I.8.3. Language acquisition between pre-puberty and the end of puberty

We have seen that, up to puberty, children have the ability to learn a language with ease and that their brain's plasticity is "good" before the end of puberty (17/18) and "great" before reaching puberty (10/13). In a study on ASL (American Sign Language) learners and natives, Mayberry \& Kluender (2017: 900) have confirmed the fact that learning a first language before the end of CPL will always be more important than learning a second language before the end of CPL. Indeed, their late L1 learners' proficiency was significantly lower than their late L2 learners' "on measures of morphology and syntax, phonological processing, and comprehension". This means that the late acquisition of a first language creates delays in the said language. It also means that the current study on language acquisition by age before 5, after 5 up to puberty and after puberty into adulthood - is only valid for mother-tongue(s) and not for second language learning.

We can however notice in Mayberry \& Kluender's discovery (2017: 900) that "Perisylvian language areas show limited activation when language is first experienced in adolescence and nearly none when it is first experienced at the end of brain maturation in young adulthood", as shown in Illustration 14 below.


Illustration 14: Perisylvian regions (Pinel, 2000)

If we follow Mayberry \& Kluender (2017: 900), we can state that the language area of the brain is only fully activated and used during the CPL, and that it decreases as time goes by, leading to partial activation during puberty to almost no activation in young adults. According to Emmorey (2018: 917), a restraint in the "left hemisphere language regions [of] some capacity to process language when language is first experienced in adolescence, but this capacity is lost by young adulthood" (Mayberry \& Kluender, 2017). This is clear proof of the impact of language learning according to the stages of life. Early childhood seems to allow more learning ground, while learning gets increasingly harder as the person gets older and the plasticity of the brain decreases. Mayberry \& Kluender's explanation (2017), as is Lenneberg's, is the synchronicity of both "brain maturation and language acquisition" for a short period of time. Mayberry \&

Kluender (2017: 900-901) have studied and analysed the development of the arcuate fasciculus - a bundle of nerves linking together Broca's area and Wernicke's area, the two areas responsible for language in the brain. They have found that it "is significantly less developed in cases of late L1 acquisition" when they were compared with those of "native deaf signers and hearing L2 signers". This shows how crucial it is to have early access to at least a first language. The risk simply is to not have the cognitive ability to properly acquire a language after the CPL has passed, as seen with Genie and Victor. The case of Genie was interesting for linguists of the time, and especially Susan Curtiss, a professor of linguistics at UCLA. She studied Genie, and wrote several articles about her findings. Her close relationship with Genie led them to become friends. According to Curtiss (1973, 1974, 1975), Genie eventually learned a few things such as drawing. She was also able to put a story together with cards showing images. Despite this type of communication, she never really learned to talk, albeit a few words. She also had very little grammar skills, even about 3 years after she was found at the age of 13 . Curtiss did mention that the window of grammar learning seems to close between 5 and 10 years old, confirming the existence of a CPL.

According to Hurford (1991: 160-161), Genie underwent a certain number of testings with Curtiss as she tried to understand and analyse Genie's language development. The conclusion that rose from their observations and testings, is, as stated, that Genie uses her righthemisphere to think, even for language. "Her language resembles that of other cases of right-hemisphere language as well as the language of those generally acquiring language outside the 'critical period'". Genie's case is the perfect example to corroborate Lennerberg's hypothesis on a CPL confirming the constraints mentioned above "on the nature of language acquisition outside of this maturational period".

Hurford (1991: 161) explains how Curtiss (1977: 234) confirmed the previous theories stating that Genie developed a right-hemisphere thinking because she missed the chance of learning language in the
left hemisphere during the CPL. This information could be the proof that the acquisition of language after the CPL would make the left hemisphere of the brain unable to process any language acquisition, therefore putting the language acquisition workload fully onto the right hemisphere.

Mayberry \& Kluender's main explanation (2017) in their conclusion was the fact that late L1 learners' problems were their language acquisition and development happening after the significant period of brain maturation in infancy and childhood. Moreover, after having explained that they believe there is a clear impact of the different linguistic experiences a child will have during their language development on the CPL, and therefore the way the first language will have been learned, they nuance earlier conclusions. They state that late L1 learners' language development is slowed down then stopped "at the level of simple sentence structure".

## I.9. A preliminary study of the observation of a child's

## language behaviour

For our own contribution to the state of the art, our Masters degree's first analysis was based on the use of extracts from a series of transcripts (twenty) of a child's language (Olivier). In order to answer most questions that were previously formulated, our own study (Clain, 2015), based on data from a primary observation of a child through the database CHILDES: Child Language Data Exchange System, yielded the following results regarding Olivier's bilingualism. The goal was to understand if his use of CS was a conscious choice, but also to measure his level of language awareness, as well as the overall use of his languages according to the situations. We wanted to examine whether Olivier was deliberately using his languages or not. This study has led us to deal with bilingualism from the angle of different acquisition theories, thanks to the study of CS. This research
will be an introduction analysis to the much larger one done in the current research.

## I.9.1. Framework of the study

The selected child is called Olivier ( O . in the following study), born August $28^{\text {th }}, 1990$, whose parents are Cheryl and Bruno. The observer is Elena Nicoladis. Three different transcripts were studied, the first one was recorded on July $3{ }^{\text {rd }}$, 1992, when Olivier was $1 ; 10.5$; the second one was on January $28^{\text {th }}, 1993$, at $2 ; 5$; and the last one was on August $12^{\text {th }} 1993$, at $2 ; 11.15$. The mother and the observer were mainly speaking to Olivier in English and his father in French. We can therefore assume that both these languages are Olivier's mothertongues, since Olivier does speak English as well as French. We will be able to select which language is Olivier's dominant language by means of these transcripts. The recordings are set in Québec, Montréal, in their home, and Olivier is playing with his toys.

## I.9.2. Analysis and results

After analysis, the main results were that Olivier, as a bilingual child, seems to make the difference between his two languages, as well as to select the language according to his interlocutor. He is mainly using English with his mother and Nicoladis, and French with his father. A few code-mixings were also noticeable but they seemed to only be the result of his very young age and do not last long over the period of time the recording lasted. These code-mixings would balance themselves out from the moment he would start to master both languages equally (which can now be confirmed, having analysed later transcriptions for the current study, cf. Chapter 2). The observation is that Olivier seems to be using CS with awareness and spontaneity. Although no results transpired as to whether there is a deliberate choice in the selection process, as he is using the process as
well when several people speaking different languages are involved. The conclusion was that CS in this particular case is a spontaneous phenomenon, more or less intentional in order to adapt to the context and the interlocutors.

First of all, we can draw a parallel between the results found and the different linguists' definitions of CS aforementioned. We can first of all analyse Olivier's speaking pattern through the Chomskyan description of Generative Grammar. As per Olivier's age at the time (between $1 ; 10.5$ and $2 ; 11.15$ ), he is understanding and speaking two different languages - French and English. He therefore seems to be subject to the rules of Generative Grammar as proposed by Chomsky (forming grammatically correct sentences, without any syntactic problems and perfectly understanding his parents as well as the observer, Nicoladis). These conclusions were made according to the child's reactions to what was being said to him, no matter the language. The poverty of the stimulus, developed by Chomsky, seems to be validated in this case. The fact that Olivier is capable of simultaneously acquiring English as well as French allows the assumption that Chomsky's theory would be here corroborated. If we stand on Chomsky's side, and the fact that Olivier learned two languages as fast as he does, a common denominator between these two languages must exist. We also noted that Olivier does sometimes confuse the French pronouns "il" ("he") and "elle" ("she"):
34) CHI: Qu'est-ce qu'il fait Eléna ?

He also confuses the French articles "le" and "la" ("the"):
35) CHI: Papa va [...] faire le vilain sorcière.

And finally, Olivier also sometimes uses "un" instead of "une" ("a"), and "une" instead of "un":
36) CHI: il fait un vilain sorcière.

These details are part of the precise grammar of the language, details the child must acquire as he grows. Moreover, UG as a supposedly innate grammar is more related to those little connections in the brain allowing the acquisition of one or more languages as fast and as well as children do.

Then, Skinner's theory could also be referred to here since he "believes in the influence of the environment of linguistic learning"; or Lieberman's theory stating that language is acquired by neuronal circuits, which is then acquired "all along the sensitive period of learning which is in the early childhood".

According to the preliminary results from Olivier's transcript samples, Pinker's vision of Chomsky's theory remains the most plausible one. It states that children are born with parameters enabling them to encode systems, thanks to the environment. Even before being born, it is possible for the human brain to possess a tool allowing the simultaneous understanding and learning of one or more languages. It is however hard to believe in the theory of a "clean slate" being filled thanks to the interaction with the outside world exclusively. A language that is produced is never word for word or sign for sign what was heard before, and these basics let humans adapt their linguistic knowledge acquired from their parents and environment. Indeed, it would seem that humans are all born with something allowing language acquisition, but we would not go as far as calling it a Universal Grammar. It is the basics allowing humans to assimilate what is happening in their environment and surroundings, to learn it, and then, thanks to a language's specific grammar, proper to each language, to produce utterances, according to the situation and the interlocutors, as seen with Olivier.

The fact that language happens on a neurological level was proven by researchers on language impairment such as Leonard (2014), Siegal et al. (2001) and Van der Lely \& Christian (1998), as quoted by Pinker (2003: 23). They showed that "intelligent people can have extreme
difficulties speaking and understanding" in the cases of "aphasia and the syndrome called dysphasia".

It would be far too simple to stop only at the "innate" version of language acquisition in the process to explain language. Pinker (2003: 21) claims as well that "grammar is only one component of language" as it also needs to interact with other "systems of the mind" which are "perception, articulation, conceptual knowledge [which gives meaning] and social knowledge [which is about the language's use and interpretation]". Chomsky does not however deny that the proposed language module interacts with other modules of mind. In language, different systems are involved, and, even though these systems are not part of the meta-language and have non-linguistic purposes, they remain crucial for communication. Pinker's vision is closer to the vision used in this study in order to offer the best chances to understand how bilingual children's language acquisition works.

Thirdly, in this case, it was not possible to validate Piaget's theory as the child is supposedly not consciously an actor in his development during the first years of his life. He is subjected to outside elements and assimilates the ideas coming from his environment. For Piaget, we cannot exclusively rely on the environment as having the sole effect on the organism since the organism also has an effect on the environment (cf. Chapter I.6.2.).

Complido (2014, our translation) is most probably right when he claims that "an assimilation without accommodation takes one into an imaginary world" ${ }^{17}$. After the analyses of Olivier's use of both his languages, there is another reason not to follow Piaget's theory since the full will of action is not obvious in the child's speech. Perhaps an action of possible innate function of his mind does exist, but we are then no longer in a constructivist theory and have once more entered the field of Chomsky's UG.

[^16]Moreover, Olivier was too young to allow us to visualise if his vision of the world was different when speaking English or French, or when his interlocutor was his mother or father. It would be very interesting to know if there is a variation of the way he understands the world at such a young age, which would allow to visualise a Whorfian effect.

Finally, some similarities between Myers-Scotton's Markedness Model and Piaget's constructivism were noticeable. The former looking like a more detailed version of the latter. The Markedness Model (cf. Chapter I.6.4.), as explained by Myers-Scotton, leaves room for doubt while opening up a possibility to evaluate a present and immediate deliberate choice as assumed by this theory. A different choice would therefore let the subject "reckon the available options in regard to the analysis of costs-benefits" as explained earlier (cf. Chapter I.9.2.). One element caught our attention, i.e., the possibility for a child as young as Olivier to make the difference between the marked and unmarked codes, hence leading us to wonder if it would be possible to detect which one of his languages is dominant. The speaker could therefore easily evaluate the language that is dominated, but it would seem improbable for a speaker to be able to do so, thus showing the limits of Myers-Scotton's Markedness Model as it calls on a lot of external data assuming the speaker's knowledge between marked and unmarked codes. But can children proceed this way?

In the study with Olivier, and following in Myers-Scotton's steps, it can be assumed that French is his unmarked code while English his marked code. It is indeed possible to count the frequencies of use of each language where the marked code is the least used one and the unmarked code the other one (Myers-Scotton, 2002: 206). These suppositions have stopped our analysis on a potential marked/unmarked code. Moreover, it would seem that CS is not always willing and deliberate, and can be used without an aware choice from the speaker.

In the abstracts of Olivier's speaking pattern, the child appeared to be using code-mixing at places with supposedly full awareness, as there are specific times and people with whom he would be using French or English. Olivier would indeed mainly answer in French to his father and Nicoladis when the latter would speak in French with him and English with his mother when she would address him in English. The child would also sometimes answer in the language he uses the most with one or the other parent even if this parent would speak their second language. He does seem to make the difference between which language was spoken by which parent leading to CS. It was possible to conclude that at the age of 1 year 10 months and 5 days $(1 ; 10.5)$, Olivier is aware of which one of his parents is speaking French and which one is speaking English, therefore managing to adapt his speech to both his parents, as well as to a stranger.

Regarding CS or code-mixing, they seem to be used deliberately as Olivier would code-switch when speaking to both his parents at once, as well as when Nicoladis is in the conversation, maybe to include them all in the conversation, as visible in the following examples 3739 , in which Olivier is $2 ; 11.15$ :
37) "MOT where did you go with Esther this morning?

CHI I go to the park!
MOT to the park?
CHI yeah
MOT tell Elena what happened to your cheek.
CHI je fais bobo.
OBS oh no!
$\mathrm{CHI}<\mathrm{je}$ tournais> [/] (.) je tournais et je fais"
In the example above (37), Olivier seems to purposefully switch from English with his mother to French with Nicoladis, even though she expresses herself in English with him.
38) "MOT no, where [/] where was the slide?

CHI over here the slide
[...]
MOT where do you put your hands on the bar?
CHI like that
[...]
He then walks toward his Father, holding his crotch and says CHI pipi"

In the previous example (38), Olivier is in a conversation with his mother in English, when suddenly he switches to French only to address his father. He seems to have a designated language for each parent and never fails to appropriately use it.
39) "MOT where did the tow truck take the car honey?

CHI at the garage.
MOT to the garage.
CHI yeah.
FAT pourquoi?
FAT Olivier, qu'est ce qu'il font au garage?
CHI oui?
CHI ils réparent la voiture.
[...]
MOT what do they do at the garage?
CHI they fix Daddy's xxx garage.
[...]
CHI Daddy's xxx (.) car.
In example 39, Olivier uses both English and French at appropriate times. English is specifically meant for his mother, while French is for his father, and he does not seem to confuse them.

As aforementioned, Olivier's French seems to be his dominant language as it is the most used language even when the parents or Nicoladis address him in English. Moreover, it is possible to notice that Olivier also makes the difference between the language used by
one or the other parent according to their first language. He would then ask the parents why they speak in this specific language when they are not used to doing so. The errors made by the child could not be differentiated between drawbacks due to his bilingualism, or only as normal language development, like any monolingual child would do. This last possibility is most likely, as monolingual children themselves sometimes confuse feminine and masculine for example.

By the end, when Olivier is older $(2 ; 11.15)$, he seems to better associate the language with the interlocutor, respectively speaking English or French when speaking to his mother or father in one single conversation. It is also quite obvious that he prefers to speak English with his mother and French with his father, and he decides to use French with Nicoladis even when she speaks English to him. This therefore confirms French as the child's dominant language, used as a default language. When the answer is exclusively for the mother, the child answers in English, when the answer is exclusively for the father, he answers in French; and when the answer is for everyone, he code-switches or code-mixes. We then came to the conclusion that Olivier is aware to a certain degree of the different languages available to him and knows exactly which one to use with which interlocutor. He makes the choice of a default language, French, and a general language, English, in order to include the largest number of people. Following Myers-Scotton's study regarding marked and unmarked codes, we could assume that French is his unmarked language, and English his marked language. When addressing people speaking different languages, he code-switches or code-mixes, but it is impossible to detect if this phenomenon is conscious and deliberate, or instinctive.

## Chapter 1: Conclusion and research questions

In Chapter 1, the term Code-Switching was described and developed not as one system only, but as the main name of different sub-systems including the use of parameters from two (or more) different
languages. We described in which cases CS can be used, thanks to some definitions as well as the presentation of the different types of CS that exist (inter-sentential or extra-sentential CS, Tag-Switching and intra-sentential CS) and what they entail. CS was then described as the switch from one language to the other, but also as the switch which can happen at varied places in an utterance, or inside words. This holds different names according to the place of the switch: "Code-Meshing", "Code-Swapping", "Code-Copying", and "CodeAlternating". We detailed the motivations for CS, in order to understand if it is related to confusion, or if it is a phenomenon for completion of one language with the other, in the case of unbalanced bilingualism. We mentioned how CS can be used for different reasons, whether a bilingualism is balanced or not. In order to understand what happens to the switched languages' phonological systems during a switch, we reported the literature on the use of VOT, which showed that there can be a trace left on the place of articulation during a switch. We also presented the difference of use between CS and codemixing when the latter is mostly used at the beginning of the language development, or when there is a dominant and a weak language, which cannot be interchanged. This chapter 1 also allowed for a presentation of a few most known theories on bilingualism by the best-known linguists. Each of them gives a specific definition of CS and bilingualism. After presenting their theories in relation to children's language acquisition and bilingualism, we were able to present the critiques and limits of each theory as well as their approach to CS. We presented Levelt's Model of Speech Production in order to visualise monolinguals' use of language, but also in order to present an alternative model of speech production, based on Levelt's Model, and adapted to bilinguals. For our current study, we chose the first of the three different stages of sensitivity accounted for in the CPL, which are between 3 and 5 for the first stage, when the plasticity of the brain is specifically sensitive; between 5 and $10 / 13$ years old, or prepuberty, for the second stage, when brain plasticity is still somewhat good (but not as important as in the previous stage);
and, from prepuberty until around 17/18 years old for the third stage, when the plasticity of the brain remains correct, to then decrease into adulthood. Indeed, following the CPL, the older a person gets, the harder it becomes to acquire a language with native-like skills and pronunciation. It is not impossible for adolescents and adults who start learning a foreign language to master it eventually, but the foreign pronunciation will most likely always remain, and it might always be challenging to understand and use specific parts of the language, such as sarcasm and jokes for example. We presented the literature on the subject, the one proving the CPL (up to 5 years old) to be true and validated; the one in which the CPL goes until 7 , or the one showing that there is no CPL, but rather a plasticity wave going up and down like a large learning curve, from speaking age until early adulthood. The study on ASL has proven useful since there are some first language ASL speakers who only learned their first language after the supposed CPL started declining, therefore having some "foreign accent phenomenon" despite having learned the language fluently. We have also established that one of the important things is the length of exposure to a language before the plasticity of the brain starts decreasing (around 18). Therefore, a child who learned a language from early on will have had a longer exposure than someone starting at 10 or 13 for example, giving them more opportunity to master said language. We have moreover emphasised the importance of having first and foremost acquired a first language, since learning anything after the start of the decline of the plasticity of the brain without a first language can prove close to impossible. We referred to the cases of Genie and Victor to exemplify our facts. The conclusion that was drawn from this study is that the use of CS requires great intellectual skills as it is supposedly the perfect mastery of both languages, since the child is able to switch between their two languages at the appropriate time and with the appropriate people. It also brings less frustration to the child who does not have an equivalent translation in both his languages. It was also shown that different comparative studies came to the conclusion that infants as early as 4 months old
distinguish between two languages' rhythms whether they are monolinguals or bilinguals. Following is that 4- and 12-months-old bilinguals could also discriminate acoustically similar sounds whereas 8 months old bilinguals were not able to do so. The sensitivity to language of an infant with a double language exposure allows for these children's brain to remain open. Therefore, what transpires from this study is that bilingual and monolingual infants' language development looks very much alike until the age of 8 months old where the bilingual infant seems to "merge the two sounds into a single phonetic category". We then exposed a preliminary study analysed during our Masters degree in order to understand the initial findings, and especially to analyse those results in comparison with the thesis of different linguists. We found a possibility that children are with initial bases that remain latent up until the time where the environment sets it off to start its development.

Several research questions emerged from this first chapter:

- Research Question 1: Do children have extended language skills thanks to CS?
- Research Question 2: Are simultaneous bilinguals calling on CS in order to fill any gaps, just as sequential bilinguals and second-
language learners do, or does the use of this phenomenon have a totally different purpose? Is there any type of confusion because of CS?
- Research Question 3: What are the possible advantages but also the drawbacks of CS?

Finally, we can add that the studies that exist on bilingualism do not give much space to the importance of CS, and those that exist on CS in specific ways do not explicitly shed light on the theories on the acquisition of language. This is why our study complements those that already exist, by adding results highlighting the advantages that CS may have in the acquisition and development of language in bilingual children.

# II. CHAPTER 2: CORPUS-BASED ANALYSIS FROM BILINGUALS AND NON-BILINGUALS UNTIL THE AGE OF 5 YEARS OLD: A STUDY OF SEVERAL CRITERIA 

## Introduction

In this study, the relationship between CS and language development indices will show the possible differences between the language development of bilingual children and of monolingual children, which will help us demonstrate the importance of the role of CS in bilingual children, as a marker of language ability. In order to do so, we will try to find out whether CS and the measures already known, which attest to linguistic skills, are correlated. In the first section, we want to understand bilingual children's level of language awareness, introduced by the seminal study to our own analysis. This will be followed, in the second section, by the overall assessment of language development in our sample of bilingual children in comparison to monolingual children of related age, through the analysis of specific aspects of language including the analysis of Lexical Words (LW) and Grammatical Words (GW). The detailed analysis of the verbs, nouns, prepositions and adjectives will allow for the description of the use bilingual children make of their lexis, followed by an analysis of the Mean Length of Utterance (MLU), the MultiMorphemic Utterances (MMU) and the Upper Bound (UB). MLU, MMU and UB are useful measures to analyse the use of language and its proficiency by the speakers. In this case, by considering a sample of bilingual children's two languages, we may be able to observe greater MLU, MMU and UB than in monolingual children, with their unique linguistic system. In the third section, we will analyse the errors made by bilingual children, compared to their monolingual peers, which are hypothesised to be more present in monolinguals, as bilinguals have the possibility
to switch from one language to the other when in doubt of a word. We will also analyse their sentence and word intelligibility in the fourth section. These last three analyses especially, will show how the use of CS can be a great tool for bilingual children in communicating since they have the opportunity and the skill to go from one language to the other in case, they have trouble finding the right words in one or the other language. Studying these aspects will help deepen the knowledge on bilingualism and CS , the way they are related to language development and the way language is used by bilingual children before the age of 5 .

This will lead to the analysis of transfers in phonology with a detail on acceleration and delay transfers in the fifth section, to finalise in the last section on the use of language as a possible emergency language or as linguistic skills.

By the end of this chapter, in order to understand the degree of language development of bilingual children in comparison to monolinguals, but also to understand what particularities children, and even more so bilingual children, have to deal with during their language development period, we will be able to evaluate if our sample of bilingual children have a better language development than their monolingual peers before the age of 5 . We will analyse the children's use of their languages following the assumptions that it would be proportionate to their level of dominance in each language.

Our field study can be summarised in those terms: do bilingual children, thanks to the use of CS , have a greater language development than monolingual children?

## II.1. Material

## II.1.1. Data

The data we personally collected are from videos, taped by the children's parents following a protocol of recording* ${ }^{18}$, and transcribed by ourselves*.

The data come from multiple sources:

- original films made by the parents of seven bilingual children following a protocol* established by ourselves: V., P., Sa., A., I., La., Sh.
- CHILDES (The Child Language Data Exchange System) for 5 bilingual children: Je., Jo., Le., Ge., O.
- CHILDES for the twelve monolingual children: D., C., B., M., P., L., AF., R., N., G., AE., L.

The bilingual children are aged between $2 ; 03.24$ and $5 ; 5.7$ and the monolingual children are aged between $2 ; 03.20$ and $4 ; 06.05$.

## II.1.2. The children

Two out of the twelve bilingual families (from both our own data and CHILDES) were living in the USA, two in the UK, seven in Canada, and one in France. There were five boys and seven girls. Regarding the use of language, nine out of the twelve families claimed to be using the One Parent One Language (OPOL) method (V., P., Sa., A., I., La., Sh., Ge., and O.) while one claimed to be using both languages separately (Ge.) - French with the father and English with the mother, and three seemed to be using it freely (Le., Je. and Jo.) although there

[^17]is no official mention for these three families (neither here nor in the seminal study by Genesee et al., 1996). The parents in six of the families were using English with one another, one of them was using French while three used them freely and one where the father spoke French with the mother, and the mother spoke English with the father.

Eight out of the twelve monolingual families spoke English, and lived in the UK (D., C., B., R., N., G., AE., La.), and four spoke French, one was living in Belgium, one in Montreal, two in France, (Le., M., P., AF.). Amongst these monolingual children, there were four boys and eight girls. This information can be found summarised in Table 2 below.

| Bilingual children | Age | Location | Gender | Method | Monolingual children | Age | Location | Gender |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| V. | $\begin{aligned} & \hline 4 ; 06.11 \\ & 4 ; 06.18 \end{aligned}$ | France | Boy | OPOL | D. | $\begin{array}{\|l\|} \hline 4 ; 00.28 \\ 4 ; 02.03 \end{array}$ | UK | Boy |
| P. | $\begin{aligned} & \hline 2 ; 11.00 \\ & 3 ; 01.00 \\ & \hline \end{aligned}$ | USA | Girl | OPOL | C. | $\begin{array}{\|l\|} \hline 4 ; 00.10 \\ 4 ; 06.05 \\ \hline \end{array}$ | UK | Boy |
| Sa. | 5;05.05 | Canada | Boy | OPOL | B. | $\begin{array}{\|l\|} \hline 3 ; 11.05 \\ 4 ; 01.18 \end{array}$ | UK | Girl |
| A. | 5;05.07 | UK | Girl | OPOL | M | $\begin{array}{\|l\|} \hline 2 ; 03.2 \\ 3 ; 00.14 \\ 3 ; 02.23 \end{array}$ | Canada | Boy |
| I. | 4;05.00 | UK | Boy | OPOL | P. | $\begin{array}{\|l\|} \hline 2 ; 10.17 \\ 3 ; 00.06 \\ 3 ; 03.12 \end{array}$ | Canada | Boy |
| La. | 4;04.25 | Canada | Girl | OPOL | L | $\begin{array}{\|l\|} \hline 2 ; 10.21 \\ 3 ; 00.05 \\ 4 ; 03.21 \end{array}$ | Belgium | Girl |
| Sh. | 2;06.00 | USA | Girl | OPOL | AF. | $\begin{array}{\|l\|} \hline 2 ; 10.18 \\ 3 ; 00.02 \\ 3 ; 05.04 \end{array}$ | France | Girl |
| Je. | $\begin{aligned} & \hline 1 ; 10.20 \\ & 1 ; 10.27 \\ & 1 ; 11.05 \\ & 1 ; 11.23 \end{aligned}$ | Canada | Girl | "free method" | R. | $\begin{array}{\|c\|} \hline 2 ; 09.09 \\ 2 ; 11.21 \end{array}$ | UK | Girl |
| Jo. | $\begin{aligned} & 2 ; 04.06 \\ & 2 ; 04.15 \\ & 2 ; 04.23 \end{aligned}$ | Canada | Girl | "free method' | N. | $\begin{array}{\|l\|} \hline 2 ; 10.01 \\ 3 ; 00.10 \end{array}$ | UK | Girl |
| Le. | $1 ; 02.18$ <br> $2 ; 02.24$ <br> $2 ; 03.00$ <br> $2 ; 03.07$ | Canada | Girl | "free method' | G | $\begin{array}{\|l\|} \hline 2 ; 09.29 \\ 2 ; 11.12 \end{array}$ | UK | Girl |
| Ge. | $\begin{aligned} & \hline 2 ; 06.29 \\ & 3 ; 00.20 \end{aligned}$ | Canada | Girl | "free method' | AE. | $\begin{array}{\|l\|} \hline 2 ; 09.08 \\ 2 ; 09.10 \\ \hline \end{array}$ | UK | Girl |
| 0. | $\begin{aligned} & \hline 2 ; 05.00 \\ & 2 ; 10.29 \end{aligned}$ | Canada | Boy | OPOL | L | $\begin{array}{\|l\|} \hline 2 ; 06.00 \\ 2 ; 09.00 \\ 3 ; 03.25 \\ \hline \end{array}$ | UK | Girl |

Table 2: Summary of our bilingual and monolingual samples' personal details.

Moreover, the CHILDES' transcripts allowed for understanding the seminal study made by Genesee et al. (1996: 430). They state that the children - Jo., Le., Je. - "were [all] first-born girls, and only one had a younger sibling. They had been raised since birth in English and French by their parents; the mother was the primary caregiver in every case". They also offer some more details regarding the parents' social background stating that " $[t]$ he parents differed somewhat with respect to educational and employment characteristics. Joelle's (Jo.) and Leila's (Le.) parents both had university degrees; Jessica's (Je.) father, but not her mother, had a university degree; [...] All of the mothers worked in the home at the time of the study. Socioeconomically, all families appeared to be middle class".

## II.1.3. The transcripts

Our own transcripts were made following an orthographic system, for both adults and children, unless the pronunciation deviated from the usual pronunciation, meaning that we used the standard spelling conventions of the language. The actions of the participants were also transcribed when they clarified the discourse. All the transcripts' analysis (and coding for CHILDES) followed Lanza's definition of an utterance (1992: 638) (as the "primary unit of coding and analysis) as "a word or a group of words with a single intonation contour" (Genesee et al., 1996: 618). Utterances of all transcriptions consisting of either onomatopoeia (tchou tchou, vroom) were excluded from the analysis. As Genesee et al. (1996: 618), we considered some onomatopoeic words and interjections to be part of one or the other language, such as coin coin (French), aouch (English), miaou (French).

All the data collected from the CHILDES database are transcripts (most of them being coupled with their original videos), and Genesee et al. (1996: 618) explain that:
"all sessions were both videos- and audiotaped. The twenty minutes following the first five minutes of each session were transcribed in accordance with the CHAT transcription system (MacWhinney \& Snow, 1990). [...] The transcriptions were done by the bilingual observer who had attended the session. Both the video and audiotapes were used for transcribing and coding. The transcripts were then checked for accuracy by a native Quebec French speaker who was also fluent in English. [...]".
"All of the children's utterances [from CHILDES] were transcribed in broad phonetic form, the utterances that were clearly comprehensible as words of a language were also transcribed in the usual orthography of that language. The parents' utterances were transcribed orthographically unless some parts of the utterance deviated noticeably from the usual pronunciation. In these cases, that part of the utterance was transcribed phonetically. All utterances were coded for addressee and for the language(s) of the utterance; utterances by the children to the observer were used to estimate the child's dominance but were otherwise ignored in the other analysis in the study. The actions of the participants were coded when they clarified the discourse".

All information regarding the transcripts can be found in the following Table 3 along with a link to the transcripts from CHILDES:

| Our own data | Data from CHILDES |
| :---: | :---: |
| - 7 bilingual children <br> - 21 transcripts | - Leveillé \& Suppes $(1973)^{19}$ <br> - De Cat \& Plunkett (2002) ${ }^{20}$ <br> - Henry (1995), Wilson \& Henry (1998) ${ }^{21}$ <br> - Jones \& Rowland (2017), Rowland (2007), Rowland \& Fletcher (2006) ${ }^{22}$ <br> - Theakston, Lieven, Pine \& Rowland (2001) ${ }^{23}$ <br> - Paradis, Nicoladis \& Genesee (2000), Nicoladis \& Genesee (1996) ${ }^{24}$ <br> - 5 bilingual children <br> - 12 monolingual children <br> - 48 transcripts |

Table 3: Summary of the sources for the data collected for the current study.

Regarding the transcriptions collected on CHILDES, "the families were visited and observed by a bilingual observer on three separate occasions during approximately three weeks. [...] on two separate occasions, the children were observed interacting with their mothers and fathers alone and on a third occasion they were observed with both parents present". (Genesee et al., 1996: 618)

[^18]Regarding our own data, there were three separate recordings, similar to the previous ones since we drew a protocol (cf. page 560) matching the existing transcriptions from CHILDES. Two recordings were made with each parent alone and a third one with both parents present. For all recordings, the parents were asked to engage in a normal free play session, some played board games, some played with little makebelieve figurines, others were packing for the holidays, or baking, while others were reading books, or having dinner. In the case of the CHILDES database transcripts, the sessions "lasted between 45 and 60 minutes" while our field data had an average of 15 minutes of recording.

## II.1.4. Number of utterances and words in our corpus

In the analysis from our personal data as well as the ones from CHILDES, we selected thirty-six bilingual transcripts altogether, equalising to an amount of 6.021 utterances in both English and French as well as non-verbal reactions to the adults' instructions. As for the monolingual sample, we selected thirty-three transcripts (eight English and four French) equalising to an amount of 10.147 utterances. We separated the bilingual utterances into four different parts: English; French; others; and CS. "English" and "French" are self-explanatory, whereas "others" are the reported utterances that were not readable, either because the child did not pronounce the words properly, or because there was noise covering the speech; and "Code-Switching" recorded intra- and extra-sentential switches. For the analysis on language awareness, we will count the number of fully intelligible utterances whether in English or in French, as well as the code-switched items which were counted separately, spoken by the children as well as their parents or other adult present. This will allow us to identify the parents' most spoken language in all of a child's transcripts and the said child's most spoken language. We will
therefore see if the child mostly uses the language of the interlocutor that is either present (for one-on-one transcripts) or who speaks the most (for transcripts where both parents and other adults are present). For the study on language development, we will count each instance of a type of word (GW or LW) in order to compare bilingual with monolingual children, we also calculate the children's MLU, MMU and UB which will allow us to identify the bilingual children's dominant language, but also to compare bilingual children with their monolingual peers, and report which sample of children makes longer and more complete utterances. As for the analysis on the word types, we will count each instance of four separate types of words: verbs, nouns, prepositions and adjectives, in order to show which sample of children uses those words with more skills. In the next analysis, we count the grammatical, morphological, semantic, and phonological) errors made by the two sets of children, and compare bilingual children with monolingual children's rate of errors. In the final analysis, we will count the appearance of unintelligible segments in the transcripts, and compare which set of children has the greatest number of unintelligible utterances.

The following study covers the analysis of four measures:

- $\quad$ the degree of language awareness (II.2);
- the language development thanks to a detailed analysis of the Lexical Words (LW) and Grammatical Words (GW); the multimorphemic utterances (MMU), Mean Length of Utterances (MLU) and Upper Bound (UB); the use of language focused on verbs, nouns, prepositions and adjectives (II.3);
- the different errors made by both samples of children (semantic, morphological, phonological, lexical, grammatical errors) (II.4);
- $\quad$ the overall intelligibility of the children (II.5)

A few hundred children would be required for a full study, whom we were not able to access. Our sample will only allow for the identification of trends that would need to be confirmed with larger samples in subsequent study. Moreover, the decision to have two sources for the current study's data collection (our own and CHILDES) had to be made following the withdrawal of some of the families that had been willing to participate in the studies. The sanitary conditions of the year 2020 onwards were also making people more careful as to letting a stranger/researcher into their homes. We considered using the CHILDES database to complete our data since we had used it in the past, during our master's thesis.

## II.2. Language awareness

For this analysis of language awareness, it is crucial to firstly define what is metalinguistic awareness. Bialystok (1988: 560) and Bialystok et al. (2014) put in "relation [...] bilingualism and linguistic awareness" as they "must be stated in terms of the degree and type of bilingualism as well as [...] degree and type of linguistic awareness". Language awareness is not however one single skill, as stated by Bialystok et al. (2014), but rather a set of skills with different levels of proficiency. It is the ability to know and/or label which language is being spoken. One bilingual or monolingual person will have a different level of proficiency in their own set of language awareness from another bilingual or monolingual person. Bilingual children's executive function is greater than monolinguals', which is developed and exemplified in Bialystok et al. (2014,) and Bialystok (2016) in relation to language awareness. The executive function system is the "process of holding information in mind while you're performing a task and selecting which information to pay attention to" (Bialystok, 2016). Bialystok (2014: 3) showed that both monolinguals and bilinguals were equally able to detect "grammatical violations in meaningful sentences (e.g., *'Apples growed on trees'), a typical
measure of metalinguistic functioning in children (De Villiers \& De Villiers, 1972)". However, they also showed that bilingual children were more accurate than monolinguals children on sentences that were grammatically correct but had a semantic anomaly "(e.g., 'Apples grow on noses')". Their conclusion was that both bilingual and monolingual children were able to detect the said anomaly, but bilinguals had greater abilities in the "process associated with access to that knowledge (distinguishing between sentence form and meaning)", in relations to the executive function system developed by Bialystok (2016). We can all make the difference between many languages, and if not precisely, at least, guess if they are Asian languages, African languages, Roman or Latin languages. Children also develop this ability as they grow and get used to being exposed to different languages.

Moreover, there are different language awareness measures that can be done: adaptation to the language, the ability to label the language, explain the choice of language, for example.

## II.2.1. Synthesis of Genesee et al.'s seminal study (1996)

The original study by Genesee et al. (1996: 432) has yielded promising results regarding language awareness by analysing the use of language produced by Joel, Jessica, Jennifer and Leila, 3 of them being involved in our own study (Joel as Jo., Jessica as Je., and Leila as Le.). This study was mostly divided into "English only", "French only" or "mixed", most of which were intra-sentential CS. Genesee et al.'s study (1996) was not as detailed as ours will be. For example, they did not examine the lexicon or word use for each child. They did not consider that it was important for their study to analyse the words that were repeated either. In the current study, we analyse all these phenomena since it can show a child's great mastery of their
languages, especially since there will be a comparison with monolingual children. As summarised in Illustration 16 below, Genesee et al. (1996) found results supporting their hypothesis since the children were using more French with their French-speaking parent than with their English-speaking parent, which was also true for the opposite. They also mentioned that even the children who had a clearly dominant language (French or English), were using more of the parent's language with them than with the other parent even if that meant having to use their less-proficient language (Genesee et al.; 1996: 434-435). Genesee et al. also found that Le. and Jo. were both using their dominant language with both parents. For example, "Leila [(Le.)] was more proficient in English and, in fact, used more English than French with both parents, she used more French with her Frenchspeaking father than with her English-speaking mother" (1996: 434435).

Genesee et al. (1996: 434-435) show that " $[t]$ he chi-square analyses were significant at the .01 level in all cases: Joelle, $x(2)=12.45$; Jessica, $x(2)=69.44$; Jennifer, $x(2)=62.81$; Leila, $x(2)=23.09$ ". The chi-square is calculated as follows: " 2 (Language of Utterance: French-only, English-only) x 2 (Mother, Father) chi-square procedures". When detailing, Genesee et al. (1996: 434-435) state that:

> "It here were large individual differences, with Joelle showing the least differentiation and Jessica the most. We suspect that Joelle's very low level of proficiency in French, her father's language, imposed a severe restraint on her ability to respond differentially to her parents using French. Jessica, in contrast, showed the most differentiation, and, of all the children, she showed the most balance in proficiency in her two languages. Jessica was the only child to show a complete crossover in language usage with her parents; she used more French than English with her French-speaking mother and more English than French with her English-speaking father".

Finally, Genesee et al. (1996: 434-435) also mentioned that the other three children (Jennifer, Leila and Joel) "used more of their dominant than their non- dominant language with both parents", therefore "demonstrat[ing] differentiation even when they were using their less proficient language as shown in Illustration 15. Moreover, they add that "although Leila was more proficient in English and, in fact, used more English than French with both parents, she used more French with her French-speaking father than with her English-speaking mother. Jennifer, who was more proficient in French, exhibited the reverse pattern".


Illustration 15: "Children's percentage of utterances in their mother's and father's language addressed to Mother and Father" (Genesee et al., 1996: 435)

Genesee et al.' s conclusion (1996: 436) regarding the language awareness of the children was that they "were clearly using English and French in context sensitive ways", even when using their non dominant language. Moreover, the children all chose to use the correct language with an adult other than the parent (observer, stranger) with whom they were not familiar and of whom they did not know the linguistic level and proficiency. They would each time choose the adequate language, therefore showing their sensitivity to the adult's language proficiency, as hypothesised by Genesee et al. (1996: 440).

It was shown through this study by Genesee et al. (1996: 439) that children as young as 2 years old have a certain degree of language awareness, seen through their ability to switch from one language to the other whether they are addressing their dominant language-speaking-parents or their weak language-speaking-parent, in a context where the two languages are neither balanced nor equal. They also noticed that children whose parents were using more of both languages were themselves using more of English and French while the children of parents who would rather keep their languages separated would also follow the same scheme.

Moreover, the data in Genesee et al. (1996) had a specificity, not only were they gathered in the presence of the parents, but they were also gathered in the presence of a stranger, in order to see if the language awareness was or was not specific to the familiarity of the situation. Two (Je. And Jo.) out of the three children (Le., Je. and Jo.) seemed sensitive to the stranger's language since they spoke more of the stranger's language with them, while the parent who was speaking the child's other language was present. The third child (Le.) seemed to have more trouble with differentiating between the languages, but this could also be explained by her lack of proficiency in her Language B, although she " $\mathrm{g}[\mathrm{a}]$ ve the impression that [she] was not at all sensitive to the monolingualism of the stranger" (1996: 439).

In the comparison with the children's speech in the presence of the stranger, Genesee et al. (1996: 439-441) show that "bilingual children as young as 2 years are able to use their languages differentially and appropriately with familiar interlocutors". They also state in their conclusion that "children who learn two languages simultaneously are sensitive, relatively early in their development, to implicit feedback about language proficiency from unfamiliar adults". Genesee et al. (1996: 439-441) indeed explain that this is not a linguistic skill which will be required from monolingual children, as they are always interacting with "linguistically competent adults" Indeed, during the language acquisition period, children only have input from adults who are proficient in their own language(s). Since their sample showed proficiency when analysing both the language of the stranger and their level of proficiency in the language, Genesee et al. (1996) came to the conclusion that there is indeed a degree of language awareness in children from 2 years of age on, as they have witnessed linguistic accommodation regarding the interlocutor.

In order to characterise bilingual children's degree of awareness, we analyse their interaction with their parents, which is the best way to have access to the type of measures we are looking for. The parents all follow the OPOL method, which is one method amongst others such as "Minority Language at Home" (ML@H), or the "Time and Place method" (T\&P), the "Mixed Language Policy" (MLP) where there CS is used depending on the situation, the subject of conversation, etc.

In the current study, in order to evaluate the language awareness of the sample of bilingual children, we will consider each child and adult's French and English (as well as CS) occurrences. The adult is present in the room and interacting with the child at the moment of the recording. We hypothesise that bilingual children speak and answer in the language that the interlocutor uses the most with them. This collection of language awareness will be illustrated by a diagram showing how many words in French and how many words in English
will have been uttered by the child in accordance to each adult's language. In addition, we will deal successively with the child's ability to choose the language, to name it, to progress in the lexicon (the latter in particular thanks to the use of CS).

Regarding language awareness, Atagi \& Sandhofer (2019) state that there are two different types of language awareness: an implicit form - or "a behavioral demonstration of children's understanding of the communicative functions and conventions of language", for which they take the example of a child who simplifies her language when speaking to younger children, something she does not do when speaking to children her own age or adults. Another example they give is a child's ability to "repair communication breakdowns by matching their language choice to that of their interlocutor". Another form would be when a child openly words the type of language, they are speaking either by "provid[ing] examples of words in their language (e.g., 'plaster', 'radish', 'uno, dos, tres'), [or by] mention[ing] the name of their language (e.g., 'English', 'Spanish')". Five of the twelve bilingual children in our sample were at least once labelling one of their languages. Moreover, Atagi \& Sandhofer (2019) have found that home bilingual exposure helps identify who is speaking the same language as the child, which language is being spoken and by whom. They have also confirmed the ability of bilingual and bilingually exposed children to name their language(s) in comparison with monolingual children. The same goes for bilingual and multilingual children, showing that "bilingual exposure in the home predicts functionally monolingual children's ability to label languages". The simple explanation they expose on these children's ability to label languages is the fact that languages might be named more often in bilingual families than in monolingual's, but that however, even if a child grows up functionally monolingual with a certain degree of bilingual exposure, they will be able to label languages. "A certain degree of bilingual exposure" for a functionally monolingual child means that both parents speak the same language but the child is
exposed to another language through television, or a babysitter, or grandparents, for example.

As a conclusion, they note that passive bilingual exposure is not sufficient to develop "children's explicit understanding of communicative consequences" (2019: 493), but rather that it is necessary to be active in the learning of a language to become a bilingual speaker. They found that language awareness firstly happens implicitly, to then become explicit as a result of a bilingual exposure. This conclusion is in accordance with Comeau et al.'s conclusion (2007: 172-173) showing bilingual children's sensitivity to their interlocutor's language preferences. They state that these children have the ability to see and react when their use of a language leads to breakdowns in communication, and that they are able to fix it. Moreover, they found that as they separated their study into two different types of breakdowns - Language breakdowns and Other breakdowns -, bilingual children were seen switching languages for Language breakdowns and not for Other breakdowns. This clearly shows their level of language awareness, as they state that "the children rarely switched languages when attempting to repair Other breakdowns but did so frequently for Language breakdowns".

## II.2.2. Corpus-based analysis

## II.2.2.1 Method for the language awareness analysis

The goal of this section is to examine if bilingual children have a certain degree of language awareness, especially when in contact with their parents or a familiar adult. In this analysis we follow Bosch \& Sebastián-Gallés (1997, 2001a) who found that children at 4.5 and 6 months old discriminate between their mother's language and English. We also follow Sebastián-Gallés et al. (2012) who saw that, in a comparative study with monolinguals, bilingual children were the
only ones discriminating languages around 8 months old, and we hypothesise that this discrimination (and therefore language awareness) is valid for bilingual children under the age of 5 .

In this section, we will count the number of utterances per child in each of their languages, as well as their unintelligible sentences and their code-switched sentences. We will also count both of the parents' sentences and compare them to the children's, in order to visualise if the children use more English with the English-speaking parent and more French with the French-speaking parent.

## II.2.2.2 Analysis and results

Our first analysis consisted in calculating the number of words spoken by the children and by the adults, respectively, in each language, in order to evaluate to what extent children adapt to the language spoken by the adult (Diagram 1). We eliminated the utterances that were unintelligible (mispronounced to the point of not knowing to which language it belonged, or covered by a sound in the recording, which will be found under the name "others" in Table 4. Most of the bilingual children use more English with the English-speaking adult present, and more French with the French-speaking adult. We also notice that the sample of bilingual children we have studied does not code-switch so often, as summarised in Table 18 (cf. Chapter II.3.4.), the CS rate being between $0.8 \%$ and $11.3 \%$ allowing us to assume that these children are able to make the difference between the language that is spoken by the adult. They do not seem to need to CS since there is a non-broken communication with the parents.

In the following table (Table 4), we provide the detailed figures per child of the use of language, which is summarised and illustrated in Diagram 1 with a comparison to the English- or French-speaking adult.


Diagram 1: Number of utterances in each language, bilinguals compared to monolinguals.
$\begin{array}{|l|l|l|l|l|l|l|l|l|}\hline \begin{array}{l}\text { Bilingual } \\
\text { children }\end{array} & \begin{array}{l}\text { Medium } \\
\text { age } \\
\text { (months) }\end{array} \\
\text { Futterances }\end{array}$ (utterances $\begin{array}{l}\text { CS } \\
\text { utterances }\end{array}$ Others \(\left.$$
\begin{array}{l}\text { Total } \\
\text { number of } \\
\text { utterances }\end{array}
$$ \begin{array}{l}French- <br>
speaking <br>

Adult\end{array}\right\}\)| English- |
| :--- |
| speaking |
| Adult |$|$

Table 4: Percentage and number of utterances per child per language (French, English, CS, other) in comparison to the French- and English-speaking adult.

Moreover, and as to reiterate what was mentioned in Genesee et al. (1996), the bilingual children also selected the right language when in the presence of an unfamiliar monolingual adult. Three out of the five bilingual children who were in the presence of another adult than their parents seemed to be fully aware of the language they were using with
them, even though they were not familiar with their level of proficiency. Nine out of the twelve bilingual children of our sample were making what seemed to be a conscious choice of language, amongst which five namely label their languages "in English" or "in French". However, five out of these nine children were using more of the opposite language with the adult present, but this choice seemed to be rather dependent on the child's proficiency in said adult's language as visible in Diagrams 2 to 13. When dissecting the sample to analyse each child's language awareness, we find that there is a greater proportion of children who use the language of the adult that is present (58.3\%), that is Sa., A., La., Sh., Je., Ge., O. The children V., P., I., Jo., Le., however seem to be using more of the opposite language than the one used by their interlocutor during the recordings ( $41.7 \%$ ). This shows that a great majority of the children in our sample is using the language of their interlocutor rather than their interlocutor's second language.


Diagram 2: Language awareness of bilingual child V. in comparison to French- and English-speaking adult


Diagram 3: Language awareness of bilingual child A. in comparison to French- and English-speaking adult


Diagram 4: Language awareness of bilingual child P. in comparison to French- and English-speaking adult


Diagram 5: Language awareness of bilingual child I. in comparison to French- and English-speaking adult


Diagram 6: Language awareness of bilingual child Le. in comparison to French- and English-speaking adult


Diagram 7: Language awareness of bilingual child G. in comparison to French- and English-speaking adult


Diagram 8: Language awareness of bilingual child Sa. in comparison to French- and English-speaking adult


Diagram 9: Language awareness of bilingual child La. in comparison to French- and English-speaking adult


Diagram 10: Language awareness of bilingual child O. in comparison to French- and English-speaking adult


Diagram 11: Language awareness of bilingual child Je. in comparison to French- and English-speaking adult


Diagram 12: Language awareness of bilingual child Jo. in comparison to French- and English-speaking adult


Diagram 13: Language awareness of bilingual child Sh. in comparison to French- and English-speaking adult

The results are coherent with those of Genesee et al.'s seminal study (1996: 619-620), but considered here with both bilingual and monolingual children, for some aspects of the analysis. Indeed, Genesee et al. (1996: 434) found that "each child used more of the mother's language with the mother than with the father and more of the father's language with the father than with the mother". Moreover, we also found that Jo. for example, had a very low level of proficiency in her father's language, French, and therefore used more English with both parents. We also found, amongst the three children (Jo., Le., Ge.) that Genesee et al. (1996) also studied in their seminal study, that Ge.
was using more French with her French-speaking parent and English with her English-speaking parent, therefore showing great balance and language awareness.

In our sample of children, we observe a clear discrimination in the use of the languages with either of the adults present. Six out of the twelve bilingual children use more of the opposite language that is the most used with them (Table 5):

| Bilingual <br> children | English <br> number <br> and (\%) | French <br> number <br> and (\%) | CS <br> number <br> and <br> (\%) | English- <br> speaking <br> parent | French- <br> speaking <br> parent |
| :---: | :---: | :---: | :---: | :---: | :---: |
| V. | 160 <br> $(51.3)$ | 96 <br> $(30.8)$ | 37 <br> $(11.9)$ | 170 | 176 |
| I. | 107 <br> $(43.5)$ | 99 <br> $(40.2)$ | 6 <br> $(2.4)$ | 170 | 211 |
| P. | 140 <br> $(61.7)$ | 31 <br> $(13.7)$ | 30 <br> $(13.2)$ | 140 | 154 |
| Sa. | 108 | 139 | 10 | 201 | 105 |
| Jo. | 782 |  |  |  |  |
| $(62.9)$ | $(51.3)$ | $(3.7)$ | 9 <br> $(3.2)$ | 770 | 815 |
| Le.8) | 483 | 46 | 28 |  |  |
| $(5.5)$ | $(3.4)$ | 926 | 1111 |  |  |
| Le. |  |  |  |  |  |

Table 5: Bilingual children who use more of the opposite language that is the most used with them.

One out of the twelve children has balanced bilingualism (Table 6):

| Bilingual <br> children | English <br> number <br> and (\%) | French <br> number <br> and (\%) | CS <br> number <br> and <br> (\%) | English- <br> speaking <br> parent | French- <br> speaking <br> parent |
| :---: | :---: | :---: | :---: | :---: | :---: |
| I. | 107 | 99 | 6 | 170 | 211 |
|  | $(43.5)$ | $(40.2)$ | $(2.4)$ |  |  |

Table 6: Bilingual child with a balanced bilingualism.

Six of them have an obvious preference for using the language that is the most used with them (Table 7):

| Bilingual <br> children | English <br> number <br> and (\%) | French <br> number <br> and (\%) | CS <br> number <br> and <br> (\%) | English- <br> speaking <br> parent | French- <br> speaking <br> parent |
| :---: | :---: | :---: | :---: | :---: | :---: |
| La. | 125 <br> $(43.1)$ | 138 <br> $(47.6)$ | 8 <br> $(2.8)$ | 182 | 218 |
| G. | 203 <br> $(40.8)$ | 178 <br> $(35.8)$ | 43 <br> $(8.6)$ | 605 | 453 |
| O. | 31 <br> $(45.5)$ | 357 <br> $(46)$ | 10 <br> $(1.8)$ | 567 | 740 |
| A. | 174 <br> $(50.3)$ | 136 <br> $(39)$ | 16 <br> $(4.6)$ | 228 | 184 |
| Sh. | 227 | 14 | 10 | 186 | 179 |
| $(84.7)$ | $(5.2)$ | $(3.7)$ |  |  |  |
| Je. | 581 |  |  |  |  |
| $(57)$ | 223 <br> $(21.9)$ | 26 <br> $(2.5)$ | 1359 | 663 |  |

Table 7: Bilingual children who use more of the language that is the most used with them.

Altogether, half of the bilingual children in our sample discriminate between their two languages.

Regarding the ones who do not use the same language that is spoken to them, there is a clear dominance in the language they use, which will be detailed in the analysis on UB, in link with MMU and MLU.

Eight out of the twelve bilingual children from our sample show clear language awareness. As can be seen, Sa., A., La., Je., Ge., O., and I. all either speak more in the language that is the most spoken to them (that is the case of Je . and Sa .), or have what is the closest to a balanced bilingualism (as is the case of A., La., Ge., O., I.). On the contrary, P., Jo., Le. and Sh. use more sentences in the opposite language. They do not seem to be using much French at all, showing a clear dominance of English. However, the short sample we were able
to analyse shows a tendency for bilingual children to be linguistically aware of the adults' languages as well as of their own languages to a certain degree. This confirms our hypothesis that bilingual children do indeed have a certain degree of language awareness, especially in the case of those with a balanced bilingualism. Some of them also label their languages (as well as other languages) such as Sa., A., La., and Sh. (La. also mentions Spanish for example, she knows only a few words in that language and is not fluent).

In the related research illustrated by Diagrams 2 to 13 that has globally evaluated all children's and parents' languages, we can notice a tendency for bilingual children to speak mostly English when the English-speaking adult is present and French when the French speaking adult is present.

There are now a few examples that illustrate the choice and discrimination made by the children:
40) CHI: ** a bee * there's a bee!

MOT: c'est pas une abeille chéri c'est une mouche
CHI: it's not a mouche ! Come on!

The child in example 40 speaks mainly in English whether alone with both parents, or one or the other parent.

In the following abstract, both his parents are present and he is mostly speaking in English, but as soon as his mother spoke to him, he switched the specific word that was of interest for him related to this part of the conversation with his mother:
41) CHI: * that's mine, that's yours. Daddy * your cup of tea your cup of tea your cup of tea

FAT: I know
CHI: ** playing. wait no! **

FAT: oh no
CHI: yes
[...]
CHI: mais c'est, c'est chaud
MOT: c'est chaud, ben repose-le là
FAT: taupe
CHI: c'est chaud

The child is example 41 has a clear dominance in English, which she uses most of the time. She does however try to speak French when she is addressing her mother, as we can see in the next abstract:
42) FAT: c'est bien ça. Et qu'est-ce qui fait lui ?

CHI: il tape sur son tambour.
FAT: ouais, tu veux dire ça à maman ? Tiens explique à maman qu'est-ce que tu vois là.

CHI: je vois le petit garçon et le singe !
FAT: ouais
CHI: et le petit garçon il tape sur le tambour.
FAT: ouais
MOT: is that a hot country do you think or a cold country?
CHI: a hot
MOT: what makes you say that?
CHI: because it's a well bit with euh
MOT: it does * hot colours doesn't it, warm colours like the sun?
CHI: yeah
MOT: yeah I think you're right.
FAT: et regarde qu'est-ce qui est ce qu'est-ce qu'il a sur lui là
CHI: c'est le singe euh qui qui euh fais ça
FAT: ouais

The child's main language in example 42 is English, she's very fluent in the said language and hardly ever has blockages on words or grammar. She also has a very good French even if she sometimes
hesitates on words, but she always speaks French when addressing her father, and English when addressing her mother.

In the following abstract, we can clearly see her decision to speak French when her father is asking questions, and she switches to English when her mother is asking questions:
43) CHI: * Nice

MOT: Nice haha
CHI: j'a dis Nice parce six entend tomme Nice
MOT: mmh ouais ça res ça ressemble un peu à Nice
CHI: oui. Et six
MOT: est-ce que c'était comme * dans la présentation de Debbie ** quand tu t'appelais * au lieu d'être *?
[...]
FAT: you tell me
CHI: ****** well si * si droit with so she and she say and she **** with with trayons

FAT: mmh
CHI: and and and she drawed with trayons $* * * *$ and she she and one of them told *
FAT: mmh
CHI: people inside the the door
FAT: ok

In this example 43, the child speaks both English and French whether he is addressing his mother or his father. He directs the right language to the appropriate parent. The child has a slight speech impediment which does alter the comprehension. We can however see that he switches from English to French when he is answering this mother or his father's question or comment.

Moreover, if we analyse the mean and Standard Deviation (SD), we can visualise the number of children who are situated either under or
over the mean, which gives us an important information regarding the use of the languages (Table 8). The analysis of the SD helps us understand the homogeneity or heterogeneity of a group in relation to the mean. The lower the number, the more clustered the SD is to the mean, and therefore the more homogenous the data is.

We can see that the SD for French (96.7), English (229.34), and CS (12.76) are situated under the mean for each language (Table 8). The number of bilingual children over and under the mean is spread equally for French utterances (124.75), more bilingual children are situated under the mean for English utterances (260.08), and more children are situated under the mean for CS (98.42). These results tell us that the SD is much further from 0 , which shows the great heterogeneity of the production of French, English and CS utterances in the sample. However, when observing the mean, we notice that English is still used more often than French. Regarding the parents, the SD is way further from the mean, which is explained by the great range of the use of the languages by the two parents (from 105 to 1111 for the French-speaking adult, and from 140 to 1359 for the Englishspeaking adult). In relations to the children, we notice that the parents generally produce more English than French utterances, which could be why the children also produce more English than French utterances. It can also mean that the children tend to use more English than French even when the parent is speaking the opposite language with them. But the results stating that the sample of bilingual children use more French with the French-speaking adult, and more English with the English-speaking adult remain (Diagram 14). This therefore corroborate some sort of language awareness in the sample of bilingual children.

| Bilingual <br> children | Medium <br> age <br> (months) | French <br> utterances | English <br> utterances | CS <br> utterances | Others | Total <br> number of <br> utterances | French- <br> speaking <br> Adult | English- <br> speaking <br> ddult |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| V. | 54.5 | 96 | 160 | 37 | 19 | 312 | 176 | 170 |
| P. | 36 | 31 | 140 | 30 | 26 | 227 | 154 | 140 |
| Sa. | 59.5 | 139 | 108 | 10 | 14 | 271 | 105 | 201 |
| A. | 57.5 | 136 | 174 | 15 | 20 | 346 | 184 | 228 |
| I. | 53 | 99 | 107 | 6 | 37 | 249 | 211 | 170 |
| La. | 52.5 | 138 | 125 | 8 | 19 | 290 | 218 | 182 |
| Sh. | 30 | 14 | 227 | 10 | 31 | 282 | 179 | 186 |
| Je. | 22.5 | 223 | 581 | 26 | 190 | 1020 | 663 | 1359 |
| Jo. | 28 | 40 | 782 | 9 | 432 | 1263 | 815 | 770 |
| Le. | 23.5 | 46 | 483 | 28 | 275 | 832 | 1111 | 926 |
| Ge. | 33 | 178 | 203 | 43 | 74 | 498 | 453 | 605 |
| $\mathbf{O .}$ | 31.5 | 357 | 31 | 10 | 41 | 439 | 740 | 567 |
| Mean |  | $\mathbf{1 2 4 . 7 5}$ | $\mathbf{2 6 0 . 0 8}$ | $\mathbf{1 9 . 4 2}$ | $\mathbf{9 8 . 1 7}$ | $\mathbf{5 0 2 . 4 2}$ | $\mathbf{4 1 7}$ | $\mathbf{5 6 7}$ |
| Standard <br> deviation |  | $\mathbf{9 6 . 7}$ | $\mathbf{2 2 9 . 3 4}$ | $\mathbf{1 2 . 7 6}$ | $\mathbf{1 3 2 . 8 7}$ | $\mathbf{3 4 4 . 7 1}$ | $\mathbf{3 3 3 . 5}$ | $\mathbf{3 9 2 . 9}$ |

Table 8: Mean and SD for bilingual children French, English and CS in comparison to the French- or English-speaking adult.


Diagram 14: Mean for bilingual children's use of French and English in comparison to the French- and English-speaking adult.

## II.2.3. Discussion on language awareness

Following our initial hypothesis stating that bilingual children should have a certain degree of language awareness, we can confirm that bilingual children before the age of 5 are indeed aware of their languages as well as their parents' or other adults' languages. Eight out of the twelve children of our bilingual sample use more English with the English-speaking adult and French with the French-speaking adult. Moreover, five out of these eight children have a balanced bilingualism, which is calculated thanks to the MMU, MLU and UB, which will be the focus of the next section. The fact that most of the children in our sample of bilingual children use more of the language that is spoken to them, even if it is their dominated language, shows clear language awareness in bilingual children. We follow in the tracks of other researchers such as De Houwer (1990) and Meisel (1990a) cited by Genesee et al. (1996: 627), who have "reported that the bilingual children they observed exhibited relatively low levels of bilingual mixing and could differentiate between their languages in similar ways".

Moreover, Benazzo \& Morgenstern (2017) also found significant results in their analysis of a young Franco-Italian boy's speech called Antoine ( $1 ; 5$ to $3 ; 6$ ). Indeed, he showed a clear discrimination of his two languages, even considering his greater exposure to French. He also showed clear dominance in French.

Since our sample of children has different levels of language proficiency in both languages, we were able to identify different reasons for switching. Some of them were switching because of a dominance in one of their languages, and therefore compensating by including words of the dominant language in the dominated language. These children did however still use more French with the Frenchspeaking adult, and English with the English-speaking adult, except for Sh . who was generally using more English even with her father who was exclusively speaking French to her. Moreover, Altman et al.
(2018: 7-9) show a dominance-based vocabulary awareness in bilingual children. This means that children will perform better "in the language in which they were dominant in terms of both receptive and expressive vocabulary". They have also found however that "monolinguals outperformed [Heritage Language]-dominant bilinguals" but "with no significant differences between monolinguals and [Societal Language]-dominant bilinguals or between HL-dominant and SL-dominant bilinguals".

Others were switching because their bilingualism was greatly balanced and they were doing it with full awareness if we base ourselves on their adaptation to the adult's language. They had equal exposure to both their languages which allowed them to develop their languages in a balanced way. All of the children in our sample codeswitched, some more than others, and for different reasons. Some did it as a compensation mechanism because of their lack of proficiency in one language, others did it because of a great proficiency in both their languages, and therefore used whichever lexicon came first or was required at the time. The others were mastering their two languages, and did not feel the need to either compensate nor use the language that came first, as they were able to select precisely the one, they needed to use.

Moreover, the analysis of the SD and its relation to the mean has shown us that bilingual children's use of French, English and CS in the sample is generally very heterogenous. The is also valid for the parents' use of the two languages, which could be the reason for the children's own heterogeneity.

Two further, larger studies could be made with the information provided in our current research: the first one could, and should be done with a larger sample of children with balanced bilingualism exclusively, something we were not able to do since the available sample was already very small. The second study that should be done would be with older children, in order to see the evolution of language
awareness in bilingual children over the years, and during the CPL. The second study should chronologically follow the first study with the same (or same type of) bilingual children in order to get consistent results.

Moreover, the number of recordings should also be more important. These should be made once a month from speaking age until 5 years old, one with each parent and one with both parents. Over those four years, there should be 144 recordings of a length of 20 to 30 minutes for each child.

## II.3. Language development

Linguistic development does not happen only when a child starts speaking and making grammatically correct sentences.

Communication happens long before that, with cooing and then babbling. Language development starts very early on, at only a few months old (Garcia-Sierra et al. 2011), when a baby is able to differentiate between his mother's language and a stranger's. He then develops into differentiating between the phonemes of two different languages at around 8 months old. Then, where monolingual children stop making the difference, bilingual children keep this skill and will continue perfecting it as they grow, if they continue to be exposed to their languages. Children will slowly say new words, first producing one word (holophrastic stage) around 10 to 13 months old, then two words around 18-24 months old. Around 24-30 months old, the multiword stage starts. Between 2 and a half and 3 years old, a child will be able to use more complex grammatical sentences, and by 5 or 6 years old, we can say that the child has reached an adult-like level in their language development. The child will usually start using nouns, then verbs, adjectives, and prepositions (Gentner, 1982), and work their way into the grammar of their language or languages. By 2 years old, a child will say about fifty words, by 3 years old, he will speak
around 250 words and his vocabulary will keep growing as the child develops, according to the Mayo Clinic ${ }^{25}$.

The four categories aforementioned (nouns, verbs, adjectives and prepositions) are only a part of all the grammatical categories that can be analysed when studying. Rossi \& Vincent-Durroux (2022: 3, our translation) have studied the use of pronouns in children from 16 months old, they mention that "[...] we thus note first of all that the child uses his first name very early and that the pronouns constitute a later acquisition, which does not completely replace the use of the first name, even at 30 months" ${ }^{26}$ (Illustration 16). They also state that " $[t]$ he singular pronouns appear first; the plural comes later: just over a quarter of children produce "they" and "them" at 30 months" ${ }^{27}$ (Illustration 17). According to them, these tendencies can also be found in French with the use of «moi».

It is however worth mentioning that Gardelle \& Vincent-Durroux (2022: 12, our translation) state that "it is necessary to take into account that grammatical categories have been defined by observing written languages, based on the representation of graphically isolated words. However, the first reality of languages is their oral form, characterized by a flow, and it is essential to observe the pronouns as they appear when spoken" ${ }^{28}$. Moreover, " $[t]$ he formalisation in categories by the analysis of the oral language could have or could give rise to different distributions". ${ }^{29}$

[^19]

Illustration 16: "Rates of use of personal pronouns and given names in American English, by age (in months)" (Rossi \& Vincent-Durroux, 2022: 3, our translation).


Illustration 17: "Rate of use of personal pronouns and first names in French by age (in months)" (Rossi \& Vincent-Durroux, 2022: 4).

Moreover, Gardelle \& Vincent-Durroux (2022: 12, our translation) also state that "[n]ot only does [the categories of pronouns] include a significant number of sub-categories depending on the role played by the pronouns in the utterance (relative, interrogative, deictic pronouns), but some of these categories also pose problems" ${ }^{30}$ which they explain to be non-homogeneous. They give the example of which, who and that and explain that:
> " $[t]$ he lack of homogeneity within the category of pronouns is also visible in the subcategory of English relative pronouns: WHICH, WHO and THAT. Relative pronouns in WH- can incorporate the human $+/$ - feature of their antecedent and can be preceded by prepositions, as are noun phrases. On these two aspects, THAT stands out (*the house in that I live) ${ }^{3}$ l.

This explanation made them wonder if that really deserves a place in the pronoun category.

Finally, Gardelle \& Vincent-Durroux (2022: 14, our translation) also state that it is therefore difficult to create a closed list of pronouns because of the criteria that need to be used.

> "A semantic criterion is that the pronouns make it possible "to ensure a certain economy in the speech, by avoiding repetitions and by basing their interpretation on the context and the situation" (framing text which accompanied the common corpus from which are extracted data analyzed in this volume)" 32 .

[^20]Gardelle \& Vincent-Durroux (2022: 14) finally state that:
> " $[t]$ he diachronic data also make it possible to isolate different subcategories of pronouns, as presented by C. Delesse [(2022)] in this volume: personal pronouns, possessives, reflections, demonstratives, interrogatives, relatives and pronouns indefinite.

> But it remains difficult to say whether this is sufficient to "constitute a closed list of pronouns" ${ }^{33}$.

So far, we have made it clear that there are as many ways of language development as there are children. To address the issue of language development, one must keep this in mind and remember that reaching one result does not mean that this result is valid for every other study. Studying language development requires specific and detailed research questions, which is why our own analysis of language development is separated into several sections with the analysis of lexical and grammatical words (GW and LW), Mean Length of Utterances (MLU) in which we take the best - fully intelligible hundred sentences and calculate the medium of morphemes ${ }^{34}$ used, of multimorphemic utterances (MMU) in which we calculate the number of morphemes in the utterances, and Upper Bound (UB) which is the sentences used with the greatest number of morphemes, but also of the use of verbs, nouns, prepositions and adjectives, the errors made by the children as well as the understandability of their speech.

[^21]
## II.3.1. Method for the analysis on language development

This section of the study focuses on the lexical development itself. In the first subsection, we will start by analysing the children's use of certain categories of words (lexical or grammatical), the former being considered less advanced than the latter. After a general analysis of bilingual children's productions, it will be interesting to analyse those productions at a morphosyntactic level with bilingual children's language development being compared to monolingual children's. There will be a detailed count of the number of times a category of word appears in each child's transcripts - including the valid repetitions, as it can be seen as a sign of mastering those words rather than counting them one time for the whole transcription, which will be reserved for the analysis on MMU. By valid repetitions, we mean the words that are repeated with a purpose, in comparison to those that are repeated because of hesitation, for example. We will therefore analyse the grammatical words (GW) - including articles, non-qualifying adjectives, conjunctions and prepositions - , and the lexical words (LW) - including nouns, qualifying adjectives, verbs and adverbs. For this specific study, we will be counting the total number of words used by the children, and every LW and every GW that they used in each available transcript of both monolingual and bilingual children.

Our hypothesis is that bilingual children, before the age of 5, make a greater use of both lexical and grammatical words regardless of the language in comparison to monolingual children, since they have access to two different linguistic systems and should be able to switch from one to the other if they found themselves short of a word.

In the next subsection, we will consider four types of words (nouns, verbs, prepositions and adjectives). Indeed, if we follow Gentner (1982) who analyses first language acquisition, nouns and verbs are more easily grasped than prepositions and adjectives. We will therefore need to compare bilingual and monolingual children, in
order to evaluate their acquisition of these four types of words. This will allow us to understand the way bilingual children and monolingual children's language acquisition happens over the course of years until the age of 5 .

For this analysis, we will be counting the number of occurrences of each type of word (verbs, nouns, prepositions and adjectives) in each transcript for the two samples of children. We will then be able to compare bilingual children to monolingual children and visualise their use of the language.

The goal of this analysis, is to visualise to what extent either monolinguals or bilinguals make a greater use of each of the selected types of words mentioned above. For that part of our study, we will consider the same 6.021 utterances spoken by the bilinguals and the same 10.147 utterances spoken by monolinguals, already used for the analysis of language awareness.

## II.3.2. Analysis of the Lexical words (LW) and Grammatical words (GW)

Trask (2013) in his Dictionary of Grammatical Terms in Linguistics defines the lexical word as being "a word with real semantic content, such as green, kitchen or swim" and the grammatical word as being a word with little or no intrinsic semantic content which primarily serves some grammatical purpose: of, the". With these definitions, we can recall Gentner (1982: 301), who states that " $[i] t$ is often reported that 'children's first words are primarily nouns (Gentner, 1978; Macnamara, 1972; Nelson, 1973)'". They refer to concepts that are easier to reach for children than verbs or prepositions.

As illustrated in Diagram 15, we found that the two samples of children use more LW than GW but, also, that bilinguals use significantly more LW (73.9\%) than monolinguals (59.9\%), and that monolinguals use significantly more GW (40.1\%) than bilinguals
(26.1\%). The detailed figures illustrated in Diagram 15 can be found in Table 9 below. Preliminary results based on these numbers, as well as a detailed analysis of the use of words from bilingual were also presented in Clain (2021, cf. Page 562).


Diagram 15: Mean use of GW and LW for bilingual and monolingual children.

|  | GW \% <br> (number of <br> words) | LW \% <br> (number of <br> words) | Total number <br> of LW and <br> GW words |
| :--- | :--- | :--- | :--- |
| Bilingual <br> children | $26.1(3950)$ | $73.9(11160)$ | 15110 |
| Monolingual <br> children | $40.1(12984)$ | $59.9(19357)$ | 32341 |

Table 9: Number of LW and GW for bilingual and monolingual children.

Moreover, if we analyse the SD (Table 10), we notice that bilingual children (4.9\%) are closer to 0 than the mean in comparison to monolinguals (5.5\%) as regards GW, but monolingual children (4.3\%) are closer to 0 than the mean compared to bilingual children (6.2\%) as regards LW. Since the figure is so much closer to 0 than the mean, we
can see that the use of GW and LW is very homogenous, even more so for bilinguals than monolinguals in GW, and for monolinguals than bilinguals in LW. The analysis of the mean confirms the results previously found stating that the two samples of children generally produce more LW than GW. But it also confirms the fact that bilinguals produce more LW (73.9\%) than monolinguals (59.9\%), and fewer GW (26.1\%) than their monolingual peers (40.1\%).

| Bilingual <br> Children | GW \% <br> Number of <br> words) | LW \% <br> (Number of <br> words | Monolingual <br> children | GW \% <br> Number of <br> words) | LW \% <br> (Number of <br> words) |
| :--- | :--- | :--- | :--- | :--- | :--- |
| V. | $10.1(400)$ | $27.1(3028)$ | D. | $7.6(985)$ | $6.7(1292)$ |
| P. | $6.9(274)$ | $4.9(547)$ | C. | $3(390)$ | $2.7(532)$ |
| Sa. | $6.3(250)$ | $5.2(585)$ | B. | $2(257)$ | $2(381)$ |
| A. | $14.7(581)$ | $8.6(956)$ | M. | $5.8(751)$ | $5.7(1108)$ |
| I. | $7.9(311)$ | $5.4(598)$ | P. | $21.4(2781)$ | $17.3(3344)$ |
| La. | $13.4(530)$ | $7(778)$ | Le. | $12.8(1660)$ | $12.1(2340)$ |
| Sh. | $10.7(422)$ | $5.7(632)$ | AF. | $14.8(1923)$ | $12(2320)$ |
| J. | $2.3(92)$ | $8.9(995)$ | R. | $7.1(926)$ | $9.8(1896)$ |
| Jo. | $2.5(99)$ | $10.2(1138)$ | N. | $7.8(1009)$ | $9.7(1871)$ |
| Le. | $1.4(56)$ | $5.5(613)$ | G. | $6.2(802)$ | $7.1(1378)$ |
| G. | $7.5(295)$ | $5.7(635)$ | AE. | $7.4(955)$ | $9.5(1841)$ |
| O. | $16.2(640)$ | $5.9(655)$ | La. | $4.2(545)$ | $5.4(1054)$ |
| Total | 3950 | 11160 | Total | 12984 | 19357 |
| Mean | $26.1(329.2)$ | $73.9(930)$ | Mean | $40.1(1082)$ | $59.9(1613.1)$ |
| Standard | $4.9(192.7)$ | $6.2(687.6)$ | Standard <br> Deviation | $5.5(714.7)$ | $4.3(833.2)$ |
| Deviation |  |  |  |  |  |

Table 10: Percentage and number of GW and LW per child for bilingual and monolingual children in relation to the mean and the $S D$.

Therefore, and going against our initial hypothesis, we can conclude that up to 5 years old, bilingual children have a slight delay in their language development in comparison to monolingual children since they use more of what is considered less advanced words (LW) than their monolingual peers.

In the next sub-section, we will detail the two categories (LW and GW) by analysing the use of word types made by children. We selected four types of words in both categories: nouns, adjectives, verbs and prepositions.

## II.3.3. Analysis of word types

We originally hypothesised that since bilingual children have access to a greater range of words, they would be using more of all types of words than monolinguals. In this analysis, we counted every instance of words appearing in the children's speech. We found, contrary to our hypotheses, that bilingual children do not make a greater use of their linguistic skills compared to monolinguals, since bilinguals use more nouns ( $51.3 \%$ ) than monolinguals ( $30.5 \%$ ), while monolinguals use more verbs ( $52.7 \%$ ) than bilinguals ( $33.5 \%$ ). Monolinguals also use more prepositions $(9 \%)$ than bilinguals $(5.6 \%)$, while bilinguals use more adjectives (9.5\%) than monolinguals (7.8\%), as detailed in Table 11 and illustrated in Diagram 16.

|  | Verbs \% | Nouns \% | Prepositions \% | Adjectives \% |
| :--- | :--- | :--- | :--- | :--- |
| Bilingual <br> children | 33.5 | 51.3 | 5.6 | 9.5 |
| Monolingual <br> children | 52.7 | 30.5 | 9 | 7.8 |

Table 11: Percentage and number of verbs, nouns, prepositions and adjectives for bilingual and monolingual children in relation to the total number of the 4 types of words.


Diagram 16: Percentage of word types (verbs, nouns, prepositions and adjectives) respectively used by both bilingual and monolingual children.

When only considering the four types of words used in comparison to the total number of words uttered by the two samples of children, the percentages are equivalent with $44.4 \%$ for bilinguals and $43.4 \%$ for monolinguals, as illustrated in Diagram 17, as the two samples of children generally use the same proportion of all four types of words analysed in link with their total number of words in all available transcripts.


Diagram 17: Percentage of the 4 types of words used by bilingual and monolingual children.

These results show that bilingual have a slight delay in comparison to monolingual children in their language development since they use a greater number of nouns and adjectives, and fewer verbs and prepositions.

However, when we visualise the percentage of verbs, nouns, prepositions and adjectives used in comparison to the total number of words used by the two samples in all available transcripts (Table 12), we find that the use of prepositions and adjectives are not very far apart between bilingual and monolingual children. Indeed, the two samples respectively use $2.5 \%$ and $3.9 \%$ of prepositions, and $4.2 \%$ and $3.4 \%$ of adjectives. This shows that although the initial conclusion regarding the use of verbs and nouns still stands, we can also add that bilingual and monolingual children make almost the same use of prepositions and adjectives, both respectively from "advanced" and "less advanced" types of words.

|  | Verbs \% <br> (number of <br> words) | Nouns \% <br> (number of <br> words) | Prepositions <br> \% <br> (number of <br> words) | Adjectives \% <br> (number of <br> words) | Other words <br> (\%) | Total <br> number <br> of words | Total <br> number of <br> the 4 types of <br> words |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| Bilingual <br> children | $14.9(2276)$ | $22.8(3484)$ | $2.5(383)$ | $4.2(644)$ | $55.6(8487)$ | 15274 | 6787 |
| Monolingual <br> children | $22.9(7415)$ | $13.2(4285)$ | $3.9(1262)$ | $3.4(1100)$ | $56.6(18309)$ | 32371 | 14062 |

Table 12: Percentage and number of verbs, nouns, prepositions and adjectives for bilingual and monolingual children in relation to the total number of words in available transcripts.

When analysing the SD per child (Table 13), we can notice that bilingual children are generally further away from 0 than their monolingual peers, which means that there is a greater dispersion of the results in the use of the four types of words in the bilingual sample than in the monolingual sample. We can also visualise the greater homogeneity in the use of prepositions and adjectives for the two samples in comparison to the use of verbs and nouns. This being said, despite a cluster around the means, bilingual children produce more
nouns than monolinguals; and monolinguals produce more verbs than monolinguals, which corroborates our previous findings (Table 12). However, as visible in Table 13, when focusing on the means, we notice that bilinguals generally produce firstly nouns ( $48.9 \%$ ), then verbs ( $35.6 \%$ ), then adjectives ( $9.5 \%$ ), and finally prepositions ( $6 \%$ ). In comparison, monolingual children produce first and foremost more verbs (53.3\%), then nouns (30.3\%), then prepositions (9.3\%), and finally adjectives (7.1\%).

| Bilingual children | Verbs \% (number of words) | Nouns \% (number of words) | Prepositions \% (number of words) | Adjectives \% (number of words) | Total number of the 4 types of words |
| :---: | :---: | :---: | :---: | :---: | :---: |
| V. | 41.2 (208) | 46.1 (233) | 9.3 (47) | 3.4 (17) | 505 |
| P. | 55.6 (235) | 25.5 (108) | 9.7 (41) | 9.2 (39) | 423 |
| Sa. | 22.3 (116) | 51 (265) | 4.8 (25) | 21.9 (114) | 520 |
| A. | 43.2 (378) | 43.7 (382) | 7.4 (65) | 5.7 (50) | 875 |
| I. | 56.3 (227) | 27.8 (112) | 9.4 (38) | 6.5 (26) | 403 |
| La. | 49.8 (281) | 36.5 (206) | 7.8 (44) | 5.9 (33) | 564 |
| Je. | 10.7 (82) | 81.3 (621) | 0.4 (3) | 7.6 (58) | 764 |
| Sh. | 51.1 (268) | 36.5 (191) | 7.4 (39) | 5 (26) | 524 |
| Jo. | 6.7 (49) | 78.5 (574) | 0.5 (4) | 14.5 (104) | 731 |
| Le. | 2.7 (13) | 74.2 (362) | 4.1 (20) | 19.1 (93) | 488 |
| Ge. | 50.1 (238) | 44.6 (209) | 1.9 (9) | 2.8 (13) | 469 |
| 0. | 37 (201) | 41.1 (223) | 8.8 (48) | 13.1 (71) | 543 |
| Mean | 35.6 (191.3) | 48.9 (290.5) | 6 (31.9) | 9.5 (53.7) | 567.4 |
| Standard Deviation | 19.8 (106.3) | 19 (165.3) | 3.5 (19.6) | 6.2 (24.7) | 145.4 |
| Monolingual children | Verbs \% (number of words) | Nouns \% <br> (number of <br> words) | Prepositions \% (number of words) | Adjectives \% (number of words) | Total number of the 4 types of words |
| D. | 61.4 (675) | 23.5 (258) | 11.6 (128) | 3.5 (39) | 1100 |
| C. | 58.5 (288) | 23.4 (115) | 7.9 (39) | 10.2 (50) | 492 |
| B. | 49.5 (160) | 33.7 (109) | 10.5 (34) | 6.2 (20) | 323 |
| M. | 53.8 (416) | 27.4 (212) | 8.3 (64) | 10.5 (81) | 773 |
| P. | 47.6 (1275) | 35 (936) | 9.1 (244) | 8.3 (222) | 2677 |
| Le. | 54.8 (939) | 27.4 (470) | 8.8 (151) | 9 (155) | 1715 |
| AF. | 57.1 (1065) | 28.6 (534) | 7.6 (142) | 6.6 (123) | 1864 |
| R. | 36 (469) | 41.9 (545) | 12.7 (165) | 9.4 (123) | 1302 |
| N. | 52 (695) | 33.2 (444) | 7.7 (103) | 7.1 (95) | 1337 |
| G. | 55.1 (565) | 28.5 (292) | 9.8 (100) | 6.6 (68) | 1025 |
| AE. | 56.1 (708) | 32.3 (408) | 9.7 (122) | 2.9 (24) | 1262 |
| La. | 57.5 (489) | 28.9 (246) | 8 (68) | 5.5 (47) | 850 |
| Mean | 53.3 (645.3) | 30.3 (380.8) | 9.3 (113.3) | 7.1 (87.3) | 1226.7 |
| Standard Deviation | 6.6 (322.5) | 5.2 (230.7) | 1.6 (59.4) | 2.6 (60) | 641.6 |

Table 13: Mean and standard deviation per child for verbs, nouns, prepositions and adjectives in relation to the total number of the 4 types of words.

## II.3.4. Analysis of the MLU/MMU/UB

The measure of MLU was created by Brown (1973). MLU - Mean Length of Utterance - is based on the number of morphemes (rather than the number of words) used by a speaker. In order to calculate the MLU, 100 perfectly intelligible sentences are considered for each child across all available transcripts, all languages combined, when evaluating a bi-multi-lingual child. The number of morphemes in the 100 sentences is then divided by the number of utterances. The number that is found is the MLU, and the higher the MLU is, the higher the child's proficiency is in the language(s). There are other criteria that can be considered regarding the calculation of the MLU, such as the elements of a syntactic nature as well as the connection, at least between what is pronounced and the situation, as detailed in Foster et al. (2000: 359). Indeed, he confirms the description found in Loban (1976: 116) who proposes a definition of the communication unit as being "a group of words that cannot be further divided without loss of their essential meaning". The measure of the MLU raises the question of what an "utterance" is for the researcher, but the definition given by Loban (1976: 116) remains, according to the study by Foster et al. (2000), the best definition 25 years later. However, despite the one downside of MLU, which is the delimitation of the utterances, the measurement of the MLU in our study remains topical, even if it could be supplemented by the measurement of the MMU and the UB. In Foster et al. (2000: 359), the different ages in which children usually go from the two-word stage to longer sentences are detailed, that is 20-30 months old for the two-word stage, up to six words around 34 48 months old, and sentences longer than six words at 48 months old. SLTinfo (2009) ${ }^{35}$ also presents a table (Illustration 18) with an age equivalent in months in relation to the MLU, originally found in Miller (1981). This table goes from 18 to 60 months old, which is exactly our age study frame, which is 5 years old and under.

[^22]| MLU | age equivalent <br> (within 1 month) |
| :---: | :---: |
| 1.31 | 18 |
| 1.62 | 21 |
| 1.92 | 24 |
| 2.54 | 30 |
| 2.85 | 33 |
| 3.16 | 36 |
| 3.47 | 39 |
| 3.78 | 42 |
| 4.09 | 45 |
| 4.40 | 48 |
| 4.71 | 51 |
| 5.02 | 54 |
| 5.32 | 57 |
| 5.63 | 60 |

Illustration 18: Table with an age equivalent in months in relation to the MLU (Miller, 1981).

In our own study, 100 perfectly intelligible sentences were selected for each child across all available transcripts, the two languages combined for bilinguals, since we are also trying to show the importance of considering all of a bilingual's languages when proceeding to a study. We then counted the number of morphemes in the 100 selected sentences and then divided them by the number of utterances.

For our sample, as summarised in Table 14 below we can see that eight out of our twelve bilingual children are above (V., P., A., La., Sh., Je., Ge., O.) the supposed MLU for the age proposed by Miller (1981), two are below (Sa., Le.), and two are right in the frame (I.,

Jo.). Ten children in our control group of monolingual children as summarised in Table 15 below (D., M., P., Le., AF., R., N., G., AE., La.) are situated high above the MLU for age equivalence whereas two are below (C., B.)

| Bilingual Children | Medium age <br> (months) | Total MLU <br> $(\%)$ |
| :---: | :---: | :---: |
| V. | 48 | 5.54 |
| P. | 36 | 4.08 |
| Sa. | 60 | 4.77 |
| A. | 57 | 9.28 |
| I. | 52 | 4.95 |
| La. | 34 | 6.42 |
| Sh. | 30 | 5.8 |
| Je. | 22.5 | 2.3 |
| Jo. | 28 | 1.99 |
| Le. | 23.5 | 1.78 |
| Ge. | 33 | 3.53 |
| O. | 31.5 | 4.69 |

Table 14: Total MLU (\%) of bilingual children.

| Monolingual <br> Children | Medium age <br> (months) | Total MLU <br> $(\%)$ |
| :---: | :---: | :---: |
| D. | 49 | 6.1 |
| C. | 51 | 3.1 |
| B. | 48 | 2.1 |
| M. | 33.6 | 6.1 |
| P. | 36.3 | 18.6 |
| Le. | 41.3 | 12.2 |
| AF. | 37 | 12.9 |
| R. | 34.3 | 8.8 |
| N. | 35.3 | 9.1 |
| G. | 34.3 | 6.8 |
| AE. | 33 | 9.2 |
| La. | 34 | 5.1 |

Table 15: Total MLU (\%) of monolingual children.

Since the measure established by Loban (1976), other measures were proposed, which help complete the MLU analysis and make it more precise: MMU and UB. The former evaluates the number of utterances consisting in more than one morpheme in a bilingual child's speech. The child's language with a higher number of MMU is more developed than the one with a lower number. UB consists in counting the number of morphemes in the longer utterance. The MMU, compared to the analysis of the LW and GW (cf. Chapter II.3.2.), can help us visualise the children's use of language without the repetitions that are normal for children this age.

In our case, when we compare bilingual children's MMU to the one of monolinguals, we can see, as illustrated in Tables 16 and 17, that bilingual children's MMUs are somewhat more balanced (between 108 and 258) while the latter's gap between the greatest and the lowest MMU is considerable (between 671 and 6044).

| Monolingual <br> children | Medium age <br> (months) | Total MMU | Total MLU (\%) |
| :--- | :--- | :--- | :--- |
| D. | 49 | 1982 | 7.02 |
| C. | 51 | 997 | 4.69 |
| B. | 48 | 671 | 5.41 |
| M. | 33.6 | 1977 | 5.28 |
| P. | 36.3 | 6044 | 6.46 |
| Le. | 41.3 | 3946 | 7.11 |
| AF. | 37 | 4179 | 5.44 |
| R. | 34.3 | 2872 | 4.71 |
| N. | 35.3 | 2939 | 4.34 |
| G. | 34.3 | 2216 | 5.8 |
| AE. | 33 | 2976 | 5.19 |
| La. | 34 | 1654 | 45 |

Table 16: Total MMU and total MLU (\%) for monolingual children.

| Bilingual Child | Medium age (months) | Total MMU | $\begin{aligned} & \text { Total MLU } \\ & (\%) \end{aligned}$ | Languages | Total MMU per language | Dominance |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| V. | 54.5 months | 209 | 5.54 | French | 79 | English |
|  |  |  |  | English | 130 |  |
| P. | 36 months | 167 | 4.08 | French | 130 | French |
|  |  |  |  | English | 37 |  |
| Sa. | 59.5months | 140 | 4.77 | French | 99 | French |
|  |  |  |  | English | 41 |  |
| A. | $\begin{aligned} & 57.5 \\ & \text { months } \end{aligned}$ | 231 | 9.28 | French | 108 | French |
|  |  |  |  | English | 123 |  |
| I. | $\begin{aligned} & \hline 53 \\ & \text { months } \end{aligned}$ | 153 | 4.95 | French | 75 | Balanced |
|  |  |  |  | English | 78 |  |
| La. | $\begin{array}{\|l\|} \hline 52.5 \\ \text { months } \end{array}$ | 189 | 6.42 | French | 105 | French |
|  |  |  |  | English | 84 |  |
| Sh. | $\begin{array}{\|l\|} \hline 30 \\ \text { months } \end{array}$ | 168 | 5.8 | French | 8 | English |
|  |  |  |  | English | 160 |  |
| Je. | $\begin{aligned} & 22.5 \\ & \text { months } \end{aligned}$ | 167 | 2.3 | French | 52 | English |
|  |  |  |  | English | 115 |  |
| Jo. | $\begin{aligned} & 28 \\ & \text { months } \end{aligned}$ | 108 | 1.99 | French | 15 | English |
|  |  |  |  | English | 193 |  |
| Le. | $\begin{aligned} & 23.5 \\ & \text { months } \end{aligned}$ | 239 | 1.78 | French | 62 | English |
|  |  |  |  | English | 177 |  |
| G. | $\begin{aligned} & 33 \\ & \text { months } \end{aligned}$ | 258 | 3.53 | French | 112 | English |
|  |  |  |  | English | 146 |  |
| O. | 31.5 months | 221 | 4.69 | French | 200 | French |
|  |  |  |  | English | 21 |  |

Table 17: Total MMU, total MMU per language, and total MLU for bilingual children.

A possible explanation as to why the sample of bilingual children seems to produce utterances with lower MMUs is related to their slower language development (especially regarding their use of verbs, nouns, preposition and adjectives) as since in the previous analysis (cf. chapter II.3.3.). Moreover, as seen thanks to the analyses of MLU and MMU, we notice that the bilingualism of the sample of children is not perfectly balanced, and many of the children actually have a dominant language, as visible in the right column of Table 16, therefore leading to the production of less complete sentences, more hesitations, or mispronunciations. This analysis could definitely benefit from being done with balanced bilingual children and monolingual children, in
order to visualise the impact of balanced/unbalanced bilingualism on the production of clear and complete sentences.

| Bilingual children | $\begin{aligned} & \text { Rate of CS } \\ & \text { (\%) } \end{aligned}$ | Languages | $\begin{array}{\|l} \hline \text { MMU } \\ (\%) \end{array}$ |
| :---: | :---: | :---: | :---: |
| V. | 11.3 | English | 37.8 |
|  |  | French | 62.2 |
| P. | 4.9 | English | 77.8 |
|  |  | French | 22.2 |
| Sa. | 2.5 | English | 70.7 |
|  |  | French | 29.3 |
| A. | 7 | English | 46.8 |
|  |  | French | 53.2 |
| I. | 1.3 | English | 49 |
|  |  | French | 51 |
| La. | 7.2 | English | 55.6 |
|  |  | French | 44.4 |
| Sh. | 1.1 | English | 4.8 |
|  |  | French | 95.2 |
| Je. | 2.1 | English | 31.1 |
|  |  | French | 68.9 |
| Jo. | 0.8 | English | 7.2 |
|  |  | French | 92.8 |
| Le. | 3.6 | English | 25.9 |
|  |  | French | 74.1 |
| Ge. | $\emptyset$ | English | 43.4 |
|  |  | French | 56.6 |
| 0. | 1.3 | English | 90.5 |
|  |  | French | 9.5 |

Table 18: Rate of CS (\%) and MMU (\%) of bilingual children.

In link with the MMU, we can analyse the rate of CS, which, in the current analysis shows that six (P., Sa., Sh., Jo., Le., O.) out of the eight children with a lower rate of CS (Table 18), also have a greater MMU either in French or in English (between 70.7 and 95.2), whereas the three (V., A., La.) with a high rate of CS (between 7\% and 11.3\%) have a more balanced MMU between French and English (between 53.2 and 62.2), as summarised in Table 18 below. This would mean
that in the sample of bilingual children, those with higher possibilities code-switched less than those with fewer possibilities of CS.

Moreover, all of the twelve children have used CS during the recordings. To evaluate the use of CS in the sample of bilingual children, we only selected the transcriptions in which both parents were present, which is why in the case of G. we do not have any data since we only had access to transcripts with each parent alone with the child (represented as $\varnothing$ in Table 18). Regarding the other children, the range of use of CS goes from $0.8 \%$ to $7.2 \%$ in the total number of utterances for each child, which means that although the children do not code-switch very often, they all do it at least once, as summarised in Table 18. If we were to make a comparison between the switched items and the use of languages, we could notice that there are three types of children: those who code-switch often because they have an unbalanced bilingualism (cf. Chapter I.3.) and therefore compensate with the other language (V., P., Je., Le.); those who do not switch a lot because they have a clear dominance in one language and therefore do not often use their second language (Sh., Jo.); and those who have a (close to) balanced bilingualism, and therefore do not feel the need to compensate at all and therefore either switch purposefully (La., A.) or do not switched very often (Sa., I., O.).

Genesee et al. (1996: 626) mention the correlation between CS and MMU scores. In their own study, they found that: "when we compare the children's rate of intra-utterance mixing with their MMUs calculated as a percentage of all utterances in EACH language [...], we found that, in every case, their rates of mixing were much lower than their MMU scores."

We evaluated the correlation between the MMU score and the rate of CS in our sample of bilingual children as well, and we also found that these bilingual children all have a lower rate of CS compared to their MMU scores, therefore coming to the same conclusion as Genesee et
al. (1996: 626), that "the children were mixing less than they could have, considering their level of morphosyntactic development".

In order to make our analysis more precise, we measured the UB in each bilingual and monolingual child's language. In order to do so, we have counted the number of morphemes in the longest utterance pronounced by the children in each available transcript.

We provide hereafter a few examples of high UB, as well as low UB.

- Examples of high UB:

44) CHI: it's it's have all the robots and jump on a car and break a window
45) CHI: il va chercher les oeufs et après il va dire à sa mamie de donner le panier pour les cacher
46) CHI: it's funny because the wolf says "come out to play lit little creature" but he's not because he he's he's the wolf says "come out to play little creature" but he's not a little creature, he is
47) CHI : ils ils peuvent pas mais je veux dire ils peut tand ils sont vivants mais ils peut seulement parler dans leur langue des chiens

- Examples of low UB:

48) CHI: là bas !
49) CHI: c'est chaud.

The use of the UB in addition to the MMU and MLU rates can help us measure the dominant language of the bilingual children. It can also help us visualise how the language development works by comparing those results to monolingual children's own UB and MMU/MLU.

Regarding the bilingual results, among the twelve bilingual children, the dominant language of nine of them was found by analysing the MMU and MLU rate which is confirmed thanks to the calculation of
the UB (V., Sa., I., La., Sh., Je., Le., Ge., O.), while three have an opposite result (P., A., Jo.), as summarised in Table 19.

In comparison to the monolingual children in our sample, we have found that the medium UB is slightly higher for the bilingual children (15.2) than for the monolinguals (14.1) as visible in Table 19 and illustrated in Diagram 18. In order to find those results, we have used the data of the bilingual children that have the highest UB. In these results, we can visualise how bilingual children have a greater opportunity to produce longer sentences, since they are able to switch from one language to the other.

| Bilingual children | Languages | UB | Monolingual children | UB |
| :---: | :---: | :---: | :---: | :---: |
| V. | English | 17 | D. | 16 |
|  | French | 7 |  |  |
| P. | English | 9 | C. | 15 |
|  | French | 6 |  |  |
| Sa. | English | 5 | B. | 13 |
|  | French | 23 |  |  |
| A. | English | 38 | M. | 11 |
|  | French | 34 |  |  |
| I. | English | 20 | P. | 17 |
|  | French | 14 |  |  |
| La. | English | 13 | Le. | 27 |
|  | French | 24 |  |  |
| Sh. | English | 18 | AF. | 17 |
|  | French | 1 |  |  |
| Je. | English | 8 | R. | 11 |
|  | French | 3 |  |  |
| Jo. | English | 3 | N. | 9 |
|  | French | 3 |  |  |
| Le. | English | 4 | G. | 11 |
|  | French | 2 |  |  |
| Ge. | English | 9 | AE. | 11 |
|  | French | 5 |  |  |
| 0. | English | 2 | La. | 11 |
|  | French | 9 |  |  |

Table 19: Bilingual and monolingual children's UB.


Diagram 18: Mean of UB for bilinguals in comparison to monolinguals.

We can clearly visualise the dominant language for each child in our sample thanks to the values of MMU (\%), MLU (\%) and UB (Table 20), which allowed us to consider which language was used with longer and sentences, with words made of more morphemes.

| Bilingual children | $\begin{array}{\|l} \hline \begin{array}{l} \text { Medium } \\ \text { age } \\ \text { (months) } \end{array} \\ \hline \end{array}$ | Languages | MLU per language | UB | $\begin{array}{\|l} \begin{array}{l} \text { MMU per } \\ \text { language } \\ \text { (\%) } \end{array} \\ \hline \end{array}$ | Dominance |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| V. | 54.5 | English | 4.26 | 17 | 62.2 | English |
|  |  | French | 1.28 | 7 | 37.8 |  |
| P. | 36 | English | 3.52 | 9 | 22.2 | French |
|  |  | French | 0.56 | 6 | 77.8 |  |
| Sa. | 59.5 | English | 0.3 | 5 | 29.3 | French |
|  |  | French | 4.47 | 23 | 70.7 |  |
| A. | 57.5 | English | 3.11 | 38 | 53.2 | English |
|  |  | French | 6.17 | 34 | 46.8 |  |
| I. | 53 | English | 2.26 | 20 | 51 | Balanced |
|  |  | French | 2.69 | 14 | 49 |  |
| La. | 52.5 | English | 2.09 | 13 | 44.4 | French |
|  |  | French | 4.33 | 24 | 55.6 |  |
| Sh. | 30 | English | 5.48 | 18 | 95.2 | English |
|  |  | French | 0.32 | 1 | 4.8 |  |
| Je. | 22.5 | English | 2.37 | 8 | 68.9 | English |
|  |  | French | 0.63 | 3 | 31.1 |  |
| Jo. | 28 | English | 1.78 | 3 | 92.8 | English |
|  |  | French | 0.21 | 3 | 7.2 |  |
| Le. | 23.5 | English | 1.28 | 4 | 74.1 | English |
|  |  | French | 0.5 | 2 | 25.9 |  |
| Ge. | 33 | English | 2.35 | 9 | 56.6 | Balanced |
|  |  | French | 1.18 | 5 | 43.4 |  |
| O. | 31.5 | English | 0.58 | 2 | 9.5 | French |
|  |  | French | 4.11 | 9 | 90.5 |  |

Table 20: Language dominance
MLU: mean length of utterance
MMU: multi-morphemic utterances.

Moreover, if we analyse the SD in the MLU column, we notice in Table 21 below that the SD of five bilingual children (2\%) and eight monolingual children ( $0.9 \%$ ) are situated under the mean of their respective samples, ( $4.6 \%$ and $5.5 \%$ ). This means that bilingual children tend to produce longer utterances than their monolingual peers. Moreover, we can see that bilinguals' SD is further away from 0 ( $2 \%$ ) than monolinguals' ( $0.9 \%$ ), meaning that bilingual children's production of longer utterances is more heterogenous than monolingual
children'. We can also state that bilingual children make fewer complete sentences in comparison to their monolingual peers, as illustrated in Diagram 19.

Moreover, regarding the rate of CS, we notice that bilingual children's SD $(3.2 \%)$ is closer to the mean $(3.9 \%)$ than to 0 . This means that the use of CS amongst the bilingual children of our sample is very heterogenous, and therefore does not necessarily depend on the age nor the language used by the children.


Diagram 19: Mean of MLU for bilinguals in comparison to monolinguals.

| Bilingual children | Medium age <br> (months) | Total MMU | Total MLU (\%) | UB | $\begin{aligned} & \text { Rate of CS } \\ & \text { (\%) } \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: |
| V. | 54.5 | 209 | 5.54 | 17 | 11.3 |
| P. | 36 | 167 | 4.08 | 9 | 4.9 |
| Sa. | 59.5 | 140 | 4.77 | 23 | 2.5 |
| A. | 57.5 | 231 | 9.28 | 38 | 7 |
| I. | 53 | 153 | 4.95 | 20 | 1.3 |
| La. | 52.5 | 189 | 6.42 | 24 | 7.2 |
| Sh. | 30 | 168 | 5.8 | 18 | 1.1 |
| Je. | 22.5 | 167 | 2.3 | 8 | 2.1 |
| Jo. | 28 | 108 | 1.99 | 3 | 0.8 |
| Le. | 23.5 | 239 | 1.78 | 4 | 3.6 |
| G. | 33 | 258 | 3.53 | 9 | $\emptyset$ |
| O. | 31.5 | 221 | 4.69 | 9 | 1.3 |
| Mean |  | 187.5 | 4.6 | 15.2 | 3.9 |
| Standard Deviation |  | 42.9 | 2 | 9.7 | 3.2 |
| Monolingual children | Medium age (months) | Total MMU | Total MLU (\%) | UB |  |
| D. | 49 | 1982 | 7.02 | 16 |  |
| C. | 51 | 997 | 4.69 | 15 |  |
| B. | 48 | 671 | 5.41 | 13 |  |
| M. | 33.6 | 1977 | 5.28 | 11 |  |
| P. | 36.3 | 6044 | 6.46 | 17 |  |
| Le. | 41.3 | 3946 | 7.11 | 27 |  |
| AF. | 37 | 4179 | 5.44 | 17 |  |
| R. | 34.3 | 2872 | 4.71 | 11 |  |
| N. | 35.3 | 2939 | 4.34 | 9 |  |
| G. | 34.3 | 2216 | 5.8 | 11 |  |
| AE. | 33 | 2976 | 5.19 | 11 |  |
| La. | 34 | 1654 | 4.5 | 11 |  |
| Mean |  | 2704.4 | 5.5 | 14.1 |  |
| Standard Deviation |  | 1491.4 | 0.9 | 4.9 |  |

Table 21: MMU, MLU (\%) and UB for each bilingual and monolingual child in relations to the total mean and standard deviation for each sample.

## II.3.5. Discussion on language development

Gentner (1982: 316) offers different explanations as to why children use more nouns, then verbs, prepositions and adjectives during their first language acquisition period. One of the reasons mentioned is the fact that children supposedly hear nouns more often than they do other types of words, which drew a contradiction since adults "use a large number of nouns, each fairly infrequently, and a smaller number of verbs, each much more frequently", meaning that children should therefore use verbs first and then nouns. The literature reports that there is a chronology in the acquisition of word types. Nouns are usually learned first, then verbs, adjectives and adverbs. Then come prepositions, pronouns, conjunctions and auxiliary verbs (Gentner, 1982). Kucera \& Francis (1967), mentioned in Gentner (1982: 316), used "the 100 most-frequent words" of a "one-million-word corpus of written language"; they state that the adult's speech is made up of " $20 \%$ of verbs (including auxiliaries) and only $6 \%$ are nouns". They then continue by stating that "prepositions constitute $14 \%$, and pronouns and other function words $39 \%$ ". Therefore, according to this analysis, if children were following this frequency pattern into their own language learning, they "would learn verbs and prepositions before they learned nouns" for example. But, on the contrary, we have seen that verbs are acquired after nouns, then followed by prepositions and pronouns.

Another interesting mention that could explain the difference in acquisition between nouns, verbs, prepositions and adjectives, is the location of these words in the sentences uttered by adults to children. Indeed, in Gentner (1982: 318), Slobin $(1973$, 1975) states that "children pay attention to the ends of words". "Suffixes are acquired earlier than prefixes, and postpositions earlier than prepositions". Therefore, thanks to this statement, it would seem obvious that whichever types of word is placed at the end of a sentence has a clear advantage over those placed at the beginning. In our study, with

English and French, we can easily notice that both languages are subject-verb-object (SVO), about which Gentner (1982: 318) explains that this "leaves nouns at the end of the sentences.The noun-final order may be even more pronounced in some kinds of speech to children". They however contradict this analysis since they have also analysed SOV languages, in which, surprisingly, children use more nouns than verbs during their first language acquisition.

Gentner (1982: 320) also thought of a morphological reason for children to use more nouns than verbs, for example, since nouns keep a stable root whereas verbs change according to their conjugation, which might be harder for children to grasp and remember. He however also contradicts this theory since Chinese Mandarin (for example) is "among the most analytical of languages, having in the neighborhood of one morpheme per word". Gentner (1982) explains that " $[t]$ here are a few verb suffixes in Mandarin, which create a small morphological difference in favor of nouns. But the difference is minimal: There are no root changes, and in many sentences both the main verb and the noun occur without affixes". But this still leaves Mandarin with a "noun-predominant acquisition patterns", and [b]ecause Mandarin does not possess enough inflections to create any sizable form-class differences in degree of morphological complexity, the predominance of nouns here tends to rule out differences in morphological transparency as the explanation for the acquisition patterns".

In French and in English, the two languages under scrutiny in the current research, nouns also happen to be the concept used by parents earlier on, and more often, with their children. According to Gentner (1982: 301), nouns and verbs are parts of two different streams in a child's language development, " $[t]$ he ongoing stream of perceptualcognitive information about the world around, and the stream of language being spoken". Nouns are part of the child's direct
environment, they are stable and concrete concepts while verbs are part of the other stream which is more abstract and volatile for a child, they "have a less transparent relation to the perceptual world" (1982: 328). Children learning languages have less guessing to do with nouns than with verbs. As a last explanation as to why it seems easier for children to learn nouns before verbs, Gentner (1982: 328) states that the concrete state of objects is "given to us by the world" whereas predicate concepts do not exist in the world and need to be invented "or, from the child's point of view, discovered". According to Gentner (1982), children acquire verbs slower than nouns because they "must discover both how to conflate sub-predicates into concepts and how to match these concepts with words".

This means that when children learn nouns, they already have a physical object while verbs suppose a call on the imagination, hence why children need to "discover" them. Moreover, nouns do not necessarily have a link with other words in a sentence, whereas verbs, as connectors between two objects - or nouns - cannot simply be used without their connectors - the objects - and their relationships towards one another.

In her article, Gentner (1982: 327) came to the conclusions that " 1 ) in case studies, children learn nouns before predicate terms; 2) in earlyproduction vocabularies, nouns greatly outnumber verbs; and 3) in one systematic study of comprehension, children not only produced but comprehended many more nouns than verbs at every stage of observation" as previously found by Goldin-Meadow et al. (1976).

In the language evolution process, children will therefore learn nouns and verbs first, as seen above, then they will learn adjectives and adverbs. Then will come the use of prepositions, pronouns, conjunctions, and auxiliary verbs around 3 to 5 years old (Gotzke \& Sample Gosse, 2007). In Gotzke \& Sample Gosse's study (2007), they have found that prepositions are acquired between 36 and 40 months, while conjunctions are acquired between 25 and 40 months and finally,
pronouns, according to the type (subjective, objective or demonstrative ones) are acquired between 36,40 or 60 months.

As regards prepositions, Groussier (1997: 227) and Morgenstern \& Sekali (2009) propose that there is a "non-primarity of space in ontogenesis", which is also the reason why we included them in our study. They explain that this "does not invalidate the hypothesis of a primarity of space, not at the speech stage, but prior to the structurations of representations". They therefore suggest that there is a chronology in the acquisition and development that precedes the use of prepositions. This chronology supposedly appears with the ontogenesis of the structuration of representations, leading to a "primarity" of space but at the stage of speech. The use of prepositions then appears in the speech to word the space indications that were already previously considered.
> "This does not seem likely to invalidate the hypothesis of a primacy of the spatial, not at the stage of speech, but at the earlier stage of the structuring of representations. Now, this is indeed what is at issue here: the ontogenesis capable of founding the primacy of the spatial in the mode of indications of relations which underlies the use of prepositions is not the ontogenesis of this use but many of the representations that precede it" (Groussier, 1997: 227, Our translation) ${ }^{36}$.

Bowerman (1996: 377), as quoted by Groussier (1997: 227-228), explains that prior to using actual prepositions, "[y]oung children often show signs of wanting to communicate about the location of objects, and before acquiring spatial morphemes, they may do so simply by combining two nouns or a verb and a noun with what seems to be a locative intention [...]".

Moreover, the analysis of the SD in relation to the mean for the use of LW and GW has confirmed the numbers regarding the greater use of

[^23]LW by bilinguals and the greater use of GW by monolinguals. It has also allowed us to show the homogeneity of the use of GW by bilinguals, and of LW by monolingual children.

Regarding the analysis of the SD for the production of verbs, nouns, prepositions and adjectives has confirmed a homogeneity in the overall use of the four types of words presented in the analysis. We have also confirmed the results previously found stating that bilinguals use more nouns and adjectives than monolinguals and fewer verbs and prepositions than monolinguals.

Regarding the analysis of the MLU, we have found that bilingual children's production of longer utterances is more heterogenous than their monolingual peers, but also that they produce fewer complete utterances in comparison to monolingual children. These results are also valid for the rate of CS which has shown to be heterogenous, meaning that the diversity of the use of CS does not necessarily depend on the child's age.

In the line of the explanation of how and why nouns and verbs are being used the way they are, this description of prepositions shows that their use calls on a more important structural dimension, conceived at the pre-linguistic stage of child language development, such as pointing to an object.

## II.4. Errors

The analysis of errors in speech is another measure we can take into consideration as it contributes to the analysis of child language development. As explained by Chevrot \& Fayol (2001), "[c]hild errors have never been analyzed for their own sake but have only been advanced in order to defend certain conceptions concerning adult phonology (Gaatone 1978, Klausenburger 1974)". In our specific case, we want to compare the errors made by both monolingual and bilingual children, therefore in order to determine which sample of
children makes the greatest number of errors. Our hypothesis is that bilingual children make more errors regarding the lexicon and phonology since they can be more challenging to process due to the bilingual state of these children as they have a wider range of lexicon to choose from, and that their pronunciation might be somewhat affected by the fact that they have two languages. Therefore, we will analyse grammatical, semantic, lexical, phonological, and morphological errors. We also hypothesise that bilingual children make fewer semantic, and grammatical errors, as semantics might be closely related to executive functions. Since bilinguals are better at semanticrelated executive function tasks (Bialystok et al., 2016) among others, this might help them make fewer errors in anything regarding semantics (Allen et al. 2012, Amunts, 2018, White et al. 2017).

In a study from Kaushanskaya (2018: 9) who "examine[s] whether a bilingual advantage for novel word learning" exists by comparing bilinguals and monolinguals regarding their surface (phonological) or semantic errors immediately after learning or one week after learning, "bilingual learners produced a larger proportion of deep semantic errors than monolingual learners at immediate testing [...] All other comparisons revealed comparable error patterns in the bilingual and monolingual learners". Although she does also mention the greater skills bilinguals have at vocabulary learning. Kaushanskaya's main conclusion (2018: 10) showed that "monolingual learners made more deep semantic errors at delayed testing than immediately after learning, bilingual learners made the same proportion of deep semantic errors at delayed and at immediate testing", but also that "bilinguals made proportionally more deep semantic errors than monolinguals immediately after learning". Finally, she found that "a week after learning took place, both monolinguals and bilinguals demonstrated similar proportions of deep and surface errors, and did not differ from each other".

Kaushanskaya (2018: 10-11) explains that the conclusion showing "both monolingual and bilingual participants [making] more surface
errors than deep semantic errors immediately after learning" is proof that "at this initial stage of the learning process, retrieval was most derailed at the level where new vocabulary items were mapped onto their phonological forms". Analysis of the results also showed that at immediate testing, bilinguals made more deep semantic errors than monolinguals. However, Kaushanskaya (2018: 10-11) also states that bilinguals manage to encode the information at the right semantic spaces, but that they have trouble dealing with interferences that may arise in the decoding process. Regarding the encoding, " $[t]$ hese findings may be interpreted to indicate that bilingual participants were able to encode novel vocabulary items deeper (i.e., to the semantic level) than monolinguals immediately upon learning". The explanation as to why those results have emerged could be "bilinguals’ greater overall language-learning experience" but also a "greater experience with lexical ambiguity".

## II.4.1. Method for the analysis on errors

Regarding errors in our data, we will be counting every mistake made in the two samples of children (from a missing article, to a completely incomprehensible sentence). We will then separate them into 5 types of errors (grammatical, morphological, semantic, phonological, and lexical) and calculate the percentages for a better visualisation in the monolingual / bilingual comparison.

As a reminder, there are 6.021 sentences uttered by bilingual children and 10.147 by monolingual children.

## II.4.2. Analysis of errors

The analysis of errors shows that monolingual children generally make more errors than bilingual children in three different areas out of five: in the grammatical area ( $19.5 \%$ against $17.8 \%$ ), in the
morphological area ( $60 \%$ against $48.2 \%$ ) and in the lexicon ( $6.4 \%$ against $3.2 \%$ ). Both samples of children make the same number of semantic errors ( $2.3 \%$ for bilinguals and $2.2 \%$ for monolinguals). Finally, bilingual children make more phonological errors than monolingual children ( $28.5 \%$ against $11.9 \%$ ), as summarised in Table 22, and illustrated in Diagrams 20.

|  | Grammatical <br> errors (\%) | Morphological <br> errors (\%) | Semantical <br> errors (\%) | Phonological <br> errors (\%) | Lexical <br> errors <br> (\%) |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Bilingual <br> children | 17.8 | 48.2 | 2.3 | 28.5 | 3.2 |
| Monolingual <br> children | 19.5 | 60 | 2.2 | 11.9 | 6.4 |

Table 22: Percentage of errors, bilingual children compared to monolingual children.


Diagram 20: Percentage of errors made by bilingual compared to monolingual children.

Moreover, the analysis of the mean for the two samples represented in Tables 23 and 24 show that bilingual children generally make fewer errors in comparison to their monolingual peers. When analysing the SD per error, we notice that bilingual children's semantic and lexical errors are closer to 0 than to the mean, which means that the data are very homogenous and clustered around the mean; the analysis of the SD for the other errors for bilingual children are higher but remain clustered around the mean, which evidences the heterogeneity of the data. In comparison, monolingual children's SD for the semantic errors is also closer to 0 , whereas all the other SD are closer to the mean. These figures show that the children, whether they are bilingual or monolingual, make random mistakes that are not linked to their age, or the languages they speak. When analysing the percentage of the different errors, we however notice a raise in the bilingual children's phonological errors, whereas monolingual children's raise in errors concerns the lexical field. All the other errors are approximately equivalent in percentage.

|  | Monolingual children |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | D. | C. | B. | M. | P. | Le. | AF. | R. | N. | G. | AE. | La. | Total numberof <br> errors | Mean | Standard <br> Deviation <br> \% (SD) |
| Grammatical errors \% (Number of words) | $\begin{aligned} & \hline 9.8 \\ & (23) \end{aligned}$ | $\begin{aligned} & 2.1 \\ & (5) \end{aligned}$ | $\begin{array}{\|l} \hline 1.3 \\ \text { (3) } \end{array}$ | $6$ (14) | $\begin{aligned} & 9 \\ & (21) \end{aligned}$ | $\begin{aligned} & 9 \\ & (21) \end{aligned}$ | $\begin{aligned} & \hline 8.5 \\ & (20) \end{aligned}$ | $\begin{array}{\|l\|} \hline 17.9 \\ (42) \end{array}$ | $\begin{aligned} & 20.9 \\ & (49) \end{aligned}$ | $\begin{aligned} & \hline 3 \\ & (7) \end{aligned}$ | $\begin{array}{\|l\|} \hline 6 \\ (14) \end{array}$ | $\begin{aligned} & \hline 6.4 \\ & (15) \end{aligned}$ | 203 | 19.5 | 5.9 (13.9) |
| Morphological errors \% (Number of words) | $\begin{aligned} & \hline 3.5 \\ & (25) \end{aligned}$ | $\begin{aligned} & 0.4 \\ & (3) \end{aligned}$ | $\begin{aligned} & 0.6 \\ & (4) \end{aligned}$ | $\begin{aligned} & 2.5 \\ & (18) \end{aligned}$ | $\begin{aligned} & \hline 7.2 \\ & (52) \end{aligned}$ | $\begin{aligned} & 4.6 \\ & (33) \end{aligned}$ | $\begin{aligned} & \hline 5.3 \\ & (38) \end{aligned}$ | $\begin{aligned} & \hline 31.9 \\ & (229) \end{aligned}$ | $\begin{aligned} & \hline 21.9 \\ & (157) \end{aligned}$ | $\begin{array}{\|l\|} \hline 8.4 \\ (60) \end{array}$ | $\left.\begin{array}{\|l\|} \hline 10.6 \\ (76) \end{array} \right\rvert\,$ | $\begin{aligned} & 3.2 \\ & (23) \end{aligned}$ | 718 | 59.8 | 9.4 (67.6) |
| Semantical errors \% (Number of words) | $\begin{aligned} & 19.2 \\ & (5) \end{aligned}$ | 0 | $\begin{array}{\|l} \hline 3.8 \\ (1) \end{array}$ | $\begin{array}{\|l\|} \hline 3.8 \\ (1) \end{array}$ | 0 | $\begin{array}{\|l\|} \hline 3.8 \\ (1) \end{array}$ | $\begin{array}{\|l} \hline 3.8 \\ (1) \end{array}$ | $\begin{aligned} & \hline 38.5 \\ & (10) \end{aligned}$ | $\begin{aligned} & 11.5 \\ & \text { (3) } \end{aligned}$ | $\begin{aligned} & 11.5 \\ & (3) \end{aligned}$ | $\begin{aligned} & 3.8 \\ & (1) \end{aligned}$ | 0 | 26 | 2.2 | 11.1 (2.9) |
| Phonological errors \% <br> (Number of words) | $\begin{aligned} & \hline 4.9 \\ & \text { (7) } \end{aligned}$ | $\begin{aligned} & 2.1 \\ & (3) \end{aligned}$ | $\begin{array}{\|l} \hline 2.1 \\ \text { (3) } \end{array}$ | $\begin{aligned} & 21.8 \\ & (31) \end{aligned}$ | $\begin{aligned} & 14.1 \\ & (20) \end{aligned}$ | $\begin{aligned} & 5.6 \\ & (8) \end{aligned}$ | $\begin{array}{\|l\|} \hline 38 \\ (54) \end{array}$ | $\begin{array}{\|l\|} \hline 3.5 \\ (5) \end{array}$ | $\begin{aligned} & 0.7 \\ & (1) \end{aligned}$ | 0 | $\begin{aligned} & 3.5 \\ & (5) \end{aligned}$ | $\begin{aligned} & \hline 3.5 \\ & (5) \end{aligned}$ | 142 | 11.8 | 11.2 (16) |
| Lexical errors \% (Number of words) | $\begin{aligned} & 2.6 \\ & (2) \end{aligned}$ | 0 | $\begin{array}{\|l} \hline 1.3 \\ (1) \end{array}$ | 5.2 <br> (4) | $\left.\begin{array}{\|l\|} \hline 18.2 \\ (14) \end{array} \right\rvert\,$ | $\begin{aligned} & 22.1 \\ & (17) \end{aligned}$ | $\begin{array}{\|l\|} \hline 19.5 \\ (15) \end{array}$ | $\begin{aligned} & 10.4 \\ & (8) \end{aligned}$ | $\begin{aligned} & \hline 13 \\ & (10) \end{aligned}$ | $\begin{aligned} & 1.3 \\ & (1) \end{aligned}$ | $\begin{aligned} & \hline \begin{array}{l} 6.5 \\ (5) \end{array} \end{aligned}$ | 0 | 77 | 6.4 | 8.1 (6.2) |

Table 23: Errors made by each monolingual child in link to the SD and the mean.

|  | Bilingual children |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | V. | P. | $\mathbf{S a}$. | A. | I. | La. | Sh. | Je. | Jo. | Le. | G. | 0. | Total number of errors | Mean | Standard Deviation \% (SD) |
| Grammatical errors \% (Number of words) | $\begin{aligned} & \hline 3.4 \\ & (7) \end{aligned}$ | $\begin{aligned} & \hline 9.4 \\ & (19) \end{aligned}$ | 1 (1) | $\begin{aligned} & \hline 4.9 \\ & (10) \end{aligned}$ | $\begin{aligned} & \hline 5.4 \\ & (11) \end{aligned}$ | $\begin{aligned} & 11.3 \\ & (23) \end{aligned}$ | $\begin{aligned} & \hline 4.4 \\ & (9) \end{aligned}$ | $\begin{aligned} & \hline 5.9 \\ & (12) \end{aligned}$ | $\begin{aligned} & 23.2 \\ & (47) \end{aligned}$ | $\begin{aligned} & 11.8 \\ & (24) \end{aligned}$ | $\begin{aligned} & 12.3 \\ & (25) \end{aligned}$ | $\begin{aligned} & \hline 6.9 \\ & (14) \end{aligned}$ | 203 | 16.9 | 5.9 (11.9) |
| Morphological errors \% (Number of words) | $\begin{aligned} & \hline 5.5 \\ & (30) \end{aligned}$ | $\begin{aligned} & \hline 2 \\ & (11) \end{aligned}$ | $\begin{aligned} & 2 \\ & (11) \end{aligned}$ | $\begin{aligned} & \hline 6.9 \\ & (38) \end{aligned}$ | $\begin{aligned} & 4 \\ & (22) \end{aligned}$ | $\begin{aligned} & \hline 6.6 \\ & (36) \end{aligned}$ | $\begin{aligned} & \hline 4.4 \\ & (24) \end{aligned}$ | $\begin{aligned} & 17.3 \\ & (95) \end{aligned}$ | $\begin{aligned} & 24.8 \\ & (136) \end{aligned}$ | $\begin{aligned} & \hline 5.8 \\ & (32) \end{aligned}$ | $\begin{aligned} & 13.5 \\ & (74) \end{aligned}$ | $\begin{aligned} & \hline 7.3 \\ & (40) \end{aligned}$ | 549 | 45.8 | 6.8 (37.5) |
| Semantical errors \% (Number of words) | $\begin{aligned} & 15.4 \\ & (4) \end{aligned}$ | $\begin{aligned} & \hline 7.7 \\ & (2) \end{aligned}$ | 0 | 11.5 <br> (3) | $\begin{aligned} & \hline 7.7 \\ & (2) \end{aligned}$ | 7.7 <br> (2) | $\begin{aligned} & 11.5 \\ & (3) \end{aligned}$ | $7.7$ <br> (2) | $\begin{aligned} & 3.8 \\ & (1) \end{aligned}$ | 0 | $\begin{aligned} & 26.9 \\ & (7) \end{aligned}$ | 0 | 26 | 2.2 | 7.7 (2) |
| Phonological errors \% (Number of words) | $\begin{aligned} & 3.1 \\ & (10) \end{aligned}$ | $\begin{aligned} & 0.9 \\ & (3) \end{aligned}$ | $\begin{array}{\|l\|} \hline 7.1 \\ (23) \end{array}$ | $2.2$ <br> (7) | $\begin{aligned} & \hline 5.2 \\ & (17) \end{aligned}$ | $\begin{aligned} & 36.9 \\ & (120) \end{aligned}$ | $\begin{aligned} & \hline 3.1 \\ & (10) \end{aligned}$ | $\begin{aligned} & 10.8 \\ & (35) \end{aligned}$ | $\begin{aligned} & 25.5 \\ & (83) \end{aligned}$ | $\begin{aligned} & 1.5 \\ & (5) \end{aligned}$ | $\begin{aligned} & \hline 2.5 \\ & (8) \end{aligned}$ | $\begin{aligned} & \hline 1.2 \\ & (4) \end{aligned}$ | 325 | 27.1 | 11.3 (36.8) |
| Lexical errors \% (Number of words) | $\begin{aligned} & \hline 2.8 \\ & (1) \end{aligned}$ | $\begin{aligned} & \hline 2.8 \\ & (1) \end{aligned}$ | $19.4$ <br> (7) | $5.6$ <br> (2) | 0 | $\begin{aligned} & 8.3 \\ & (3) \end{aligned}$ | 0 | 11.1 <br> (4) | $\begin{aligned} & \hline 2.8 \\ & (1) \end{aligned}$ | $\begin{aligned} & 19.4 \\ & (7) \end{aligned}$ | $\begin{aligned} & 13.9 \\ & (5) \end{aligned}$ | $\begin{aligned} & 13.9 \\ & (5) \end{aligned}$ | 36 | 3 | 7.1 (2.6) |

Table 24: Errors made by each bilingual child in link to the SD and the mean.

Examples of grammatical error:
50) CHI: mais vous dois * mais euh mais je je veux vous dois je veux toi dois mort quand je suis un adulte parce te je parce te si vous étez morts tand on était * et moi étaient enfants tell mama ou papa de habiter avec *
51) CHI: I nearly falled down the stairs .
52) CHI: she brung [: brought] [*] me a wee dog .

Examples of morphological error:
53) CHI: une voiture vert
54) CHI : regarde qu'est je vais faire .
55) CHI: (il) faut faire une autre tour maintenant .

Examples of lexical error:
56) CHI: and that one is for (é)cole
57) CHI: et là (j)e vais manger .
58) CHI: cooler+bear [: polar bear] [*] .

Examples of semantic error:
59) CHI: I feed the bottle
60) CHI ne pas des chevaux **
61) $\mathrm{CHI}^{* *}$ chair and ${ }^{* * * *}$ change it their rainbow taco

Examples of phonological error:
62) CHI so il pouait pas le mette dans son on satados
63) CHI: pi [: puis] moi aussi .
64) CHI: xxx parce qu'on rate, on rate les feuilles mordes

These results go against our initial hypothesis stating that bilingual children's main errors may be in the lexical and phonological areas. In the first case, it would be because of the wider lexicon they can choose from in both their linguistic systems. In the second one, their pronunciation might be affected by the presence of the two linguistic systems. Bilingual children may also make fewer errors in the semantic and grammatical fields, closely related to executive functions.

The results therefore show that bilingual children make numerous mistakes in the phonological field while they make fewer mistakes in the grammatical, morphological, and lexical fields than monolingual children. The two groups of children make the same rate of errors in the semantic field.

## II.4.3. Discussion on errors

This study has shown that in the language development of both bilingual and monolingual children, bilingual children have the advantage over the control sample. Indeed, as a continuation of what Kaushanskaya (2018) states, bilingual children do make more
phonological (or what she calls "surface") errors as well as slightly more semantic errors. Yet, whereas she found bilingual children making significantly more semantic errors than monolinguals, we found that the rate of errors between the two samples in the semantic field was very similar ( $2.3 \%$ for bilinguals and $2.2 \%$ for monolinguals).

Other types of errors we have not mentioned in our study have been analysed before, such as the liaisons in French by Chevrot \& Fayol (2001). The analysis on the French language requires other transcription granularities since more precise phonological elements would have to be transcribed. They have analysed a little girl's monolingual speech between $2 ; 1$ and $3 ; 6$, and have found that she tends to make either substitutions or additions in her speech regarding liaisons between words in French. They explain that the little girl was making more $/ \mathrm{n} /$ substitutions and additions in her speech, as summarised in Illustration 19. According to them, the reason for $/ \mathrm{n} /$ being used more often than $/ t /$ or $/ \mathrm{z} /$ is that " $[t]$ he availability of $/ \mathrm{n} /$ would therefore appear to result from the interaction of the frequency factor - which penalizes $/ \mathrm{t} /$ - and the order of acquisition - which penalizes /z/".

|  | $/ \mathbf{l /} /$ | $/ \mathbf{n} /$ | $/ \mathbf{t} / /$ | $/ \mathbf{z} /$ | Chi square (theoretical balanced <br> distribution for $/ \mathrm{l} /, / \mathrm{n} /, / \mathrm{t} / / \mathrm{z} /$ ) |
| :---: | :--- | :--- | :--- | :--- | :---: |
| Substitutions | 13 | 188 | 30 | 45 | Chi2 $=281, \mathrm{p}<0.001$ |
| Additions | 37 | 226 | 32 | 94 | Chi2 $=251, \mathrm{p}<0.001$ |

Illustration 19: Frequency of $/ l /, / n /$, $/ t /$ and $/ z /$ in the substitutions and additions" (Chevrot \& Fayol, 2001).

Such study could be made with bilingual children as well, which could easily show if bilingual children make more mistakes in that area and evidence a confusion to some degree. The analysis of phonological errors in bilingual children's speech could, for example, help with the diagnosis of speech sound disorders (SSD) if it was found that
bilingual children were making other types of errors in comparison to monolinguals for example.

Goldstein \& Gildersleeve-Neumann (2015: 238) have shown that there is a misconception regarding bilinguals' speech sound development in comparison to monolinguals, as it is "often thought to be slower than that of monolingual children", which has however been disproved in a number of following studies "especially if a longitudinal view of acquisition is considered". Expanding the research regarding the "normal" errors made by bilingual children will help those with a SSD to be properly diagnosed. When a bilingual child with SSD follows a treatment, it is explained that " $[\mathrm{h}]$ ow each language is treated may differ depending on the child and the situation, with some children with SSD needing direct intervention in both languages throughout and others primarily receiving direct intervention in one language with the other language(s) treated through brief carryover activities or homework assignments" (2015: 242). The types of deficits that can be found, for example, in a bilingual child with SSD are "articulatory, phonological, motor planning, or a combination of these", and would be present in the languages the child uses. They also mention that it is crucial to evaluate the child's language environment in order to "determine which [one] is optimal for the bilingual treatment, as well as which language environment(s) are effective" (Goldstein \& Gildersleeve-Neumann, 2015: 242).

Regarding the analysis of the errors' SD in link with the mean, we found that bilingual children generally make fewer errors than monolingual children. Bilingual children's errors are regrouped mostly around the phonological field whereas monolingual children's errors are mostly in the lexical field.

With our results, we could wonder if the greater capacity of bilingual children to master such different areas of language (grammatical, morphological, and lexical) while monolinguals master better the semantic (to a rather small degree) and phonological areas, has to do
with the brain development of the children navigating the use of two languages for bilinguals. Could it also be linked to bilinguals' neurological areas found in them having a greater executive function?

This study could greatly benefit from larger samples of both bilingual and monolingual children. The bilingual children should be balanced and all children should be considered at the same age, to ensure that the comparison is not impacted by the age development of language.

## II.5. Intelligibility of children according to age

In this subsection, we will analyse the pronunciation of words, since articulation is also part of language development. Children learn the right way to pronounce words as they grow, starting with the approximate pronunciations of certain words, until managing to master the most complex articulations. We will examine whether bilingual and monolingual children have a harder time pronouncing words. We will determine the rate of unintelligible sentences according to the samples of children (bilingual vs monolingual). The original study by Genesee et al. (1996) found that " $11 \%$ of Je.'s utterances were unintelligible, [...]. 29\% of Jo.'s, and $29 \%$ of Le.'s".

## II.5.1. Method for the analysis on intelligibility

For this analysis, we will be counting the number of utterances which were not fully intelligible, excluding the ones that were covered by a sound in the environment. Our hypothesis is that bilingual children will have fewer unintelligible materials since they have the possibility to CS to complement what is supposedly missing in a sentence.

## II.5.2. Analysis of unintelligible sentences and results

In our study, we found that bilingual children's total unintelligible material makes up $18.3 \%$ of all bilingual material, while monolingual children's unintelligible material makes up for $9.2 \%$ of all monolingual material, as detailed in Table 25, and illustrated in Diagrams 21 and 22.

| Bilingual <br> children | Age <br> (months) | Unintelligible \% <br> (number of <br> utterances) | Monolingual <br> children | Age <br> (months) | Unintelligible \% <br> (number of <br> utterances) |
| :--- | :--- | :--- | :--- | :--- | :--- |
| V. | 54.5 | $0.3(19)$ | D. | 49 | $0.1(8)$ |
| P. | 36 | $0.4(26)$ | C. | 51 | $1.2(119)$ |
| Sa. | 59.5 | $0.2(14)$ | B. | 48 | $0.1(10)$ |
| A. | 57.5 | $0.3(20)$ | M. | 33.6 | $1.5(151)$ |
| I. | 53 | $0.6(37)$ | P. | 36.3 | $0.7(68)$ |
| La. | 52.5 | $0.3(19)$ | Le. | 41.3 | $0.3(35)$ |
| Sh. | 30 | $0.6(31)$ | AF. | 37 | $0.4(46)$ |
| Je. | 22.5 | $3.1(190)$ | R. | 34.3 | $0.7(67)$ |
| Jo. | 28 | $6.1(367)$ | N. | 35.3 | $1.4(143)$ |
| Le. | 23.5 | $4.6(275)$ | G. | 34.3 | $0.9(91)$ |
| G. | 33 | $1.2(74)$ | AE. | 33 | $1.2(127)$ |
| O. | 31.5 | $0.6(32)$ | La. | 34 | $0.7(69)$ |
| Total <br> bilinguals |  | $18.3 \%(1104)$ | Total <br> monolinguals |  | $9.2 \%(934)$ |
| Total of <br> bilingual <br> utterances |  | 6021 | Total of <br> monolingual <br> utterances |  | 10147 |
| Mean |  | 1.5 | Mean |  | 0.8 |
| Standard <br> Deviation | 2 | Standard <br> Deviation |  | 0.5 |  |
| Mean <br> without <br> Jo., Je. <br> and Le. | 0.5 |  |  |  |  |
| Standard <br> Deviation <br> without <br> Jo., Je. <br> and Le. |  |  |  |  |  |

Table 25: Unintelligible utterances for each bilingual and monolingual child.

We found that bilinguals produce a greater amount of unintelligible material ( $18.3 \%$ out of the $81.7 \%$ of all intelligible utterances). This could be explained by the fact that their access to two linguistic systems make it more difficult for them to develop their pronunciation in comparison to monolinguals who have $9.2 \%$ of unintelligible materials out of the $90.8 \%$ of all intelligible utterances). This statement is especially true in the current analysis for younger bilingual children (between 22.5 months and 28 months old) since they are the ones producing more unintelligible utterances as visible in Diagrams 21 and 22, and detailed in Table 25 with the analysis of the mean.


Diagram 21: Unintelligible materials of bilingual children compared to the total of bilingual children's utterances.


- Total monolinguals unintelligible
- Total intelligible

Diagram 22: Unintelligible materials of monolingual children compared to the total of monolingual children's utterances.

Regarding the analysis of the SD and the mean for the unintelligible material, we found that nine out of the twelve bilingual children are situated under the mean of $1.5 \%$, which shows that their progression is more linear than monolinguals (Table 25). Monolinguals have a mean of $0.8 \%$, and seven children are situated under this mean. The results here show that there is a greater number of unintelligible utterances in bilingual children's production than in monolinguals', but we can notice that if we remove the younger bilingual children, they all have approximately the same number of unintelligible utterances, in comparison to monolingual children, who are more heterogenous in their production of unintelligible utterances. If we remove the three bilingual children who produce the greatest number of unintelligible material (Je., Jo., and Le.), we found a mean of 0.5 : all of them would be close to the mean and remain under the mean. Moreover, we can also notice that without the three younger children, the mean and the SD would be under the one of monolinguals, and would therefore get closer to 0 . This proves the homogeneity of the bilingual children's production of unintelligible utterances in comparison to monolinguals as visible in Diagrams 23 and 24. It is here interesting to notice that even though bilinguals produce a greater amount of unintelligible materials, more children from this sample are located under the mean in comparison to monolingual children. Moreover, bilingual children's mean would still be under monolingual's mean if we were to remove the three younger monolingual children. The results from bilinguals are due to fewer children making more unintelligible material than monolinguals who, even though they have fewer of these materials in total, have a higher number of children making these mistakes.

However, seeing the small size of our samples, and the situation of the data collection, this analysis should be done again with a greater number of children, both monolingual and bilingual. It should be done also with a better material since the lower quality of our recordings led
to not understanding some sentences due to some sound or noise made when the children were speaking.


Diagram 23: Unintelligible sentences for bilingual children in relation to the mean.


Diagram 24: Unintelligible utterances for monolingual children in relation to the mean.

## II.5.3. Discussion on intelligibility

In coherence with our own analysis of unintelligible utterances, who Goldstein \& Gildersleeve-Neumann (2015) mention several studies (Dodd, So, \& Wei, 1996; Gildersleeve-Neumann, Kester, Davis, \& Peña, 2009; and Goldstein \& Washington, 2001) that show lower proficiency and language skills and use in bilingual children than in monolingual children. Gildersleeve-Neumann, Kester, Davis, and Peña (2009) "showed an overall lower intelligibility rating, made more consonant and vowel errors overall, and produced more uncommon error patterns". Moreover, Goldstein \& Washington (2001) found, in a study on 4-year-old children, that "the bilingual children were significantly less accurate than monolingual children on three sound classes in Spanish (spirants, flap/tap, and trill in Spanish)".

These studies' coherence with our own analyses regarding intelligibility in bilingual and monolingual children show that there is a possibility that the fact of bilingualism may bring a disadvantage regarding elocution in children under the age of 5 .

On the other hand, a few studies have also shown bilingualism to be an advantage regarding pronunciation, such as "Grech and Dodd (2008) [who have] found that the bilingual children showed higher consonant accuracy and fewer error patterns in comparison to monolinguals". For example, Goldstein \& Washington (2001) explain that bilingual children's "skills are commensurate with those of monolingual peers. Such results have been seen in Spanish-English bilingual children and in Russian-English bilingual children (Gildersleeve-Neumann \& Wright, 2010)" as reported in Goldstein \& Gildersleeve-Neumann (2015). Moreover, they state that "[c]ommensurate skills across the bilingual and monolingual groups have extended to overall consonant accuracy, accuracy on sound classes, word-shape
complexity, phonetic inventories, and percentages of occurrence for phonological patterns". Finally, they also state that "[o]verall, findings from these studies showed that bilingual children generally exhibited a similar rate of acquisition compared to monolinguals and that their speech sound skills were within normal limits compared to monolingual peers", which goes against our current findings.

One of the reasons for this difference in conclusion is that the qualities of the recordings were not similar, which means that our current analysis of unintelligible utterances and/or words should be reproduced with a better material, and on site in order to be able to have more control over the quality of the recordings.

Moreover, regarding the analysis of the SD and the mean for the unintelligible material, we found that even though bilingual children produce more unintelligible utterances than monolinguals, this is only due to three of the children, whereas more monolingual children produce unintelligible utterances. We found that if we removed the three bilingual children (who are also the youngest) who produce the greatest number of unintelligible utterances, the mean and the SD would be under monolinguals' own mean and SD. This would also still be the case if we were to remove the two youngest children's samples. This has helped us show the homogeneity of the bilingual children's production of unintelligible utterances.

## II.6. Transfers in phonology

Müller (1998) states that transfers in phonology are mainly language interferences which she calls "relief strategy", used by bilingual children in order to overcome any "ambiguous input". Therefore, all the correct possibilities that exist from the child's eyes, with possible overlap of the two languages. What could be considered errors in bilinguals may be transfers by the sole fact that these children have knowledge in another language, therefore creating a bridge between
the two languages. However, bilingualism cannot solely account for all errors made by children as these errors also exist in monolingual's speech (cf. Chapter II.4.).

Transfers can happen two ways, either there is a mark left from the first language onto the switched language, or, by anticipation, there is a mark onto the first language from the switched language. This is called the place of articulation.

CS and transfer must be distinguished since CS is conscious and purposefully used whereas transfer happens against the speakers' will, an aspect which will be detailed later on. The former is controllable while the latter is not. Moreover, code-switched items appear obvious and distinguished whereas transfers can be barely noticeable. CS has already been defined at the beginning of the study as "the alternation of two languages within a single discourse, sentence or constituent" (Poplack, 1980: 583). Transfer does not take the form of a word, but rather of a trace left from one language onto the other at the place of the articulation. CS can exist without transfer, but transfer is completely dependent on the use of CS.

Several authors have developed and pursued different types of transfers, with no phonetic interactions. Grosjean \& Miller (1994: 204-205), for whom there is no effect of CS as regards French-English bilinguals, explain that "there is no apparent trace of the base language at the onset of the code-switch". Their main conclusion focuses on the great flexibility of bilinguals as well as their precision "when going in and out of a code-switch". This can show high competence of languages in bilinguals since they are apparently able to CS without leaving a trace on either of the two languages, at the place of articulation.

Olson (2016: 264-267) also reports that different types of transfers were found, especially unidirectional transfers (Bullock et al., 2006) where it was discovered that early L2-dominant Greek-English bilinguals have showed a possible unidirectional influence of L1 on

L2, whereas Bullock \& Toribio (2009) found bi-directional transfers, while González-López (2012) found transfers at the place of articulation. Transfers at the place of articulation were however the focus of studies about simultaneous bilinguals (Balukas \& Koops, 2014) and sequential bilinguals (Bullock et al.,2006). Simultaneous bilinguals are the ones of interest in the current study. Finally, Simonet (2014) has reported CS effects (on the vowel height of two Catalan back vowels) on early Catalan-Spanish bilinguals whether they were Spanish-dominant or Catalan-dominant.

Several words can be used by researching to describe the phenomenon. To clarify, we can mention Treffers-Daller (2009: 59) who explains, in Bullock \& Toribio (2009), that all the terminologies hereafter quoted are one and the same, but they are used and developed by several researchers in many fields of study.

Treffers-Daller (2009) believed this information was worth mentioning as different people and researchers study items with different labels, without necessarily being aware that they are all working on the very same item:

- "interference" is used by psycholinguists
- "transfer/cross-linguistic influence" by researchers on SecondLanguage Acquisition
- "convergence"; "inter-systemic influence"; or "substrate / superstrate / adstrate influence" by researchers of contact-induced language chance.

A few authors have proven the existence of transfer to a certain degree, among whom we can quote Hlavač (1999:39) who states that "Australian English vowel phonemes not found in Croatian (e.g., select monophthongs, diphthongs, triphthongs) are nearly always replaced by Croatian vowel phonemes which are closest to them in terms of place of articulation, i.e., partial or compromise transphonemisation in Filipović's (1978) terms".

It is also possible to measure the value of the Voice Onset Time (VOT) (cf. Chapter I.4.), which, as explained by Wee \& Cheung (2009: 1-2), is "the time interval between the release of a stop and the beginning of vocal fold vibration". Their explanation is that this interval exists thanks to the clear distinction between "the voicing and closure mechanisms". They describe it as the closure that happens when all the articulators stop the air from flowing, and that "occur[s] at the region which is above the larynx". On the other side, the vibration happens "at the larynx, which houses the vocal folds". It either releases a voiced phoneme by having " $[t]$ he vocal folds [...] close together loosely so they can vibrate" (b/d/g), or a voiceless where " $[t]$ he vocal folds are wide apart so that air passes freely" ( $p / t /$ $\mathrm{k})$. These voiced and voiceless phonemes are measured in milliseconds (ms. ${ }^{37}$ ). Wee \& Cheung (2009: 3) explain that "VOT only concerns stops that are followed by voiced segments".

Elias et al.'s study (2017: 3) on Spanish-English bilinguals' voiceless stops shows results proving that:
> "despite maintaining separate phonological systems, the early bilinguals' VOT values exhibited convergence in the direction of the opposite language; this is to say, when code-switching from Spanish to English, the early bilinguals had shorter English VOT values, while when code-switching from English to Spanish these participants had longer Spanish VOT values.".

Balukas \& Koops (2014), quoted in Elias et al. (2017: 3) found that when bilinguals were switching from Spanish to English, an anticipation transfer was visible, therefore showing "reduced VOT values in the English tokens that were closer to the switch site", whereas they did not find similar results for Spanish tokens. This means that the four authors have indeed found a CS effect at the place of articulation. The results, also found in Piccinini \& Arvaniti (2015), were showing that "the voiceless stops, both in English and in Spanish, in code-switching utterances had shorter VOT values before
and after the switch than voiceless stops in monolingual English and in monolingual Spanish utterances" (Elias et al., 2017: 3). This is visible in both CS and monolinguals sessions. Elias et al. (2017: 3) came to the same conclusions as Piccinini \& Arvaniti (2015: 130) on the fact that CS could provide a "significant effect on the phonetic production of bilinguals". However, both English and Spanish react differently whether they are close to a post CS point or far from it. In English tokens, "the greater the distance [...], the higher (more English-like) VOT durations become". Spanish tokens, on the other hand, do not evidence great modifications in their durations according to their position with a post CS (Piccinini \& Arvaniti, 2015: 129).

It is important to mention that English is a long-lag VOT language at more than 30 msec and Spanish is a short-lag VOT language at between 0 and 30 msec . This means that according to their findings, the various authors have indeed proven the existence of unidirectional (Bullock et al., 2006; Balukas \& Koops, 2014) as well as bidirectional (Bullock \& Toribio, 2009) transfers. Indeed, Elias et al. (2017: 3) explain that "[i]n both Bullock \& Toribio [(2009)] and Piccinini \& Arvaniti [(2015)] the introduction of English via codeswitching lengthened the VOT of Spanish voiceless stops. [...]" Elias et al.'s conclusion (2017: 3) is that "the introduction of English via code-switching produces statistically significant differences in the vowel quality between the two language sessions", therefore leading English to influence the Spanish token that follows an English to Spanish CS ${ }^{38}$.

[^24]VOT Durations:
Separated by Language and Context


Illustration 20: Boxplots of tokens separated by language and context (Piccinini \& Arvaniti, 2015: 130).


Illustration 21: "Boxplots of tokens separated by language and task." Piccinini \& Arvaniti (2015: 130)

Illustrations 20 and 21 from Piccinini \& Arvaniti (2015: 130) clearly support the statement made above, evidencing a CS effect on VOT in bilinguals. In their study summarised by these two illustrations, they found that " $[t]$ he effect of language was significant $[\mathrm{p}<0.05]$ for all speakers, with Spanish tokens having shorter VOTs than English
tokens". On the other hand, they found that " $[t]$ he effect of context was significant $[\mathrm{p}<0.05]$ for three of the six speakers" and that " $[t]$ he interaction of language and task was significant for four out of six speakers". They also state that the lack of effects for the other two people were most likely due to data scarcity.


Illustration 22: "Mean VOT by place of articulation for English and Spanish by distance from code-switch with standard deviations for (a) /p/, (b) /t//, and (c) /k/. Negative numbers correspond to pre- switch and positive numbers post-switch; zero is dual-switch." (Piccinini \& Arvaniti, 2015: 131)

Balukas \& Koops (2014) also found a similar effect for English VOT as "their speakers, for whom dominance was not clear, had rather short VOTs in English [...]".

As a result, it is possible to say that despite the early studies in which Grosjean \& Miller (1994) concluded to the non-existence of any type of transfers, many further studies have proven the existence of some types of unidirectional (Bullock et al., 2006; Balukas \& Koops, 2015) and bi-directional (Bullock \& Toribio, 2009) transfers. Following the previous study report on phonological transfers in simultaneous bilinguals, we will mainly focus on Piccinini \& Arvaniti's results (2015) and their meaning, but we will also develop on acceleration and delay transfers.

To summarise the difference between CS and transfer, the latter cannot be heard by the auditory analysis and a special tool in needed to evaluate the degree of transfer during a CS. Indeed, there can be CS with no transfer, but transfer is dependent on the use of CS since it happens at the border between the two languages. Whether it be "relief strategies" (Müller, 1998), or not, transfers are a bridge between the two spoken languages and is measured thanks to the VOT tools.

Although it was not possible to measure transfers and VOT in our current study, it was relevant to mention it since it can appear during a switch. Moreover, we wish to apply this analysis on our own samples in order to know if there could be a link between transfers and language proficiency. We have mentioned some authors who did not find transfers, and others who found either unidirectional or bidirectional transfers, and a subsequent study could help understand if the presence of a transfer means a better bilingual language competence with the use of CS.

## II.6.1. Acceleration transfer

Transfers are mostly studied in comparison to monolinguals, therefore taking monolingualism as the norm. According to Müller (2017: 9), there are two different types of transfers. The first one is the acceleration transfer, or "positive transfer", in which case language A helps for the acquisition of language $B$ by speeding it up. Müller (2017: 7) also explains that "acceleration is always rooted in efficient computation in a non-linguistic sense [...]". Acceleration transfer, per its name, brings an advantageous effect into bilingualism, and the influence from one language on the other. For Müller (2017: 19), the acceleration of language acquisition means a precocious appearance of certain grammatical properties, in comparison to monolinguals. Müller (2017: 10) explains that both acceleration transfer and delay transfer (see below) "are observable effects, the reason of which is the fact that bilinguals have to suppress competing information". One main reason for acceleration transfer is that bilinguals have a greater cognitive experience than monolinguals especially regarding executive function (cf. Chapter II.2.2.) (Bialystok, 2014, 2016). Müller (2017: 19) explains that however rare acceleration transfer is, it can enable the (unbalanced) bilingual child to have a faster grammatical development than a monolingual child. It is also used by the bilingual child with a linguistic delay to improve his weak language thanks to his strong language, in order to catch up with the monolingual child's development. This is of course taking monolingualism as the norm and assuming bilingual children indeed have a slower language development in comparison to monolingual children. It seems rather obvious that acceleration transfer would be more visible - and therefore easier to study - in unbalanced bilingual children since it would be more visible in their daily language use. In order to prove acceleration transfer to be mainly due to crosslinguistic influence in bilinguals, Müller (2017: 24) states that if it is "never due to cross-linguistic influence, it should be observable in all kinds of bilinguals, balanced and unbalanced. It should also be
independent of the language combination". In a more in-depth study, we envisage to analyse the possible transfers in order to understand if the unbalanced bilinguals in our sample (V., P., Je. and Le.) use CS to take advantage of the benefits of acceleration transfer, which would mean that there is some part of awareness in the use of CS for the purpose of acceleration transfer.

## II.6.2. Delay transfer

Müller (2017: 7) proposes that delay, or "negative transfer", "can be due to cross-linguistic influence on the competence or the performance level and to the mere cognitive burden to process two languages". Müller (2017: 7) states that delay can usually be occurring during interference "due to computational complexity". Delay transfer, in comparison to acceleration transfer, is detected more often since it is obvious in bilinguals. With delay transfer, there is a negative impression on bilingualism, as it evidences the influence of one language on the other. Müller (2017: 9) explains that language B will usually reduce the speed of acquisition of language A. That is "where [the] development is slowed down due to the transmission of grammatical knowledge from language A to language B which results in target-deviant grammatical representation in language B". Müller (2017: 12-13) states that one of the reasons that could put forward delay transfer is the sole fact that bilinguals have to make a daily choice between two languages. Their access to each language system is reduced in comparison to monolinguals' access to their one linguistic system. The very reason why bilingual children have greater results in non-linguistic skills than monolinguals also seems to be the very reason why they have less access to lexical contents. It indeed "requires inhibition of the linguistic form of the non-target language" (Müller, 2017: 13). This means that the mere fact of bilingual children having to make a daily selection between two linguistic systems also creates a delay in their selecting a lexical system.

Müller's main conclusion (2017: 24) regarding delay transfers is that "[d]elay may or may not depend on the language combination and should be observed in a more articulated manner in the balanced bilinguals". In her study, Müller (2017: 14) clearly explains that while monolinguals will be using omissions (not using a word that should be used, for example "went out?" instead of "Papa went out?") and placeholders (which are words used to replace others but that do not hold the same importance in a sentence such as the word "thing" or "stuff" used mainly when the original item's word has been forgotten) in case of linguistic gaps, bilinguals will have the possibility to use their second-language as a gap-filler for the first one.

Müller (2017: 14) describes the possibility of "delay exceeding monolingual limits" due to either language dominance, computational complexity, or processing limitations. According to her, in the first possibility, the dominated or "weak" language in its entirety is used less than the dominant language. (2017: 14). As a second possibility, the author explains that acquisition delay can be intrinsically rooted in the very fact of bilingualism regardless of balanced or unbalanced bilingualism. A bilingual child will naturally go towards the easiest production, which can also happen to result in it being the least developed language. In the third possibility envisaged by Müller, finally, delay can exist because bilingual children might need longer to process two languages, unlike monolinguals (2017: 16).

If the bilingual child was to go to the more complex system, it would require more thinking and would therefore decrease the spontaneity of the conversation. From here on, we can conclude that there is indeed a certain degree of cross-linguistic influence, whether it be because of a dominant language, a simplicity of production, or processing problems. The mere fact of having two languages puts the bilingual child in a slightly harder linguistic production position. Müller (2017: 17) explains that "[c]ross-linguistic influence caused by processing limitations will lead to delay in the language whose processing is more complex".

The conclusion in Müller's study (2017: 17) is that the sole fact that bilingualism is more time-consuming in processing vocabulary is the only explanation for the usual negative results found across studies, a result that considers monolingual speech as reference. What would be the conclusions when considering both sets of lexicons, whether it be for bilingual children, or for bilingual adults?

Moreover, could delay transfer be the stratagem for efficient communication, since, without delay transfer, there may be a breakdown in communication since the child would have a harder time switching? A further study on the analysis of our sample of bilingual children could help us understand if delay transfer may appear in bilingual speech to make communication more efficient. To do so, we would need to analyse the speech of bilingual children with both acceleration and delay transfers with the use of the VOT measure which could allow us to visualise a shorter or longer voiceless production at the place of the switch, whether it be for balanced or unbalanced bilinguals, either in a situation of acceleration or delay transfer. Moreover, we would like to make further studies based on the analysis of delay and acceleration transfers in bilingual children. It would be interesting to have more data about this as it could provide a definite proof on the importance of bilingualism, and CS, for children. Indeed, if we were able to prove that the use of CS and the fact of bilingualism was linked to acceleration transfer rather than delay transfer, then we would have a proof that bilingualism and CS have a positive effect on children's language development. These analyses could not be done on our samples because of a lack of access to the needed material.

## II.6.3. Conclusion on our results

In conclusion, the results of the current analysis have shown a great degree of CS in bilingual children. Those who participated in the study were switching languages whether they were speaking to their mother or father. We were able to specify that language awareness is not explained by only one definition since there are different types of bilingualism, and different types of language awareness, depending on whether we consider monolingual or bilingual language awareness.

Our results showed clear language awareness in bilingual children under 5 years old. We have found that our sample of bilingual children uses more French with the French-speaking adult and more English with the English-speaking adult. Putting aside the children with a strict language dominance, we could see a clear language awareness in our sample. It is however worth mentioning that Benazzo \& Morgenstern (2017, our translation) stated that "[e]ven if the bilingual child is in fact providing 'twice of much' work and despite the possible discrepancy between strong and weak language, the bilingual acquisition does not imply a significant delay in language development" ${ }^{39}$.

The children in our sample have however also used CS at one point in the transcripts: the rate of MMU (\%) and MLU (\%) has shown that the sample did not use CS as much as they could have, results also corroborated by Genesee et al. (1996: 626).

A more detailed analysis of the children's language development, with a look into their use of GW and LW, has proved that bilingual children use fewer GW, considered as advanced words, than monolinguals. The analysis of their use of nouns, verbs, prepositions and adjectives adds onto this conclusion, showing that bilingual children use more nouns and adjectives, and fewer prepositions and

[^25]verbs than monolinguals. These two studies lead to the conclusion that bilingual children under the age of 5 have a slightly slower language development than monolingual children.

Our analyses of the MMU/MLU/UB have allowed to evidence the bilinguals' language dominance but also, thanks to the UB, we found bilingual children's sentence production to be slightly higher than monolinguals, which could mean that their CS skills might allow them to produce longer sentences, although monolinguals produce more complete sentences more often.

By calculating the errors made by both bilingual and monolingual children, we have shown that bilingual children make fewer grammatical, morphological and lexical errors, almost as many semantic errors, but more phonological errors than monolingual children. Our conclusion regarding the fewer errors made by bilinguals is that their linguistic skills happen to be greater thanks to their dual languages but this same reason might be a downside to their pronunciation, hence their significant number of phonological errors compared to monolinguals.

Moreover, although the study of transfers was not feasible in the current study, they were worth mentioning since we would also like to proceed later on to further research based on transfers in trilingual children. With the hypothesis that trilingual children have a hierarchy in their languages, we would be using the VOT to evaluate this hierarchy. That way, it would be possible to analyse transfer on one or the other languages and its impact of the child's bi-multi-lingualism.

On VOT, the goal was to see if there is indeed a certain degree of transfers, and especially at the place of articulation. Bullock \& Toribio (2009), in Elias et al. (2017: 3), as well as Balukas \& Koops (2014) and Piccinini \& Arvaniti (2015), have come up with the same results that there certainly is a transfer, called "convergence", between some languages. They proved that it could be noticed before the switch. The VOTs were different, shorter if in a long-VOT language, and the
opposite if in a short-VOT language, mimicking the VOT value of the opposite language. Their overall conclusion was that there was indeed a CS effect at the place of articulation.

On transfer, Müller (2017: 10) quotes Carlson \& Meltzoff (2008), who proved that the results showed a bilingual advantage when in a situation of conflict. This correlates with Bialystok's conclusion (2016) on Peal \& Lambert (1962) who stated that bilinguals were more advantaged in non-linguistic situations. The study shows that bilinguals were performing better when competition was involved (Carlson \& Meltzoff, 2008 in Müller, 2017: 10). In their comparison of both "conflict and delay tasks", in which the "'delay tasks' require[d] the children to delay/tempera prepotent response, and 'conflict tasks' [...] require[d] children to make a novel response while inhibiting a conflicting, prepotent response" (Carlson \& Meltzoff, 2008: 284). The results showed that "[o]nly the conflict tasks revealed a bilingual advantage. [...] Bilingual children performed better on the conflict tasks that presented a choice of competing options. Competition had to be resolved in order to give the correct response.

In the study, Müller (2017: 11) also comes to the conclusion that bilingual children, by the mere fact of having to select the proper language and executive function between the two available languages, develop their cognitive functions "implicating frontal lobe processes":

> Distributed activation of language has the inconvenience that interference from the language that is not relevant becomes likely. Therefore, fluent bilinguals constantly have to inhibit the activation of the non-response language (implicating frontal lobe processes). Thus, it could be proposed that bilinguals who have growing experience with controlling language activation/inhibition have enhanced executive functioning - a capacity needed not only for language production/comprehension but also for other cognitive abilities.

Moreover, she mentions in her conclusion these two types of transfers - acceleration and delay - which do not have the same origins.

According to Müller (2017: 24), while delay may more than likely come from cross-linguistic influence with one of the bilingual child's language interfering with the other one, "acceleration exceeding the monolingual limits can be explained with the principles of efficient computation which are not language-specific [...]. It is rooted in the child's choice of efficient computation in a non-linguistic sense, the consequence of which is that the speed of acquisition looks accelerated to the linguist if compared to monolingual children".

We have previously mentioned that Bialystok et al. $(2014,2016)$ concluded on bilinguals being better than monolinguals at nonlanguage related tasks such as executive function tasks. Müller (2017) has herself concluded that the choice of a language that the bilingual child has to make is less related to language itself than it is to executive function. This would be the reason why acceleration transfer happens to have a positive effect on bilingual children's development, in comparison to monolinguals' development.

For Müller (2017), delay transfer can find its cause either in the dominance of one language over the other, or in how hard one of the languages is to process - , therefore leading the child to use the easiest one - , or even in the fact that bilingual children might need longer processing time compared to monolinguals. What can be said here is that cross-linguistic influence definitely happens (as seen mostly at the place of articulation) and can cause some type of "damage" to the child's language development.

In a study which purpose would be to analyse the language dominance, the parents should not be present. This study could be made by showing each child a set of images they would have to name as fast as possible. The results arising from this study could show which language is primarily used.

## II.7. Emergency language or linguistic skills?

In this part, we will firstly explain what simultaneous and sequential bilinguals are, and we will report the literature regarding their skills in both languages. We will then focus on simultaneous bilinguals and how they use their languages to compensate possible linguistic deficiencies, especially in unbalanced bilingualism.

## II.7.1. Simultaneous / Sequential bilingualism: nonskill in both languages?

Early bilinguals are those who have or have had fluent access to two languages from early on, therefore possessing two mother-tongues. On the other hand, sequential bilinguals are the ones who have had a later access to their second language, but have become bilinguals and therefore have one mother-tongue (or L1) and a second language (or L2). Simultaneous bilinguals can have more or less the same proficiency in both their languages depending if they are balanced or unbalanced bilinguals, whereas sequential bilinguals most of the time are more proficient in one of their languages, that is the L1 (or their L2 in the case of language attrition, which in this case, is the loss, or diminution in skill in the mother-tongue). At this point, the use of another language may come to help the speaker to express themselves in one or the other language.

We have seen that benefits seem to exist for growing up bilingual in comparison to monolingual. They have been shown to be sharper in the cognitive field, as well as with their motor skills, but they also have downsides, such as a slower language development, if compared to monolingual children taken as the norm, up to the age of 5 as seen in our current study.

In this section, we will try to understand how simultaneous and sequential bilinguals access their languages, and for which purposes.

Our main goal is to comprehend if, by using CS, they sometimes use these languages as "gap fillers", to compensate any deficiency that could appear in the other language.

The hypothesis is that the great difference existing between early and sequential bilinguals adds yet another skill to the bow of simultaneous bilinguals. The ability simultaneous bilinguals have to switch from one language to the other is anything but a lack of skills in both their languages as it was previously mentioned, regarding the great skills needed to be able to go from one linguistic system to the other, including lexical, phonetical, and grammatical aspects, amongst others. On the contrary, when focusing on the use sequential bilinguals make of their two languages, the hypothesis is that sequential bilinguals, despite their great skills in their first and second language, keep a lower skill in one or the other, therefore making one language stronger than the other. It can hence be assumed that there is a non-skill existing in sequential bilinguals as they do call onto one of their languages to support and help in the compensation of their other language by using CS. In comparison, balanced simultaneous bilinguals do not generally need to compensate one language with the other one as it allows them to consecutively use both languages with great skills.

It was previously mentioned (cf. Chapter II.6.) that transfers can be used to unconsciously fill the gaps existing between a bilingual child's main and secondary languages, and we will go into more details regarding these "gap-fillers".

When it comes to the (in)competence of bilinguals when switching from one linguistic system to the other, early reports state that children who grow up bilingual do not differentiate between their two languages until the age of 3 . They supposedly use both systems as one and the use of CS was the proof of this pre-separation period and of these children's inability to differentiate between the two systems, therefore leading to confusion (also found in Volterra \& Taeschner,

1978; Köppe \& Meisel, 1995; and Genesee, 1989). However, a few researchers, already mentioned in this study, such as Deuchar \& Quay (2001), Cantone (2007), and Nicoladis \& Genesee (1997), have proven bilingual children's ability to differentiate between their two languages, even using the lexicon from one to compensate any words lacking in the other, therefore showing great linguistic skill management.

## II.7.2. Receptive-expressive gaps

Keller et al. (2015) presented the possible reasons for a receptiveexpressive gap, stating that language familiarity hypothesis and language exposure hypothesis can be causes for the gaps to appear. Both these terms were advocated by Oller et al. (2007). Regarding the language familiarity hypothesis, on the transfers we have previously mentioned (cf. Chapter II.6.); Keller et al. (2015: 2) explain that the gaps exist more easily in linguistically related languages such as English and German, and have less chance of being created in linguistically unrelated languages like Tamil and German.

## II.7.2.1. In relation to unbalanced bilingualism

A study about the receptive-expressive gap has been developed to introduce the possibility of a linguistic deficiency in bilingual children, that is simultaneous bilinguals. As aforementioned, balanced bilingualism is rare. One can mainly encounter children (and adults) with a somewhat unbalanced bilingualism, therefore locating their two languages at two different levels of proficiency. In our study, we will speak of main and secondary languages when dealing with an unbalanced bilingualism. Pearson et al. (1993: 111) have found out that bilinguals usually have an even language production between their two languages. When comparing each language with monolinguals' single language, they found that bilinguals had fewer
words in each system than monolinguals. But when comparing the two languages together, the two sets of children "indicated comparable vocabularies" (1993: 113). Their main explanation is that:
> " $[g]$ iven that vocabulary production requires an additional performance from the child (one must understand a word to produce it appropriately, but the reverse is not true), bilingual children's productive vocabularies might have been expected to show a greater deficit with respect to monolinguals' than their comprehension vocabularies" (1993: 113).

There was indeed an equal measure of vocabulary production between monolinguals and bilinguals when considering bilingual children's two lexical systems. However, this is not what transpired through our own samples on children under 5, as shown by the results illustrated in Diagram 4 (cf. Chapter II.3.) on word count: bilinguals had a smaller lexicon than monolinguals, even when considering both languages. De Houwer et al. (2014) report results by Pearson et al. (1993: 117-118) who found that all languages considered, bilingual children up to the age of 30 months old had the same productive vocabulary as monolingual children. Pearson et al. (1993) also state that a language comparison should not be made just for the sake of comparing two different linguistic systems, but rather that there should be a clear purpose for this comparison. According to them, "[ $[7]$ here are diverse uses for single-language and double-language measures of bilingual children's abilities". A monolingual child will be using the same language, but two different lexeis regarding whether they are at school or at home for example, while a bilingual child may be using more of one language at home and the other at school. The comparison therefore needs to be specific to what the research is looking for. Moreover, D e Houwer et al. (2014: 1197-1198) found on comprehension, that at age 13 months, "[o]n average, infant bilinguals understood as many Dutch words as did monolingual infants [...]", while at 20 months, "[ $t$ ]he monolingual toddlers understood similar numbers of Dutch words as the bilingual toddlers". In the same study, they found that "[w]hen we compared the bilingual infants' overall
word comprehension (combining Dutch and French) with that of the monolinguals, [they] found that, on average, the bilinguals understood $71 \%$ more words than did the monolinguals", which is "a significant difference". De Houwer et al. (2014: 1198) also state that "[a]s was the case for overall word comprehension at 13 months, overall word production at 20 months showed a wide range of inter-individual variation, with larger within-group variation for the bilinguals than for the monolinguals".

## II.7.2.2. The cases of (un-) related languages

Keller et al. (2015: 2) offer the hypothesis that linguistic transfers are more likely to happen for "linguistically related languages". They develop an explanation of a "language familiarity hypothesis" arguing that the two languages can support one another.

Keller et al. (2015: 2) have supposedly noticed a greater receptiveexpressive gap in the group of children who were using linguistically related language such as English and German for example. For Keller et al. (2015: 2), a receptive-expressive gap assumes that "the transfer is greater in the receptive area and is favored by the close familiarity of the two languages". They make a comparison with "two linguistically unrelated languages (e.g., Tamil - German)" which supposedly have a smaller gap because there are fewer possibilities for transfers.

## II.7.2.3. Degree of exposure

According to Keller et al. (2015: 2), the language exposure hypothesis should "trace the causes of the gap back to the degree of language exposure". The latter supposes that the limited access a child has to each of the linguistic systems naturally leads to a lesser degree of language production. This therefore shows that the lexical systems of
each language are not as developed as the single one of their monolingual peers. Their own results showed that "the gap does not depend on the language familiarity of L1 and L2. As there were no significant gap differences it was not necessary to sort the language groups in order to language familiarity of L1 and L2" (2015: 5). However, there was a shorter gap for children in contact with Germanspeaking relatives and friends in comparison to those who have less contact with such people. According to Keller et al. (2015: 6), "the data on direct language contact provide evidence for the language exposure hypothesis".

The same paper (Keller et al., 2015: 3) also shows that if the degree of exposure indeed leads to a linguistic gap, then all bilinguals do not possess the same linguistic gap, as not all bilinguals have a similar degree of language exposure. Keller et al.'s results (2015: 5) confirmed their hypotheses, showing a clear receptive-expressive gap since "a total of $90.1 \%$ of the children revealed a better receptive competence in comparison to their expressive competence; the expressive competence was better developed among only $6.2 \%$ of the bilingual children". According to Keller et al. (2015: 5), "[t]he share of children with a receptive-expressive gap in favor of receptive language [...] amounted to $62.3 \%$, whereas only four children (1\%) showed a significant gap in the opposite direction". As a reminder, Gibson et al. (2014) stated that a great majority of the samples studied had a bigger gap when having to express themselves and a smaller gap when receptive to the languages.

Indeed, Keller et al. (2015: 7) clarify that "the bilingual gap is a normative phenomenon that already exists in the early stage of second language acquisition" as they have found that $90.1 \%$ of the bilingual children were better receivers than producers and " $62.3 \%$ of the cases showed a receptive-expressive gap".

It is important to distinguish between "normative modality asymmetries" in a bilingual's two languages and a receptive-expressive gap. Keller
et al. (2015) explained that in order to make this distinction, "standard scores of language tests" are used.

For decades now, a number of studies such as Pearson et al. (1993) and De Houwer et al. (2014) however found that bilingual children do have more ease at language comprehension than at language production.

## II.7.2.4. Gap-fillers in the weak language

It is therefore possible that simultaneous bilingual children use CS to fill the gaps of the weak language with the strong language. This can only happen, not because of a lack of skills in one language but rather because a child's language exposure is never exactly the same in the two languages, therefore providing the child with more specific lexicon in one language in comparison to the other. Being able to use one of their languages to complement what they wish to say in the other one makes them rather more skilled than non-skilled. It gives them an ability to express themselves instead of staying "stuck" and incapable of expressing what they wish to say.

However, the situation is different regarding sequential bilinguals. They are able to learn a new language later on in their life and become quite fluent in this new language. They will however always have a kind of divergence in comparison to native speakers. Moreover, the fact that the longer they stay in the country of their second language, the more they can notice a change in their mother-tongue when compared to their native peers. This is known as language attrition as aforementioned. In this case, gap-fillers are used and show a non-skill in one or both languages according to the speaker's learning environment, attitude and general behaviour towards the second language.

## II.7.2.5. The solution in language exposure

The main results achieved by bilingual children compared to monolinguals in non-linguistic skills were previously mentioned (cf. Chapter II.6.2.), but Tao et al. (2011) have found that no matter the type of bilingualism - simultaneous or sequential; similar or nonsimilar languages - the executive control is still greater in bilinguals. Tao et al. (2011) have however also explained that a more balanced bilingualism as well as a sequential bilingualism "appear to show a greater enhancement in conflict resolution".

When the language exposure of a bilingual child is done properly and as equally as possible between his two languages, we can assume that there is no gap to fill.

We have developed on the fact that bilingual children have a harder time in language production than in reception (cf. Chapter II.7.2.). It is however worth noting that simultaneous bilinguals have a greater language proficiency than sequential bilinguals as their languages' acquisition was made during the CPL, whereas sequential bilinguals' development happened after the CPL (or during the decline in brain plasticity) and after their first language had reached a sufficient level of maturity.

Moreover, when considering together the two bilinguals' languages, the lexical deficiency of the children in one language in comparison to monolinguals is eventually evened out. This is in accordance with Keller et al. (2015) on exposure, as bilinguals have a lesser degree of exposure to each of their languages separately, compared to monolinguals' single language, but have an equal amount of exposure, when considering both languages together as a complete system.

The recognition of the languages can also be proof of which language possesses the greatest number of gaps. We can take the example of heritage languages - which are languages spoken at home, and that are different from the language of the society speakers grew up in - , or of
immigrant people who will see their mother-tongue usually undermined (cf. Chapter I.2.3.), leading them to have more gaps in their first language, without being able to adequately learn their second language. The solution in this case would be an equal amount of exposure to the two languages: the community language, and the heritage language.

## II.7.2.6. The "weaker link" Hypothesis

Moreover, Keller et al. (2015) state that researchers such as Gollan et al. (2002) have come up with the hypothesis called the "weaker link" hypothesis, due to the fact that bilingual children have fewer opportunities to speak each of their languages, therefore leading to "a weaker connection between semantic and lexical structures [...], hamping the lexical access that is essential for language production (Gollan \& Acenas, 2004, and Yan \& Nicoladis, 2009)". Keller et al. (2015) finally state that this weaker link does not have any impact on the bilingual children's understanding of a language but mostly on their self-expression and language production. The study showed that there was indeed "a significant receptive-expressive gap in favor of language comprehension".

## II.7.2.7. The Language Familiarity Hypothesis

Moreover, Keller et al. (2015) have found that although there is indeed a receptive-expressive gap between a certain number of languages, they do not confirm the language familiarity hypothesis since they could not find significant differences in the gap size across the group of selected languages. Finally, regarding the language exposure hypothesis, they could not find a difference in the gap size in the bilingual children who had more or less language exposure since they showed similar gap sizes. They however also found that "[c]hildren from families which used L2, German, alongside their
native language revealed less difference between receptive and expressive language in comparison to children from homes in which the native language was exclusively or predominantly spoken". But their study also showed that "[c]hildren who attended a daycare institution for more than 12 h a week showed a lower receptiveexpressive gap in comparison with their peers who were exclusively looked after in the family or were in daycare for fewer than 12 h ", and that " $[f]$ or children who had contact on a regular base with Germanspeaking children and adults among their relations, acquaintances and neighbors, the gap was less strongly pronounced than for children with fewer contacts with German-speaking persons". The main conclusion confirms to a certain extent the language exposure analysis.

## II.7.2.8. The Language Exposure Hypothesis

Regarding The Language Exposure Hypothesis, Hoff (2006) quotes Ribot et al. (2018: 930) who presents the type of adult utterances that will help the child in their language development, that is the ones "respond[ing] to or pick[ing] up on prior child utterances [...] including expansions and recasts of prior child utterances". This supposes therefore that children who are spoken to and who speak more have a better language development than those who do not have similar input to languages from adults. Ribot et al. (2018: 930) are also consistent with the previous proven statement as they came to the conclusion that "children who switch to English had higher English scores than children who switch to Spanish" (2018: 934) in the case of English-Spanish bilingual children. But also, that "children who switch to English group showed increases in expressive vocabulary at a faster rate than children who switch to Spanish group, controlling for English input at home". They confirmed that children who had a greater input in English had seen their English grow faster than those with a lower input in English (2018: 934-935).

We have also noticed such results in the case of our sample of bilingual children, who did not receive proper exposure in one of their languages, leading them to have developed an unbalanced bilingualism. Regarding the current report on receptive-expressive gap, it is shown here that both receptive English and expressive English are required to reach a seemingly balanced level of English. This is assumed for other languages as well. Ribot et al. (2018: 935936) come to the conclusion that "language use (i.e., output) contributes to the development of expressive language skill". However, they have also mentioned, as found in Gibson et al. (2012), that CS can also be the cause for this receptive-expressive gap, as bilingual children always go towards their strong language to express themselves, creating even less output in their second language, therefore reducing the possibility for improvement.

## Chapter 2: Conclusion

Several results transpired from our own analyses based on samples of twelve monolingual and twelve bilingual children. First of all, we found that bilingual children had indeed a certain degree of language awareness. A seminal study on language awareness by Genesee et al. (1996) has allowed to show that bilingual children have more skills in discriminating and differentiating two languages, as well as labelling them, compared to their monolingual peers. An obvious executive function skill in bilinguals was evidenced in this study since they are able to focus better than monolinguals on metalinguistic phenomena.

We have also reported examples of the ability bilingual children have to adapt their language (choice) to their interlocutor whether they are young children or adults. Bilingual children also have more skills in repairing breakdowns in communication.

The original study from Genesee et al. (1996) showed great awareness in three out of the four children whose speech was analysed in the sample. There is a correspondence between the original study by Genesee et al. (1996) and our own as we also found, in our broader sample of children up until 5 years old, that half of the bilingual children (La., G., O., A., Sa., Je.) discriminate between the languages that are mostly used with them. We have found that these children mainly use French with their French-speaking parent and English with their English speaking-parent. Moreover, we have also mentioned that this decision to use one or the other language with the English or French speaking parents was also dependent on the children's language dominance. We have indeed found that among the other six children (V., I., P., Sh., Jo., Le.) who use the opposite language than the one used with them, one of them (P.) uses her non-dominant language with the parent of the non-dominant language, meaning she prefers to speak her non-dominant language with the parent to match the language she is using.

In the different analyses making up our current study, we found that several of the children were showing opposite results from our hypotheses. The analysis on LW and GW has shown that monolingual children under the age of 5 tend to use more advanced words (GW) than bilingual children.

We have also found that when considering both of a bilingual's languages, the UB is slightly higher than in monolinguals, which would not be the case if considering the bilingual's languages separately.

We assume that the opportunity for bilingual children to code-switch in the speech compared to monolinguals (the fact that they have two systems) helps them get their meaning across. In the same line as the GW and LW, we have found that our sample of bilingual children linger onto more basic words (nouns, adjectives) as their monolingual peers who use more advanced words (prepositions, verbs). We came to the conclusion that the bilingual children in our sample have a slight delay in comparison to the of monolingual children in the sample who show greater linguistic skills.

We have also focused our analysis on the different errors (lexical, grammatical, morphological, semantic, phonological) found in the two samples of children. This has shown both samples to make equal numbers of semantic errors, whereas monolinguals make more grammatical, morphological, and lexical errors, while bilinguals make more phonological errors. These results have brought us to the conclusion that, apart from the phonological errors (two bilingual children from our sample also seemed to have problems related to their speech), bilingual children generally make fewer errors than monolinguals. This could be explained by the double language exposure as well as the greater executive function of bilinguals. This hypothesis remains to be proven by further studies.

The greater language skills aforementioned (verbs, nouns, prepositions, adjectives) lead to more complete sentences uttered by monolinguals, therefore showing better pronunciation and clearer speech.

The analysis of the SD in relation with the mean for the different section of our study has shown that bilingual children are aware of the language that is used with them, but also of the language that needs to be used with other people, and most especially their parents, or other adults that they are used to interact with. It has also shown that bilingual children have a very homogenous use of the language, especially in for the GW, even though they tend to use more LW than monolinguals. Moreover, the analysis of the SD has confirmed the homogeneity of the use of prepositions and adjectives for bilinguals and monolinguals in comparison with their use of verbs and nouns. It has also confirmed the greater use of nouns and adjectives than monolinguals, who themselves use more verbs and prepositions than bilinguals. These last two analyses have moreover helped in the confirmation of a slight delay in bilingual children's than in monolingual children's language development. In our study, the analysis of the SD regarding the MLU and CS rate has shown that bilingual children produce fewer complete sentences in comparison to monolingual children, and that their CS is very heterogenous which could mean that the use of CS does not necessarily depend on the age or the language that is used by the children. The analysis of the SD regarding the errors has highlighted the fact that bilinguals generally make fewer mistakes than their monolingual peers, except in the phonological field. Finally, regarding the SD for the unintelligible utterances, it has shown that bilingual children produce more unintelligible utterances than monolingual children, but that these unintelligible utterances are due to only three children for the bilingual sample, whereas more children produce unintelligible in the monolingual sample. The tendency is reversed when we remove the three bilingual children (who are also the youngest) who produce the most unintelligible sentences, and it remains this way even if we also remove the three youngest monolingual children.

As concerns transfers, we have found that the occurrence of a transfer is dependent on CS. The difference however is that CS is a conscious and obvious mechanism whereas transfer is unconscious and can sometimes only be noticeable with the help of a special tool. Transfer is also dependent on the type of bilingualism since it is more visible in unbalanced bilinguals.

Our analysis of the MLU, MMU and UB has allowed us to detect the balanced and unbalanced bilingual children in our sample. A correlation is believed to exist between the rate of MMU, MLU and UB, and the type of bilingualism a child has.

A distinction was made between CS and transfer in order to understand the clear difference existing between a balanced (conscious with CS) and unbalanced (unconscious with transfer and CS ) bilingualism. Although the lack of time and material did not allow going into VOT study to analyse transfers, the type of results that could appear through the study of VOT with CS was detailed. As mentioned, this study did not dwell on the types of transfers, whether it be delay or acceleration. It would however be interesting to dedicate a study on the evolution of bilinguals' language while including the use of VOT in order to notice its evolution, with or without transfer.

In the third section, we have reported that between early and sequential bilinguals, there can be a gap, especially in the case of unbalanced bilingualism (either when the L1 or, in a language attrition, when the L2 is dominant). These gaps can however be fixed with gap-fillers, conscious or not. We have found that simultaneous bilinguals do not use gap-fillers because of a lack of linguistic skills like in sequential bilinguals. They do so because a bilingual child does not have an equal exposure to their two languages, leading them to have a difference in vocabulary in different subjects. Both simultaneous and sequential bilinguals use gap-fillers to compensate words missing in their other languages. Sequential bilinguals however also use them from their L1 to their L2, or from their L2 to their L1. It
was however reported that bilingual children have greater receptive than expressive skills.

This section showed clear results regarding bilingual children's language abilities. It was shown that sequential bilinguals can indeed be using their strong language to compensate the lack of skills and vocabulary in their weak language. However, simultaneous bilinguals have such great linguistic skills that any switch from one language to the other is motivated by a reason and has a purpose.

One of the important results from the current study is that even if it is possible to learn a new language later on, the most native-like acquisition is the earliest one. However, the samples used in this study showed that before age 5 , children who are bilinguals have a slight linguistic delay (both systems considered) in comparison to their monolingual peers. A few other studies have found that bilinguals actually have a greater non-linguistic development than monolinguals (as seen in Bialystok et al., 2014 2016, in relation to executive functions, cf. Chapter II.2.2.).

One of the most interesting results of this study is that bilingual children under the age of 5 have a slower language development than monolingual children, but that their use of language was greater than monolingual children (who use more advanced words and have better pronunciation), which we associate to their access to two linguistic systems. Indeed, bilingual children produce longer sentences, they make generally fewer errors than monolingual children, but it is also true that despite those advantages, bilingual children have a slight delay in their language development: their use of language is simpler, they use more LW in general. It would seem that globally speaking, bilingual children take more time to complete their linguistic skills, even if this means being slightly behind, when the norm is the monolingual child.

We have reported that the existing receptive-expressive gap in bilinguals was mostly due to the unbalanced nature of some bilingualism who were bilinguals in related languages (Keller et al., 2015). Moreover, gaps, just like bilingualism, are always dependent on the speaker since each individual has different linguistic skills from their peers.

Moreover, for sequential bilinguals, gap-filling can happen when they use it to compensate their first language with their second language, most especially in the case of language attrition. We have also concluded that the more balanced bilingualism is, the fewer gaps will need to be filled, since there is less language deficiency than in unbalanced bilinguals. We have presented two hypotheses (Oller et al., 2007) that could be related to the reasons for the appearance of the receptive-expressive gaps: (1) the language familiarity hypothesis, stating that the two languages can support each other, therefore explaining why closely related languages would bring more easily language gaps than unrelated languages, and (2) the language exposure hypothesis, which supposes that the gaps are related to the degree of early language exposure. Another hypothesis states that bilinguals have less chance to speak each of their languages, creating a "weaker connection between semantic and lexical structures [...], which hampers the lexical access that is essential for language production" (Gollan et al., 2002).

However, some simultaneous bilinguals have different degrees of a receptive-expressive gap. It was found that according to their degree of exposure to each of the two languages (Keller et al., 2015), children might have greater ease to understand than produce in their languages. It was also found that bilinguals may all have different linguistic gaps since no two bilingualisms are alike.

A crucial follow up to this study would have to find out if those results still stand regarding children after 5 and until prepuberty, and then
subjects between prepuberty and the end of adolescence, when brain plasticity starts to decline.

A further study should also be made on gap-fillers and receptiveexpressive gaps in relation to age. Its goal would be to analyse if those receptive-expressive gaps exist at different ages and with different types of bilingualism (early or late), or if the phenomenon is specific to a certain type of bilingualism and a certain age group.

As seen in the first chapter through several studies, growing up bilingual and using CS is good for the brain, but it is also useful in one's everyday life, for people's future. The situation of a few bilingual countries will be analysed in a third chapter.

## III. CHAPTER 3: BILINGUALISM AND CODESWITCHING (CS) AFTER THE CRITICAL PERIOD FOR LANGUAGE LEARNING (CPL)

## Introduction

In this chapter, we will examine if CS is an asset in bilingual children's brain development by analysing the literature on the link between bilingualism and brain activity. We will start with an analysis of the cognitive benefits of bilingualism and a report of the research on the action of CS on the brain. The goal is to comprehend, after the study on language development per se, the impact of bilingualism on the development of the brain, thanks to different techniques described in III.1.2. We also develop on the different studies concluding on bilinguals having or not having a better language development and brain activity than monolinguals. This will allow us to draw a bilingual and monolingual comparison of their brain development.

We will then present the academic benefits of being bilingual, and we will finally see the different impacts of bilingualism in comparison to monolingualism on adult life and most especially on life at work and on wages, in order to assess the advantages in everyday life as a bilingual. We will report on the importance of bilingualism at three different levels: "micro", "meso" and "macro", but also through the review of the literature on bilingualism in different countries: Canada, the USA and Switzerland. The results should show that bilinguals have access to better paid and valued jobs.

## III.1. Cognitive benefits of bilingualism and reaction of the brain to CS

This section will analyse in more depth the impact of bilingualism on the brain. Different studies show how bilingualism changes the very structure of the brain. The previous chapters and sections have proven that there is indeed a difference between bilinguals and monolinguals in their language evolution. In this section, we will see how deeply rooted this difference is. We will firstly see what the research says about the link between brain and bilingualism and the possible impact one has on the other. We will present the different techniques used to study the brain in general and more specifically languages in the brain. We will then explain the two statements according to which bilinguals do not have a better language development. The first statement was issued when research started on bilingualism. The second statement is more recent. Early research envisaged negative effects of bilingualism on the brain as well as on the overall development of these children. Present studies clearly show the great benefits brought on by bilingualism. We will then compare bilinguals and monolinguals' brain development thanks to different studies on Alzheimer's Disease (AD) and Mild Cognitive Impairment (MCI), allowing to understand the impact of bilingualism on the volume of grey and white matter in the brain, but also its impact on the tissue density in the different language related areas of the brain.

## III.1.1. Code-Switching and the brain

In this section, we expand on the action of bilingualism on the brain, limiting ourselves to the developmental factors appearing in bilinguals compared to monolinguals. We will also briefly go into neuroscience and brain activity. Many studies have proven that bilingual children, in addition to greater non-linguistic skills when compared to monolinguals (such as cognition and attention span), happen to have a
slightly slower degree of language evolution when considering their two languages, as seen in our own study in chapter II. Moreover, it is also interesting to wonder if being bilingual changes the "pathways underlying human language processing" (Kovelman et al. 2008), causing potential modification in the brain tissue. We will develop on this, as well as seeing the possibility of negative effects of CS on children's brain.

## III.1.2. Literature review

Our hypothesis is that bilingual and monolingual children have a cognitive difference in their language development. Indeed, the fact that bilingual children grow up with two different systems, they have less exposure to each language than the one of a monolingual child to their unique system. According to Hoff et al. (2012), there are disadvantages to being bilingual. They state that bilinguals control a smaller vocabulary range in each of their languages than monolinguals do, and they also lag behind on grammatical measures when skills are measured on a single language.

However, how and why could someone evaluate a bilingual child's linguistic skill on one of his languages when he possesses two? It is obvious that their proficiency will be different from that of a monolingual child since they have two different systems to navigate between when speaking. Moreover, controlling a bilingual child's language skills based on one language only makes monolingualism the norm to follow.

Hoff et al. (2012), Hoff \& Core (2013), as quoted by Ramírez \& Kuhl (2016: 5), later state that, when considering bilingual children's both languages, it is possible to conclude that they do not lag behind monolingual children. For example, "bilingual vocabulary sizes, when combined across both languages, are equal to or greater than those of
monolingual children. Similar findings are reported on measures of grammatical knowledge."

But even though a bilingual child might take slightly longer to reach the same level in each of their languages as a monolingual child with their unique language, they will have greater cognitive functions. This means that their bilingualism might help them develop other types of acquisitions, such as balance and coordination, for example. This still needs to be proven, of course, but we can already rely on Ramírez \& Kuhl (2016: 4) presenting bilingual children's language development by 12 months old, where they focused on both of the children's tongues. Their study shows that bilingual children are on the same rhythm as monolingual children who also reach the same level of language proficiency at the same age. They then add that monolingual and bilingual children do start "producing their first syllables and their first words at the same age" (2016: 4). Indeed, both languages considered, bilingual children have the same pattern of vocabulary and grammatical development as monolingual children. In fact, bilingual children have the same language development as monolingual children. It is not possible to study bilingualism if the children's languages are analysed separately rather than as a pair, since they divide their time between their two languages. One must also see that it is usually difficult for a bilingual child to have an exact $50 \%$ proficiency between both of his language, as they tend to have a dominant one. This decision will be made thanks to the ratio quality/quantity of the two languages they hear. Conboy \& Mills (2006) moreover present the specific difference they managed to find in their study regarding the pattern of activity in the brain for dominant and non-dominant languages.

Bialystok et al. (2005) as well as Eviatar \& Ibrahim (2000) report the lower level of reading skills of bilingual immigrant children compared to monolingual English children. They state that the exposure to two languages helps improve phonological awareness "which is the ability
to recognize and manipulate the sound units of language and is one of the best predictors of reading ability".

Of course, as aforementioned (cf. Chapter II.7.2.), immigrant children may have performance troubles in one of the languages they speak. In comparison to monolingual children, it is normal for them to perform less, as monolingualism is taken as the norm, while the fact that their brain is developing another linguistic system is not taken into consideration.

The different studies showed us that children who are exposed to more than one language from early on in their childhood have more ease processing their languages' different sounds, as well as the sounds of other languages. For example, in the United-Kingdom, when teaching French to English speaking children who had only been exposed to English their entire life, we had to make them pronounce sounds over and over again. It was a real challenge for them to change the way they were hearing and producing the sounds. Their very own "sound system" was not damaged, but simply not developed for other sounds. When teaching in Canada, which is a bilingual country, we were facing students who were at least bilinguals for the most part (some even speaking between four and six languages). The more languages they were fluent into, the easier it was for them to pronounce new French words, or even Reunionese Creole (which they could not have been exposed to when they grew up).

Ramírez \& Kuhl (2016: 5) explain that the sole fact of bilingual children having to deal with two languages makes them able to play with and manipulate sounds. Moreover, they state that this phonological awareness skill acquired by bilingual children acquire can be used from one language to the other, and it also "assists children in their language and literacy development by facilitating sound-symbol awareness, grammatical knowledge, and vocabulary knowledge."

## III.1.2.1 Brain activity recording techniques

Kuhl \& Rivera-Gaxiola (2008) and Kuhl (2011) have presented the following image of a few techniques used for studying infants and children's brain responses regarding language use (Illustration 23):

NEUROSCIENCE TECHNIQUES USED WITH INFANTS


Illustration 23: Neuroscience Techniques used with Infants (Kuhl \& RiveraGaxiola, 2008 and Kuhl, 2011)

Kuhl (2011: 2-3) details the different techniques seen above, firstly with ERPs which precision is to the millisecond.

> "Event-related Potentials (ERPs) [..] a part of the EEG, reflect electrical activity that is time-locked to the presentation of a specific sensory stimulus (for example, syllables or words) or a cognitive process (recognition of a semantic violation within a sentence or phrase). By placing sensors on a child's scalp, the activity of neural networks firing in a coordinated and synchronous fashion in open field configurations can be measured, and voltage changes occurring as a function of cortical neural activity can be detected".

The second technique is "Magnetoencephalography (MEG) [which] is another brain imaging technique that tracks activity in the brain with exquisite temporal resolution. [It] measure[s] the minute magnetic fields associated with electrical currents that are produced by the brain when it is performing sensory, motor, or cognitive tasks. [It] allows precise localization of the neural currents responsible for the sources of the magnetic fields". The third technique is called "Magnetic resonance imaging (MRI) [and] can be combined with MEG and/or EEG, providing static structural/anatomical pictures of the brain". The "Functional magnetic resonance imaging (fMRI) [which] is a popular method of neuroimaging in adults because it provides high spatialresolution maps of neural activity across the entire brain (e.g., Gernsbacher \& Kaschak, 2003). [It] does not directly detect neural activity, but rather the changes in blood-oxygenation that occur in response to neural activation". Finally, the fourth technique is the Near-Infrared Spectroscopy (NIRS).
> "Near-Infrared Spectroscopy (NIRS) [which] also measures cerebral hemodynamic responses in relation to neural activity, but utilizes the absorption of light, which is sensitive to the concentration of haemoglobin, to measure activation (Aslin \& Mehler, 2005). NIRS measures changes in blood oxy- and deoxy-haemoglobin concentrations in the brain as well as total blood volume changes in various regions of the cerebral cortex using near infrared light".

## III.1.2.2. Observations

Moreover, in the case of people suffering from different conditions such as aphasia, Paradis (1977), as reported by Kovelman et al. (2008), found that "individuals may selectively lose only one language" supporting the theory of "a language differentiation". The type of bilingualism, whether it be early or late, has been the focus of most neuroimaging studies, where they showed that simultaneous bilingual language exposure has been found to result in bilinguals using the same neural tissue for processing both of their languages as has been classically observed in monolinguals" (2008: 4). The proficiency of the language has also been proven to modify the brain of bilinguals. Indeed, Chee et al. (2004) have found that the age of acquisition, and therefore the proficiency of the bilingual, can create "neural differences in bilingual brains". Following on this, a study from researchers we have previously mentioned, Mechelli et al. (2004) have compared early and sequential bilinguals with monolinguals and has found that "bilinguals have an increase in grey matter volume in the left inferior parietal lobe". But what also seemed very interesting is the fact that this increase was most noticeable in high-proficiency bilinguals. Mechelli et al. (2004) have also found in "three groups of young adults: monolinguals, simultaneous bilinguals who had learned their second language before the age of 5 years, and sequential bilinguals who had learned their second language between the ages of 10 and 15 years" that "grey matter density was significantly greater for bilinguals than monolinguals in the left inferior parietal gyrus (LIPG)" mostly for simultaneous bilinguals when compared to sequential bilinguals. These results were also obtained by Abutalebi et al. $(2015,2014)$, since they reported that "older bilinguals showed better preserved grey matter density than comparable monolinguals in the anterior temporal pole, a region important for conceptualization" (Bialystok, 2017: 20), which clearly confirms the hypothesis stating that bilingualism protects the decaying of people's grey matter volume. Another example is the one of white
matter preservation with ageing in bilinguals with Luk et al. (2011) who "found higher fractional anisotropy (FA) in bilinguals than monolinguals in tracts across the corpus collosum and extending to the superior and inferior longitudinal fasciculi" (Bialystok, 2017: 21), meaning an "increase in white matter structure in bilinguals". This latter statement applies to both younger and older adults. According to Bialystok (2017: 21), only one study on white matter structure applies to children, the one of Mohades et al. $(2012,2015)$, who "assessed children at two points in time, when they were 8- to 11- years old and again three years later and found higher FA [fractional anisotropy] values for bilingual children than monolinguals in their inferior fronto-occipital fasciculus [...] but not the superior longitudinal fasciculi". A study by Martensson et al. (2012) is reported by Bialystok (2017: 19) and shows a greater difference in the "hippocampal volume and cortical thickness of the LIPG (as well as in the left middle frontal gyrus and superior temporal gyrus)" of adults who were in the process of intensively learning a language to become interpreters.


Illustration 24: "Anatomical and cytoarchitectonic details of the left hemisphere [...]" (Friederici, 2011: 1359)

Regarding Illustration 24, Friederici (2011: 1359) states that:

> "It the different lobes (frontal, temporal, parietal, occipital) are marked by colored borders. Major language relevant gyri (IFG, STG, MTG) are color coded. Numbers indicate language-relevant Brodmann Areas (BA) which Brodmann (1909) defined on the basis of cytoarchitectonic characteristics. The coordinate labels superior/inferior indicate the position of the gyrus within a lobe (e.g., superior temporal gyrus) or within a BA (e.g., superior BA 44, the superior/ inferior dimension is also labeled dorsal/ventral). The coordinate labels anterior/posterior indicate the position within a gyrus (e.g., anterior superior temporal gyrus; the anterior/posterior dimension is also labeled rostral/caudal). Broca's area consists of the pars opercularis (BA 44) and the pars triangularis (BA 45). Located anterior to Broca's area is the pars orbitalis (BA 47). The frontal operculum (FOP) is located ventrally and more medially to BA 44 BA 45. The premotor cortex is located in BA 6. Wernicke's area is defined as BA 42 and BA 22. The primary auditory cortex (PAC) and Heschl's gyrus (HG) are located in a lateral to medial orientation".

Kovelman et al. (2008: 4) mentions a few researchers who also found promising results earlier on. Rodriguez-Fornells et al. (2002, 2005), Quaresima et al. (2002), Hernandez et al. (2000), and Price et al. (1999) whose "imaging studies have yielded the important finding that specific brain areas are involved in bilingual switching: dorsolateral prefrontal cortex, inferior frontal cortex, anterior cingulate, and supramarginal gyrus". This finding also appears in Luk et al. (2011: 2) who specify four brain regions considered to be crucial for bilingual language switching: left dorsolateral prefrontal cortex (DLPFC), anterior cingulate cortex (ACC), caudate nucleus and bilateral supramarginal gyri (SMG)". Moreover, Fabbro et al. (2000: 652) "by using a systematic analysis, [...] have provided evidence for the first time in a bilingual brain damaged subject - for the important part played by the anterior cingulate prefrontal, and frontal structures in switching between languages". Marian \& Shook (2012: 4-5) also mention this specific brain regions DLPFC "show[ing] increased activation which is associated with cognitive skills like attention and inhibition", in English-Spanish bilinguals who were switching between "naming pictures in Spanish and naming pictures in English". Moreover, both Abutalebi \& Green (2008) and Luk et al. (2011: 5)
have come to the conclusion that "the brain regions active across studies during bilingual language switching were largely left lateralized, and six of the ten were in the frontal regions. [...] This finding is consistent with the argument that the frontal subcortical circuit involving the caudate is critical for language control (Kovelman et al. 2008), suggesting there is no single brain region specific to bilingual language switching". They also add an information which they confirmed to be important, that "bilateral caudate and the left prefrontal regions were robustly observed, supporting the frontal subcortical circuit for bilingual language control" (Luk et al., 2011: 7). Moreover, according to the same source, "the meta-analysis extended this model to other brain regions shown to be crucial to cognitive control and to other regions implicated in lexical and semantic processing that are the likely targets of language control". The main hypothesis rising from these studies is that there should be a greater difference between bilingual and monolingual's brains when rapid switching from one language to the next is involved. But, in their results on reaction-time, they found that "overall, bilinguals performed slower than monolinguals on each sentence type ( p . 05 )" (Kovelman et al., 2008: 11), whereas in accuracy analysis, they found "no accuracy difference between the language groups and bilinguals in English, like monolinguals in English, performed better on OS [object / subject] than SO [subject / object] sentences". Regarding their conclusions on neuroimaging results, they found that both bilinguals and monolinguals "activated the same classic language areas, as well as predicted vision and motor areas" (2008: 11). Moreover, regarding their study on bilinguals, they were able to prove that "bilinguals have differentiated neural representation of their two languages" (2008: 13) since the two groups showed significant differences in "behavioral performance and neural activity" according to which language they were using. They also found a significant difference between English bilinguals processing English and English monolinguals in the blood oxygenation leveldependant (BOLD) signal since the latter "revealed a greater BOLD
signal intensity as well as a greater extent in LIFC [left inferior frontal cortex] recruitment [...]" (2008: 13). "An important difference [was found in the studies comparing monolinguals and bilinguals showing] that bilinguals had a significantly greater increase in the blood oxygenation level-dependent signal in the LIFC [...] when processing English than the English monolinguals" (2008: 1).

Kovelman et al. (2008: 14) also wonder if the LIFC area mentioned above could "be the seat of a language separation mechanism for bilinguals" as it was previously hypothesised by Penfield \& Lamar (1959). The neuroimaging results however also showed bilinguals' ability to "recruit a greater extent of the brain's classic language processing tissue than monolinguals" (2008: 13). But the other fascinating information is the ability for bilinguals to become chameleons in their own language whether they are processing one or the other language since they "show an English neural profile when processing English [...] and they show a Spanish profile when processing Spanish" (2008: 13) also respecting the "grammatical distinctions between their two languages". But there was also neural difference in the same brain: when bilinguals were speaking one or the other language, they observed that these were "principled, predictable and governed by the morphosyntactic differences that exist between the specific languages at hand" (2008: 14). The neuroimaging studies "provide neural evidence" (2008: 14) of the difference in bilinguals' brains when they are using one or the other language since the pathways that light up are not the same for one or the other.

Some clear differences can also be noticeable in the brains of bilinguals versus monolinguals as explained by Mechelli et al. (2004) who showed that "early and highly proficient bilinguals had the most extensive enlargement of the inferior parietal cortex", an area of the brain which, when damaged, is "associated with uncontrolled language switching" according to Marian \& Shook (2012: 6). Mechelli et al.'s finding (2004) is also consistent with the different studies reported by Bialystok (2017: 22) stating that "for grey matter,
there is convergence on the finding that bilingualism and second language learning are associated with greater density in parietal and frontal regions, with some results also showing changes in the basal ganglia". She also specifies the "involvement of language processing and attentional control" in these areas of the brain.

The numerous studies gathered in Ramírez \& Kuhl (2016) keep confirming the great benefice of bilingualism for children's brain, even in their later life. This is evidenced by Neville et (1997), and WeberFox \& Neville (2001) who show that, as aforementioned, "brain responses [...] are stronger and more mature" in early than in sequential bilinguals. Then comes a study by Mechelli et al. (2004) for whom "structural brain studies indicate that bilingual adults have greater brain tissue density in areas related to language, memory, and attention, with the highest levels of tissue density among those who were exposed to two languages before the age of 5 years" (Ramírez \& Kuhl, 2016: 6). The study also showed bilingual children to have greater sensitivity to two languages while monolingual children showed greater sensitivity to only one language, as reported by Ramírez et al. (2016).

It is common in parents of bilingual children to wonder if their children will get confused by using two languages. They believe, and they are even told by some doctors, that children who code-switch are mixing their languages, leading them to have a slower language development than their monolingual peers. It is even sometimes recommended by some doctors, not to code-switch with bilingual children, and to stop them from code-switching, in order to help them make the distinction between their two languages. A Confusion Theory was developed which point was to increase the child's proficiency in one of their languages. We still stand here in the monolingual supremacy where bilingualism is seen through the monolingual spectrum.

Bialystok (2007), in Ramírez \& Kuhl (2016: 7), has explained that, on the contrary, the mental process needed to manage attention between languages "fosters children's thinking about language per se, and leads to increased metacognitive and metalinguistic skills", which seems to be the opposite of confusion.

Kovacs \& Mehler (2009) have confirmed that bilingual children as young as 7 - or 12- months old show more flexibility in their language patterns than monolingual children. They then state that "[...] bilingual 2- and 3 -year-olds are more flexible learners of additional labels for previously known actions or objects, whereas monolingual children often find it difficult to learn labels for actions or objects that already have a name (Yoshida, 2008)" (Ramírez \& Kuhl, 2016: 7).

## III.1.2.3. CS and the brain

When we analyse the action of bilingualism and CS on children's brain, it is possible to mention that the very fact of switching from one language to the other creates a high level of focus and concentration in the child. Not only do they switch language, grammatical system, phonological system, vocabulary base, but they also switch culture. They are more flexible and open simply because they have access to these two systems and their brain does twice as much work as a monolingual child's, who only focuses on one system, one base, one culture. However, there is no day-to-day proof of these cognitive advantages, as they are found only "using highly sensitive laboratorybased methods." (Byers-Heinlein \& Lew-Williams, 2013: 99).

When narrowing down to the study of CS and the brain, we can come back to researchers we have previously mentioned and who are also quoted in Kutas et al. (2008: 299). These researchers state that "language switching hypothetically relies on inhibition of the nontarget language via the left basal ganglia (Abutalebi et al., 2000; Fabbro et al., 1997; [...]), and/or attentional/executive control
mechanisms [involve] the anterior cingulate prefrontal and frontal cortices (Fabbro et al., 2000; Hernández et al., 2000. 2001), or bilateral supramarginal gyri and Broca's area (Price et al., 1999)."

Moreover, Fabbro et al. (1997) also mention that "patient data as well as neuroimaging data from healthy adults generally implicate a cortical-subcortical network (including the thalamus, basal ganglia, and frontal cortex) in language switching". But these are "presumably important for inhibitory control of an unintended language, especially the more automatized language (e.g., Aglioti et al., 1996; Aglioti \& Fabbro, 1993)." (Kutas et al., 2008: 300).

Kutas et al. (2008: 300) also add that:

> "[..] data from patients as well as from neuroimaging studies in healthy adults have implicated both subcortical and (prefrontal) cortical structures in voluntary and involuntary language switching. Subcortical structures, especially in the basal ganglia are presumably involved in language selection and/or inhibition mechanisms that are not necessarily specific to bilinguals, but important for their CS".

Regarding the difference between CS in production or comprehension, it was found that there is "an overall difference between the effects of language switching at the word level on production and comprehension, particularly when the task requires both languages to be active" (Kutas et al., 2008: 302). This experiment in Jackson et al. (2004) consisted in showing numbers to bilinguals, and they were to say, in either of their languages, if the number was even or odd.

## III.1.3. Different aspects in the development of bilinguals

In this part, we will start by reporting the research regarding the positive and possible negative aspects of bilingualism. Bilingualism can have different degrees, as seen in previous chapters (cf. Chapter I.3.): a balanced bilingualism or an unbalanced bilingualism. In addition to the results from earlier studies until the 50s mentioned at the beginning of our study, we have also found that bilingual children have a slight delay in their linguistic development. The main belief that a bilingual child who would code-switch was separating his brain in half, hence dividing his intelligence and skills in half as well, is no longer relevant. Bilingualism used to be studied by taking monolingual as the norm and each of the children's languages was studied separately. It was therefore found that a bilingual child has a lesser degree of exposure to each of their languages, in comparison to the exposure of their monolingual's peers to their unique language. These bilingual children were supposedly confused, therefore leading to underachievement at school because of a delay in learning. These were clear misconceptions, as the earlier studies were already conceived in favour of monolingualism, but also in favour of studying bilinguals' both languages independently and only considering the intelligence. They would not look into what Bialystok (2016) later called the "executive function system" - which is the "process of holding information in mind while you're performing a task and selecting which information to pay attention to". Bialystok's conclusion (2016) was focused on the ability of the "executive function system [...] to selectively attend to the language that currently needs to be used [...]".

Those earlier results however showed that, sometimes, and in certain conditions, bilinguals have trouble performing at the same rate as monolinguals, which we have also shown in our current study. Ransdell \& Fischler (1987) take the example of lexical recognition,
but only on "abstract words during recognition, but not for concrete words". However, regarding lexical decision, the results were showing bilingual disadvantage that were "great for concrete as for abstract words". The aforementioned studies were however solely made considering one of the bilingual's languages, hence their overall conclusion stating that "restricting the task to one language's surface code puts the bilinguals at a disadvantage" (1987). Their exposure to each of their languages was supposedly reduced in comparison to monolingual's single language. This was also confirmed by Bialystok \& Luk (2011), as they further found that bilinguals who had been bilinguals for a shorter period of time had more trouble finding words than the ones who had been bilinguals for a longer period of time, but that they also performed less well than monolinguals. Their conclusion mainly states that bilingualism and vocabulary level in the language of testing has an effect on language production, therefore "placing limits on the generalizability of theoretical models of language comprehension and production" (2011: 398). Many different researchers have come up with the same general conclusion in which bilingual children have troubles finding words when their cognitive abilities are higher for equal age to their monolingual peers. This is a proof of the greater language development of bilingual children.

However, a recent study by Bialystok (2017: 13) proves that the usual neuroimaging results "show greater structural density in bilinguals or functional patterns in bilingual children that resemble those obtained from older children or adults are evidence for better brain development in bilinguals". She presents two studies, Barac et al. (2016) and Kuipers \& Thierry (2012), that used EEG technology to "demonstrate that the event-related potential (ERP) waveforms for bilingual children reflect greater sensitivity to stimulus change than do those of monolingual children".

Bialystok (2017) also reports the results from two different papers (Mohades et al., 2012, 2015) who found data on white matter, stating that "between the ages of 8- and 13-years old, bilinguals had better
structural connectivity on pathways associated with semantic processing and that myelination of these pathways" was better for simultaneous than sequential bilingual children. Bialystok (2017: 14) also reports the greater performance of multilingual children as well as their "larger increase in grey matter volume in the LIPG [left inferior parietal gyrus]" between the two testing times after having given them a Flanker task. Baghdadi et al. (2021) explain that the Flanker task, originally created by Eriksen \& Eriksen (1974) "is a set of tests to assess selective attention and inhibitory function" ${ }^{40}$, that is to assess the way a person selects appropriate responses and inhibits the inappropriate ones in a specific context.
"In this task, the target is positioned in the center and is flanked by non-target stimuli. The individual is requested to press the left or right arrow key according to the target's direction. There are three types of non-target stimuli in" this task. Those three types of stimuli are:

1. The congruent stimulus that is sometimes called compatible mode. In this mode, the direction of the non-target stimuli is the same as the target.
2. The incongruent stimulus that is sometimes called the incompatible mode. In this mode, the direction of the non-target stimuli is the opposite of the target. Therefore, choosing a correct response is more challenging than the compatible mode.
3. The neutral stimulus that has neither the same nor the opposite direction of the target stimulus".

Hereafter in Illustration 25 is a summary of the three types aforementioned:

[^26]

Illustration 25: Schematic of the three types aforementioned (Baghdadi et al., 2021)

In the following Illustrations 26 to 28 , there are a few examples of what can be used in the Flanker tasks (linguistic and non-linguistic tasks stimuli) which help us visualise the difference between congruent and incongruent conditions:


Illustration 26: "Non-linguistic Flanker task stimuli sample" (Gray \& Kiran. 2018)


Illustration 27: "Linguistic Flanker task stimuli sample" (Gray \& Kiran. 2018).


Illustration 28: "Linguistic Triad task stimuli sample" (Gray \& Kiran. 2018).

This task was also used by Luk et al. (2011), who found "different networks of activation for monolinguals and bilinguals for incongruent (but not congruent) trials, with bilinguals relying more on frontal and subcortical regions and monolinguals on temporal and parietal networks" (Bialystok, 2017: 22). Moreover, Marian \& Shook (2012: 5) also mention that "the neurological roots of the bilingual advantage extend to subcortical brain areas more traditionally associated with sensory processing". Moreover, Marian \& Shook (2012: 5-6) state that "[...] in bilingual people, blood flow (a marker
for neuronal activity) is greater in the brain stem in response to the sound [...]" This means that the same controls used for processing languages in the brain also have a general impact, extended to, touching specific neurological sections and "fine-tuning both cognitive control mechanisms and sensory processes". After using the same type of task, Abutalebi et al. (2012) found the opposite results, that is "the dorsal ACC to be important for conflict resolution in both groups but for the bilinguals, less activation of this region was associated with better performance" which they linked to the switching skills bilinguals acquire as they grow and get more proficient in their languages, but "which also relied on the ACC".

Moreover, Kuipers \& Thierry (2013) found interesting results showing the greater performance of bilinguals in comparison with monolinguals after recording "ERPs and pupil size in [...] toddlers who were presented with word-picture pairs". The results were that "for unrelated pairs, bilinguals showed greater pupil dilation than monolinguals that was correlated with a decrease in N400 amplitude; that is the larger the pupil dilation, the less negative the N400. [...]" (Bialystok, 2017: 14) This study however showed the opposite pattern for monolinguals.

As we have seen, most of the studies now come up with results in favour of bilingualism and CS. Not only do they allow children to be more "cognitively open", but they are also more grounded and aware, culturally as well as linguistically speaking. According to Bialystok (2016), the first study giving positive results about bilingualism is the one of Peal and Lambert (1962) made in Montreal and "comparing French-English bilingual children with French monolingual children". For Bialystok (2016), the goal of these researchers was to show bilingualism' benefits on children in comparison to monolingualism. "They predicted that if they designed this study carefully, bilingual children would perform the same as monolingual children on nonverbal tasks, but worse than monolingual children on verbal tasks". Then, for the first time in the history of bilingual studies, they found
positive results for bilingualism. The bilingual children were even performing better than monolinguals at equal tasks. This was only the beginning, as, over the years, researchers made the tasks even more precise, and paved the way to where we are today, with positive and promising results regarding bilingualism and CS. The challenge is now to know how bilinguals are better, as it has clearly been proven that they indeed have a better development. Bilingualism does not seem to make them more intelligent, but they are for sure more proficient. They have a greater "executive function system" (Bialystok et al., 2014; Bialystok, 2016), as, for example, they go for the language that needs to be used at a given moment. It is precisely "the process that is at the bottom of all the cognitive tasks on which bilinguals are performing better".

Moreover, according to the NHS (Wein, 2012), it was found that bilingual children are usually better at multitasking as well as focusing their attention. In the same article, we read that, according to Dr. Kraus, " $[b]$ ilingualism serves as enrichment for the brain and has real consequences when it comes to executive function, specifically attention and working memory". Her colleague in the team, Dr. Marian, develops that " $[t]$ he bilingual juggles linguistic input" and they seem to make the difference between relevant and irrelevant sounds, which supposes a greater mental ability. Her conclusion shows that " $[r]$ ather than promoting linguistic confusion, bilingualism promotes improved 'inhibitory control,' or the ability to pick out relevant speech sounds and ignore others".

Moreover, Costa \& Sebastián-Gallés (2014: 3) developed on the fact that both French- or English- speaking monolingual or bilingual infants between 4 - and 6 -months old were able to discriminate people speaking French versus English from watching silent videos. They showed that this ability disappears after 8 months of age for monolingual infants, therefore allowing the researchers to conclude that "bilingual infants show a specific adaptation in the attentional
system that allows them to perceive and track relevant information in two different systems".

Willis (2012) presents a study developed in order to analyse the "prefrontal cortex brain activity networks, which direct the highest levels of thinking and awareness". The results were conclusive as to say that bilinguals, in comparison with monolinguals, "averaged higher scores in cognitive performance on tests and had greater attention focus, distraction resistance, decision-making, judgment and responsiveness to feedback". Willis (2012) also concludes that the brain activity was not reduced to the intake/output of their own languages. They went far beyond this 'simple' task. They found that the area of the brain that was lighting up the most in bilingual brains was the area responsible for "goal-oriented behavior including directing attentive focus, prioritizing, planning, self-monitoring, inhibitory control, judgment, working memory (maintenance and manipulation of information), and analysis". This correlates with many other studies. Willis (2012) also compares the brain to any other type of body muscle, improving with exercise, as the brain also "appear[s] to build strength, speed, and efficiency in their executive function networks" the longer the bilingual environment remains.

Finally, in order to briefly portray the whole spectrum of the difference between the "bilingual brain" and the "monolingual brain", Ping, in an interview led by Grosjean (2016) claims that:
> " $n$ n]euroscientists have discovered that when bilingual brains are compared with monolingual brains as a whole, specific brain regions are more active when doing specific linguistic tasks (phonology, orthography, syntax). These regions also become strengthened in terms of the amount/volume of neural substances, i.e., grey matter and white matter".

White matter is also usually shown in bilinguals with a "better integrity in several tracts, notably those involved with interhemisphere connectivity, and anterior medial tracts" (Bialystok, 2017: 22). Moreover, Bialystok (2017: 22) states that " $[t]$ hese processes [...]
result in positive brain changes in the frontal and subcortical brain regions (due to inhibition of the unwanted language(s)) and in the anterior cingulate cortex (due to monitoring)", therefore changing the brain's neuroplasticity. Bialystok, who is well known for working on the link between bilingualism and executive functions, has concluded on the interesting fact that the "brain regions that are involved in language processing and attention to language systems are modified by bilingualism." (2017: 22). She mentions that "all the regions uncovered in these studies have plausible connections to cognitive processing". Bialystok (2005b) refers to one of her previous studies, in which an MEG recorded the brain reaction during a Simon task. A Simon task shows "the difference in accuracy or reaction time between trials in which stimulus and response are on the same side and trials in which they are on opposite sides, with responses being generally slower and less accurate when the stimulus and response are on opposite sides" (Amso \& Casey, 2009). Bialystok (2005b) measured performance differences with "faster reaction time for bilinguals [which was] associated with greater activation in left cingulate and frontal regions, whereas faster reaction time for monolinguals was associated with activation in middle-frontal regions". Bialystok (2017: 22) explains that through these results, we can see that " $[t]$ he region associated with faster responding in bilinguals overlapped with language processing areas even though the task was nonverbal", meaning that monolinguals and bilinguals call on different parts of the brain in order to perform a task in the most efficient way possible. The interest here is to see that bilinguals use part of the brain related to language even when the task in non-verbal whereas the monolinguals were not using these specific parts of the brain related to language. We wonder if these tasks are mostly switching tasks, which would be related to the same brain regions as the ones used for CS. This question would be an interesting follow up to the current study.

Yet, it is crucial not to forget that every bilingual and monolingual child's brain is different, due to many different reasons such as context, level of language, type and degree of bilingualism, to name only a few. Moreover, it should also be noted that while monolinguals only have one language for one context, relationships, conversations, purpose, "bilinguals use their two languages to a different extent, in different contexts, for different purposes, and with different people" (Ping Li in an interview conducted by Grosjean, 2016).

The literature reported in this section shows that bilinguals have an intrinsic difference in their brains, which can only undeniably lead to differences in development and acquisition, as detailed in chapter II with our own study. Moreover, it shows that, despite the few downsides of bilingualism, for example a slower lexical processing than monolinguals (cf. Chapter II.3.4.) -, there are mostly positive outcomes to bilingualism, as regards language and brain development, as seen in our previous chapter as well as the current chapter. These confirm the results found in our own field study (cf. Chapter 2) and we will see if the use of CS has an even greater impact on bilinguals' brains than when CS is not used.

## III.1.4. A comparison of monolinguals vs. bilinguals' brain development

There is not much research done on the comparison between monolingual and bilingual brain development in healthy people. Most of the research that can be found are on patients suffering or who could in the future be suffering from Alzheimer's Disease (AD) or Mild Cognitive Impairment (MCI) ${ }^{41}$. A quick review of different studies comparing brain structure of bilinguals and monolinguals shows that there is in fact a difference in structural development between bilinguals and monolinguals but also between early and

[^27]sequential bilinguals. Duncan et al. (2018: 271) report that there have been studies showing a difference in grey matter "in a number of brain areas related to executive functioning language". With an increase in "brain matter for bilinguals compared to monolinguals". In our second chapter, we mentioned the possibility for adults to have more trouble learning a second language, and it was shown that, indeed, bilingual adults have more chance of having "greater tissue density and thicker cortex" in comparison to monolinguals. A few studies have brought some contradictory results because research with healthy, younger and older, adults have shown that bilinguals have thicker cortex/higher tissue density than monolinguals of the same age. Duncan et al. (2018) however hypothesises "that cognitively compromised bilinguals would have less brain matter" compared to monolinguals. They explain that this resides in the brain area that is studied.

Researchers usually study the area of the brain that they believe will benefit from bilingualism which it usually does. For example, "in the healthy adult literature, bilingualism is conceptualized as an enriching exercise that contributes to neuroplasticity. As such, these studies have directly measured brain areas thought to be affected by bilingualism (i.e., LCC areas [left inferior frontal gyrus, left Heschl's gyrus, left putamen, right and left supramarginal gyri, left and right cerebellum, for young adults. For older adults, left anterior inferior temporal gyrus, left and right inferior parietal lobe, left and right anterior cingulate cortex or ACC]." (Duncan et al., 2018: 271). According to Bialystok (2017: 20), Abutalebi et al. (2012) even found "a greater density in the dorsal ACC for bilingual than monolingual young adults" thanks to the use of voxel-based morphometry.

Abutalebi et al. (2012) finally came to the conclusion, which we have anticipated, that multilinguals have a "greater cortical thickness" than monolinguals shown by "a main effect of language group in all of the LCC brain areas (all $\mathrm{p}<0.026$, uncorrected for multiple comparisons)". (Duncan et al., 2018: 275) Technically speaking, they found that a difference remained "for the right inferior frontal gyrus,
right ventromedial prefrontal cortex, right cerebellum, and right cerebellar tonsil" (2018: 275). The specific regions of the brain that is the left inferior frontal gyrus (IFG) which is "often considered the language production centre of the brain, appears to be involved in both linguistic and non-linguistic cognitive control". This information is also confirmed by Jackson (1958), as quoted by Fabbro et al. (2000), who has reported "an increased activation of the left inferior frontal region and bilateral supramarginal gyri during switching tasks between words in German and English in normal bilingual subjects". Finally, as a proof, "[...] greater grey matter tissue density was found within the multilingual group compared to the monolingual group [...] in both left and right hippocampi [...]". (Duncan et al., 2018: 275)

## III.1.4.1. Focus on simultaneous and sequential bilinguals' brain development

Berken et al.'s study (2016) on simultaneous and sequential bilinguals has shown a clear difference between both types of bilinguals' language development. Berken et al.'s early results (2016: 1167) show an obvious non-native accent in sequential bilinguals' L2 in comparison to the native-like accent of simultaneous bilinguals' both languages. We have already mentioned the inferior frontal gyrus (IFG), which is seen as an important part of the brain as regards language development. Berken et al. (2016) have found a clear difference between simultaneous and sequential bilinguals since the former "demonstrated stronger functional connectivity between the left inferior frontal seed and its homolog, the right IFGpt [(inferior frontal gyrus pars triangularis)], as well as the right IFGpo [(inferior frontal gyrus pars opercularis)], right dorsolateral prefrontal cortex, and bilateral inferior parietal lobule" than the latter. Moreover, the authors of the study also state another notable difference in which simultaneous bilinguals seem to have better results than sequential bilinguals. Indeed, according to Berken et al. (2016: 1167), at rest,
simultaneous "state functional connectivity between the right IFG seed and its homolog, the left IFGpt, as well as with the left IFGpo, and bilateral posterior cerebellum [was stronger] than sequential bilinguals" as shown Illustration 29 below.


Illustration 29: BOLD signal change in percentage (\%) for simultaneous and sequential bilinguals (Berken et al., 2016: 1170)


Illustration 30: "Significant correlations in functional connectivity overlaid on the surface of a standardized brain indicating group differences [...]" (Berken et al., 2016: 1168)




Illustration 31: "Functional connectivity related to age of acquisition in sequential bilinguals overlaid on the surface of a standardized brain [...] (Berken et al., 2016: 1170).

About Illustrations 30 and 31, Berken et al. (2016: 1170) state that:

> "A significant negative correlation was determined between interhemispheric connectivity strength of the IFGpt and neural activation in the left IFG during speech production for simultaneous and sequential bilinguals. Here, the stronger the functional connectivity between the left and the right IFG, the lower the functional activation of the left IFG is required to achieve proficient speech" (Berken et al., 2016: 1170)
> "A significant negative correlation between resting-state functional connectivity in the left IFGpt seed region and age of acquisition was observed for sequential bilinguals. Scatter plots represent mean connectivity between the seed region and each cluster. Error bars indicate SEM. Clusters survived a height threshold of uncorrected $p<0.05$ and an extend threshold of FWE-corrected $p<0.05$ at the cluster level".

## III.1.4.2. Focus on AD and MCI patients

Duncan et al.'s study (2018: 271) have focused on AD and MCI patients "with the overall trend towards increased tissue density in the multilingual MCIs compared to the monolinguals" when putting side by side "the left and right para-hippocampal gyri and the left and right rhinal sulci". They have also found the opposite to be true in the AD patients, that is "lower tissue density in the multilinguals compared to monolinguals". Going into technicality, it was found that "[...] multilingual MCI patients had higher tissue density than monolingual MCI patients in voxels within the right para-hippocampal gyrus, while the opposite pattern was found in the AD patients (i.e., lower tissue density for multilinguals compared to monolinguals) in the left and right para-hippocampal gyri" (2018: 276). According to the authors, one of the most important findings in the study they mention that it proves existing differences in the differences in bilingual and monolingual brain structure regarding LLC brain areas "in persons with high risk for AD". They reiterated how they have found "greater grey matter in multilinguals (both MCI and AD) as compared to monolinguals in left and right inferior frontal gyri, left medial superior
gyrus, right ventromedial prefrontal cortex, left and right anterior temporal gyri, left parietal lobule, left and right cerebellum, and right cerebellar tonsil" (2018: 278). Thanks to all these pieces of information, their main conclusion confirms their hypothesis that growing up with two languages or having learned another language later on is beneficial as it "exercises specific brain regions implicated in various control processes, inducing neural changes that can be seen at the level of increased cortical thickness and grey matter density". (2018: 279) They have proven those structural differences thanks to MCI and AD patients who are either multilingual or monolingual, for comparison, as, indeed, "multilingual AD patients showed thinner cortex and lower tissue density in the posterior para-hippocampal gyri and the rhinal sulci" while "multilingual MCI patients did not show evidence of cognitive reserve" therefore having a thicker cortex and higher grey matter density, "or [they] did not differ reliably from the monolingual MCIs" (2018: 280). But these "structural differences [...] in grey matter density in more frontal areas, although unlike the concentration of results for LIPG, [...] cover a more diverse set of regions" (Bialystok, 2017: 20).

Moreover Li et al. (2014: 302) share contradictions regarding the CPL we mentioned in our previous chapter (cf. Chapter I.8.), as they have found that even if an L2 was learned late in adulthood, it would still lead to "both behavioural and neural changes that may approximate the patterns of native or first language (L1)".

They explain in a technical way that " $[n]$ eurons are organized within the brain to form GM [(Grey Matter)] and WM [(White Matter)]. GM consist primarily of neuronal cell bodies, whereas WM consists of axons and support cells (e.g., glia cells). Bundles of axons form the so-called fiber tracts that connect different cortical regions within the same hemisphere (through association tracts), between hemispheres (through commissures, e.g., the corpus callosum (CC)), or between cortical and subcortical structures (projection tracts). The brain is filled with cerebrospinal fluid (CSF), which also runs through the ventricles of the brain. Measures of anatomical changes focus mainly on changes in GM and WM", (2014: 302)

In their study, Li et al. (2014) found "greater GM density in the left inferior parietal lobule (IPL) in bilinguals than monolinguals" (2014: 303) and even more so in simultaneous bilinguals than in sequential bilinguals. This shows that despite the studies explaining how adults' L2 acquisition may still comprise neural changes, the ones from simultaneous bilinguals, and bilinguals over monolinguals, still remain more important than late L2 acquisition.

Moreover, we can come back to Bialystok et al. (2014: 308) whom we have previously mentioned since they found that bilinguals develop "better executive functions (e.g., inhibiting, updating and switching) and better conflict monitoring abilities than monolinguals in tasks that involve selective attention, inhibition of irrelevant information, and task switching". This information is confirmed by Abutalebi \& Green (2008) for whom both executive functions and language find their core in the same brain areas. Luk et al. (2011:2) state that the brain areas listed above by Abutalebi \& Green (2008) "are similar to those implicated in other forms of higher cognitive functions [(error detection, motor response control, goal directed behaviour)], supporting the notion that bilingual language control, especially language switching, is a demanding task sharing features with other types of cognitive control". Moreover, in their discussion, they state that "if there is sufficient, consistent, and long-term stimulation from the L2 across an extended period of the lifespan, brain changes will likely be accompanied by performance abilities that approximate or reach the skills of native speakers, and in exceptional cases, excelling above the average level of native-ness." This statement, although interesting, still confirms our previous statement that late language learning and late bilingualism will more than likely always leave a foreign accent in the speaker's speech, therefore removing the nativeness that could more than likely be found in early bilingualism and early L2 language learning.

We considered a more biological dimension in order to improve our knowledge on the concrete changes there can be on the different areas of bilinguals' brain.

We have made clear the importance of considering a bilingual's two linguistic systems rather than only one when studying their speech since their exposure to each language is divided by two. When getting into the heart of the matter, we reported several studies showing the more mature neural development of bilinguals when compared to monolinguals.

Focusing on CS, Fabbro (1999) and Fabbro (1999) in Fabbro et al. (2000: 650) have stated that "[n]umerous studies have established that pathological mixing is mainly due to lesions in the parietotemporal structures of the left hemisphere, whereas the nervous structures responsible for switching between languages have not yet been clearly described". However, two pieces of information showed bilinguals' ability to "recruit a greater extent of the brain's classic language processing tissue than monolinguals". The second information being bilingual people's ability to "behave" as monolinguals' when their brain is processing either one or the other language. The reported studies have cleared the misconceptions about bilingual children's confusion since Bialystok (2007) managed to prove "increase metacognitive and metalinguistic skills" in bilingual children.

The general conclusion that can transpire from this section is the clear improvement of bilingual's brain's regions linked to language, as well as to different executive functions. Both grey and white matter seem greater in bilinguals, and most especially simultaneous bilinguals. It was also clearly stated that, for similar tasks, bilinguals and monolinguals use different parts of the brain.

Moreover, thanks to more recent studies in the last 30-40 years, it is possible to notice greater cognitive and executive function (attention and working memory) abilities in bilingual children. It has been shown that bilingual children have many different positive skills
brought up by their bilingualism such as multitasking, sound discrimination in infants as early as 4-6 months old. Bilinguals also show greater capacities for non-linguistic related tasks such as focus, and decision-making, for example, also showing more lighting up on the scans in the brain regions related to prioritising, planning, analysis, to name just a few (Willis, 2012).

We also managed to report the results of comparative studies of monolinguals and bilinguals' brain analysis. The subjects were suffering either from AD or MCI. Most of the studies have been done on subjects with one of these illnesses and it was not possible to find a study on healthy subjects.

## III.2. Academic benefits of bilingualism

Our study on bilingualism and bilingual children's language development would not be complete if we did not analyse the academic results of these children. Indeed, what better way to prove bilingualism's efficiency and usefulness but through a comparison of bilingual and monolingual children's academic results. The hypothesis is that bilingualism provides bilingual children with a better basis for learning other subjects at school, therefore leading them to succeed better than monolinguals in several other subjects. We will make a review of the literature on the subject. We should conclude to a greater academic success in bilingual children from early on until the end of adolescence.

## III.2.1. Literature review on the link between bilingualism and academic benefits

Most of the studies regarding the link between bilingualism and academic achievements usually consider immigrant children who may learn their second language at school, or, if they belong to the second
generation, may not speak the community language properly as they only speak their parents' tongue at home. There are very varied cases of "bilinguals at school", but we only present a few of them.

There has been a certain amount of research on the overall school achievements of bilingual children. Some (Collier \& Thomas, 2017: 6) have hypothesised that there is a difference in academic success between additive and subtractive bilinguals ${ }^{42}$, that is when bilingualism has either a negative or a positive impact on the child's language development, usually depending on his type of bilingualism (imbalanced or balanced). They compared a certain category of children in dual classes with those in non-dual classes and found that "all of these groups attending dual classes outperformed their peers not in dual language" (2017: 10). Collier \& Thomas (2004: 301) also found that "only those children who received strong, grade-level cognitive and academic support in both languages for many years were succeeding at the end of high school". They also mentioned that those same children's performance was equal if not better than their English monolinguals peers, especially for those who were "[b]ilingually schooled student, after 4-7 years of such instructions". Moreover, Collier \& Thomas (2004: 315-316) also found that regarding the "English-Dominant Bilingual and Mixed Bilingual children whose score at kindergarten entry was lower than the ones of the "White English Monolingual children by fifth grade on both reading and math scores", their later score ended up being as good as "(for Asian children)" if not better "(for Latino children)" than their monolingual peers. They also analysed the opposite results with "nonEnglish Dominant Bilingual children" who, in comparison, had "significantly lower reading and maths scores" but who also did not catch up by fifth grade. They did however reduce the gap between

[^28]themselves and their monolingual peers, mainly regarding their maths results.

Moreover, other researchers such as Mouw \& Xie (1999: 232-233) following Cummins (1977), Peal \& Lambert (1962) and Bankston \& Zhou (1995) have developed a "cognitive perspective" and a "cultural perspective" to bilingualism. The former ones "suggest that bilingualism is beneficial to mental development because it allows bilingual children to switch easily between two linguistic mediums". The latter ones "hold that bilingual children have better access to the ethnic and cultural capital of their parents than do their monolingual counterparts".

Lin \& He (2019: 4) mention Cummins (1979: 232) who invented the term Threshold Hypothesis (TH) and who stated that "the level of linguistic competence attained by bilingual children may act as an intervening variable in mediating the effects of bilingualism on their cognitive and academic development".

According to Cummins (1979), the level of academic achievement in bilinguals solely depends on the type of bilingualism the person has. Indeed, in a subtractive bilingualism or semi-lingualism, it is more than likely that the children's academic results will suffer. In the case of a dominant bilingualism, "there are no longer positive or negative cognitive effects on their bilingual competence". However, in an additive bilingualism, the children "will most likely enjoy cognitive and academic advantages". Therefore, it is crucial that bilingual children reach a somewhat balanced bilingualism at the risk of seeing both languages partially development, leading to a negative impact on academic achievement. Moreover, conclusions from Lin \& He (2019: 8/12) showed higher results in "GPA [(Grade Point Average)], CET4 [(College English Teaching)], and CET6 averages" (the students begin school between 4 and 6) for the students enrolled in bilingual classes. Their main conclusion was that students with an additive bilingualism
were more likely to have greater academic achievements than those with semi-lingualism, or subtractive bilingualism.

Turnbull et al. (2003: 7) have stated that "results show that initially immersion students' achievement in English lags behind in their academic potential. However, the results also suggested that within one year of the introduction of English language arts into the curriculum, immersion students catch up with comparable students in the regular English program".

However, it is shown that students catch up their delay from the moment when they are introduced to the "formal instruction in English". Turnbull et al. (1999: 8) explains that these children simply cannot express what they wish to since they do not have the words for it. They therefore state that "this phenomenon can be explained by the theoretical premise that in situations of additive bilingualism, linguistic, cognitive, and academic advantages accrue because L1 skills are already well established when exposure to the L2 begins". Turnbull et al.'s discussion of the results (1999) states that either this greater improvement could also be the results of the natural academic growth between $3^{\text {rd }}$ and $6^{\text {th }}$ grade, since no child and no teaching is the same between these two levels, or it could be that the ones remaining in $6^{\text {th }}$ grade originally have a greater level than in $3^{\text {rd }}$ grade since those with a lower level would already have abandoned by $6^{\text {th }}$ grade.

The difficulty of showing clear and strict results regarding bilinguals' academic achievement mainly lies in three different reasons, as detailed by Lindholm \& Aclan (1991: 100-101):
> "(1) language majority students enjoying an additive bilingual program that enables them to add a second language to their first (i.e., Canadian immersion or U.S. Immersion); (2) language minority students enjoying an additive program that enables them to keep their native language while also learning English (i.e., maintenance bilingual education); (3) language minority students in a subtractive program - one that requires them to learn English as quickly as possible to support their native language, which is minimally, if at all, developed in the program (i.e., submersion, ESL pull out, transitional bilingual)"

Lindholm \& Aclan (1991) came to the conclusion that being bilingual can have a positive effect on academic results. However, not every bilingualism can lead to these positive academic achievements as it is crucial that the child's proficiency in their two languages be equal to each other, at the risk of having the opposite effect if the child evolves in a subtractive bilingualism. But the pure linguistic skill is not the only thing that matter when speaking about academic achievement in general. Lindholm \& Aclan (1991: 102) explain that it also "requires the development of both academic and conversational skills". According to them, the former is mostly used in the classroom and "require[s] more precise and elaborated language", while the latter is rather "context embedded" and is "used in everyday conversation". Finally, they state that these academic language skills fully "depend on linguistic cues rather than context, to interpret the communication; reading, writing, and analyzing language (e.g., providing definitions)" (1991: 102). Therefore, their main findings showed that highly proficient bilinguals' academic results were greater than the ones of lower, or even medium proficient bilinguals in all of the categories tested, that is "Spanish and English reading and Spanish and English mathematics" (1991: 111). This shows that according to the type of bilingualism, and when said bilingualism has reached proper level (that is when the "bilingual individual [has developed] full academic language proficiency in both languages" (1991: 112)), there "may be [development of] an advantage over students who have low or even intermediate levels of bilingual proficiency" (1991: 111).

There are not a lot of studies regarding bilingual children's academic success over the years, although O'Connor et al. (2017: 5) studied multilingual children in Australia by separating them into two groups: children who were proficient in English by age 6-7, and those who were not. They stated that "[...] children who entered school having not yet attained receptive English vocabulary skills showed poorer reading skills at Grade 3, even after accounting for child and socioeconomic characteristics (proficient by 6-7 years: $\mathrm{p}<0.05$; not yet
proficient by 6-7 years: $\mathrm{p}<0.01$ ). By Grade 5 , however, only those multilingual children who were not yet proficient at 6-7 years showed poorer reading skills ( $\mathrm{p}<0.05$ ). Multilingual children who began school with proficient receptive English vocabulary skills were not significantly different from their monolingual peers in reading outcome once covariates were accounted for". Similar results were found in the study on numeracy.

## III.2.2. Focus on simultaneous and sequential bilinguals' academic achievements

A study by Ozfidan (2017: 38) is based on respondents' answers to a survey regarding their opinion on the "academic value of bilingual education", and he developed the data found in Illustration 32, in which he states that "access to bilingual education will have a positive effect on all students' academic achievement" in a statement with which a total of $81.29 \%$ either agree or strongly agree with the statement. As for the mean score (4.14) seen in Illustration 33, Ozfidan (2017: 39) states that as the highest mean score in his study was 4.17 , the great majority of the respondents agreed with the original statement.

| $\#$ | In my opinion, | Strongly <br> Disagree | Disagree | Neutral | Agree | Strongly <br> Agree |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: |
| 9 | Access to bilingual education will have a <br> positive effect on all students' academic <br> achievement. | $2.88 \%$ <br> $(4)$ | $7.19 \%$ <br> $(10)$ | $8.63 \%$ <br> $(12)$ | $35.97 \%$ <br> $(50)$ | $45.32 \%$ <br> $(63)$ |

Illustration 32: "[...] percentage of participants about academic value of bilingual education" (Ozfidan, 2017: 38).

| $\#$ | In my opinion, | Mean | SD |
| :--- | :--- | :---: | :---: |
| 9 | Access to bilingual education will have a positive effect on all <br> students' academic achievement. | 4.14 | 1.04 |

Illustration 33: "Perception scale on the academic value of bilingual education (Mean scores and standard deviation values)" (Ozfidan, 2017: 40).

Berken et al.'s main conclusion (2016) was that there was a noticeable difference between the way the brain was shaped according to whether one had acquired an L2 earlier or later on in life.

The different studies existing regarding the greater potential bilingual children have in comparison to monolingual children have mostly focused on Working Memory (WM) since it is at the basis of many abilities related to the brain and skills, whether it be in monolinguals or bilinguals, such as executive functions and switching, for example. Indeed, some studies have found a considerable advantage from bilinguals onto monolinguals regarding WM skills (Soliman, 2014) and numerical knowledge (Daubert \& Ramani, 2019: 326), especially in pre-schoolers, mostly in addition and numeral identification, but not better than monolinguals "on measures of symbolic and non-symbolic magnitude comparison". According to Hoff et al., (2012), Legacy et al. (2016), Pearson et al. (1993), quoted by Daubert \& Ramani (2019: 326-327), bilinguals' greater WM also seems to be the main explanation for their greater skills in additions and numeral identification. Studies have also shown that bilingual children have a vocabulary size comparable to, if not larger than, monolinguals if both languages are taken into account.

Morales et al. (2013) reported that bilingual children were mostly performing better than monolingual children regarding working memory on certain tasks such as the Corsi blocks tasks (Corsi, 1972) with 5- and 7-year-old and a comparison of 8 and 12 years-old monolingual and bilinguals on measures using a four-factor latent variable approach which are the phonological loop, the visuospatial sketchpad, the central executive, and the episodic buffer, as represented by Soliman (2014: 173-175) in Illustration 34:


Illustration 34: "A schematic representation of four WM components for the data from monolinguals; the significant coefficients are in bold" (Soliman, 2014: 173)

Soliman (2014: 175) found that bilingual children outperformed monolingual children as regards to these four components which "might be explained by the suggestion that the bilinguals' experience with the second language made them more able to switch between the two languages and inhibit cross-linguistic interference. This is expected to increase executive functioning, particularly inhibition, organization and switching".

Daubert \& Ramani (2019: 326) state that other studies focused on bilinguals' greater reading performance and academic achievement (Seadatee-Shamir \& Siavoshi, 2014: 351) showing that bilinguals have "significantly higher scores on reading performance and academic achievements than [monolingual] peers ([also found in]

Girbau \& Schwartz, 2008; Siegel, 1988; Ferrari \& Palladino, 2007; Carlson \& Meltzoff, 2008)", leading them to conclude that growing up with two languages "helps them to extend the storage of the different vowels, sounds, letters, and benefit a rich cognitive and linguistic storage in their memory". This is therefore the reason why bilinguals have the ability to improve both knowledge and memory to reach greater academic performance than monolinguals. Seadatee-Shamir \& Siavoshi (2014: 348) take Bialystok $(1988,1997)$ for reference since she concluded on bilinguals as having greater skills in reading and academic achievements. According to Seadatee-Shamir \& Siavoshi (2014: 348), Bialystok (1997) also suggests that "the basic features of the language acquisition process in both groups [monolinguals and bilinguals] are very similar but bilinguals outperform their [monolingual] peers in different cognitive tasks which lead to academic achievement" [...]. According to Seadatee-Shamir \& Siavoshi (2014: 348), the very way bilinguals have to deal with an input of two different languages leads them to "have higher levels of linguistic awareness when compared to their [monolingual] peers". Seadatee-Shamir \& Siavoshi's main conclusion (2014: 348) explains the natural outperformance of bilinguals over monolinguals in academic tasks by the fact that these tasks require "broad and flexible knowledge of linguistic and semantic". Bilinguals have also been found to outperform their monolingual peers in studies based on comprehensive tests taken in the language of the monolingual testtakers (Fenoll, 2017), most especially in language- and mathematicsrelated tests. The four tests used were:

- Letter Word Identification "measur[ing] symbolic learning and reading identification skills";
- Applied Problems "evaluat[ing] aptitude in practical problem solving in mathematics";
- Passage Comprehension "assess[ing] reading comprehension and vocabulary";
- Calculation which "determines mathematical and quantitative ability" (Woodcock \& Johnson, 1989).

There is also a drawback where a certain number of studies have also found no significant greater performance in bilinguals as compared to monolinguals. The main finding shows that, following Bialystok's results (2009), "[...] bilinguals typically outperform monolinguals on nonverbal executive function tasks whereas monolinguals outperform bilinguals on verbal executive function tasks" (Daubert \& Ramani, 2019: 316), as briefly stated above. The latter also report studies (Bonifacci et al. 2011) that have found results where both monolinguals and bilinguals from 6 to 12 years old were performing similarly. There is also mention of a study from Engel de Abreu (2011) who found no difference between bilingual and monolingual children who had to "count and recall circles, or backward digit recall". However, monolinguals did outperform bilinguals especially in the "verbal nonword repetition task [...]", which follows the previous results presented from the literature (Bialystok, 2009) explaining bilinguals' prevalence in "nonverbal executive function tasks".

Among the studies to have evaluated bilingual children's academic success to an extent, whether the goal of the study was to do so or not, we have found Han (2012), in Bialystok (2018: 670), who concluded that children's bilingualism was indeed beneficial as regards to academic achievements. Han's results (2012) showed that the bilingual children whose home language was different from the language of instruction entered kindergarten with a lower achievement in English and Maths than their native peers, but "closed the math gap by fifth grade".

Since it is easy for most children in early immersion programs to catch up on their language delay as soon as "the threshold amount of English-language instruction needed to get in motion gains in English language" (Turnbull et al., 1999: 15), almost all these children also
manage to catch up on their overall delay caused by a lack of performance in the L2 (English). Following this catch up, it is specified that "[...] although immersion students (except those in total immersion to the end of grade 3 ) do as well as their regular program peers on tests at grade 3 , they outperform them at grade $6 "(1999: 15)$. According to Turnbull et al. (1999: 15), "[...] early immersion students may on average have greater academic potential than those in the regular program. This greater aptitude does not translate into better performance, however, until supported by the amount of formal instruction in English represented in the second threshold".

Turnbull et al., 1999 also state the great importance of having a basic level of formal instruction in English since it "may [later] involve metalinguistic effects associated with bilingual education".

Lindholm-Leary \& Genesee (2014: 169, underlined in the original text) have come to interesting conclusions regarding the difference of academic results in other competences between early and sequential bilinguals. According to the authors, "below average students in both early and late immersion scored lower on tests of French reading and writing than average and above average students in the same programs; similarly, the average student in both program types scored lower than the above average students". But they also pinpoint something worth noting, the difference with late immersion average students who "also exhibited advantages on measures of speaking and listening in comparison to average and below average students in late immersion [...]". What can also be noticed is the lack of clear differences "between ability sub-groups in the early immersion program on measures of speaking and listening in the L2". The difference of immersion - whether it be early or late immersion changes the students' exposure to the language. Typically, children in early immersion will have a longer exposure to their immersion language than children in delayed or late immersion, therefore showing greater achievements in the said language or other school subjects. This has also been shown by Lindholm-Leary \& Genesee
(2014: 171) who reported early immersion students to "generally achieve significantly higher levels of French proficiency than students in programs with a delayed (middle elementary grades) or late (beginning of secondary school) starting grade (Genesee, 1981; [...]). However, Canadian research has shown that despite the greater ability of early immersion students in comparison to delayed or late immersion students, those "in two-year late immersion can sometimes achieve the same or almost the same levels of proficiency in French as students in early total immersion in some domains of language [...] (Genesee, 1981)" (Lindholm-Leary \& Genesee, 2014: 171). Furthermore, bilingual students' greater academic skills do not necessarily stop at the language level, their abilities may even extend to other school subjects such as "mathematics, sciences, history, and other subjects [...]" as explained by Lindholm-Leary \& Genesee (2014: 168) since immersion students "achieve the same levels of competence as comparable students in mainstream programs [...]".

Following this study, Lindholm-Leary (2014), as reported by Bialystok (2018: 668-669), found that, when studying a group of Hispanic children in the USA in either English or bilingual programs, the group in the English program became less bilingual while the group in the bilingual program reversed the original trend after one or two years by scoring better in both Spanish and English in comparison to their peers in the English program who had scored better upon arrival.

What appears from these studies (Genesee, 1983, 2007; Hermanto et al. 2012; Swain \& Lapkin, 1982 in Canada; Montanari, 2013 in Italian-English languages in the USA; Padilla et al., 2013 in Mandarin-English languages in the USA; Schwartz, 2013, and Schwartz \& Shaul, 2013 in Hebrew-Russian language in a Hebrew community) is the fact that when the language of instruction is opposite to the community language, the children perform better than when the language of instruction is the same as the community language, leading the children to also lose some of their minority
language skills. Bialystok (2018: 670) states that "[a]cross all these studies, therefore, the majority language of the community was mastered whether or not it was the primary language of instruction, but the minority language required environmental support to reach high proficiency levels".

We had ourselves published an online survey in order to collect data regarding bilingualism and academic success in comparison to monolingual children of the same age. Our goal was to collect data providing results showing that bilingual children of various ages have better grades at school than monolingual children. The survey's questions included children's age, the languages spoken by parents, but also the language spoken by the main parent ${ }^{43}$ (the community language, the child's second language, or both), at what age the children became bilingual, their overall school grade, and which language was spoken at home. Unfortunately, not enough people answered the surveys, and the few people who did answer skipped the question about school, therefore making the results moot.

Such a study should be made in order to understand the impact of bilingualism on academic success in comparison to monolingual children. This study should however be made on balanced bilinguals, both groups (bilinguals and monolingual control group) should be of similar age, the community language should be the same for all bilinguals, and the main parent should be speaking the same language for all bilinguals.

[^29]
## III.3. When parents and children do not speak the same language

The studies that we found regarding the link between children's academic success and their parents' language skills are mostly related to immigration, where the language of the community is not spoken at home, where the parents do not speak the language of the community and where the children sometimes have to learn the language of the community as they enter school since they did not have any exposure to the said language in their upbringing.

The literature report and suppositions we will be making in link with those reports are only hypotheses and theories of what the results could be in such studies.

Further studies should therefore be made to analyse bilingual children's academic achievements in cases where the parents either speak the community language and not the child's second language; or where the parents speak the child's second language and not the community language. Seeing the rise of numbers of multicultural (multi-ethnic, multiracial) families, there are great opportunities regarding this kind of study with bilingual children brought up in families where either the father speaks the community language and not the second language, or the opposite, while the mother speaks the second language and not the community language, or the opposite.

## III.3.1. Parents' use of the child's languages

It is suggested by a report from the OECD (2021: 138) that "parents' target language proficiency is positively associated with higher proficiency in foreign languages among students in Japan (Yoshitomi, 1990), but also across European countries (European Commission, 2012; Bonnet, 2002; Lindgren \& Muñoz, 2013). Although these studies mention foreign language proficiency, we can speculate that
there are similar results when parents do not speak one the child's languages, and most especially if it is the community and school language. One of the reasons is that a parent's proficiency in all of the children's languages can lead "parents to help children with homework [...]" (Yoshitomi, 1990 in OECD, 2021: 138) but also with the practice of the parents' second language through activities for example. Moreover, the parents being proficient in their children's languages can help increase the children's self-confidence, self-esteem and pride in those languages, but can also be a good example that learning and practicing is a good opportunity for improvement, and can lead the children to be more motivated for their school work.

According to another report from the OECD (2019), it was found that "families play an important role in fostering academic and nonacademic success for students [...], for example by developing students' self-confidence" (OECD, 2021: 138).

Another study (ELLiE, 2011: 119) found that parents' proficiency and use of their children's Foreign Language (FL), which they learn at school, has significant impact on their children's achievements in the said language.

## III.3.2. When the children do not speak their mother-tongue, a case of first language attrition

Bilingualism does not always mean two valued languages learned at the same time when a child grows up. Sometimes, it involves immigration and the learning of a second language during preschool years. Some families, with the aim of helping their child's integration in the country, end up giving up their mother-tongue and use the language of the community with the children who are still in a phase of first language acquisition and/or development, while they are not proficient in the language of the community. This technique will most likely lead the child to failing in different areas of school, since they
have not been given the opportunity to reach sufficient proficiency in their mother-tongue, leading them to not having enough linguistic basics to learn a second language. Moreover, the parents using the community language may themselves not be proficient enough to transmit a "proper" language to their children, leaving them with an underdeveloped mother-tongue and a partly developed community language. It is crucial for these families to keep using their mothertongue, even if they are not considered as valued languages, in order for their children to have sufficient language exposure to be able to learn a second language. A situation where the child does not know either of his languages with sufficient proficiency will lead them to poor academic achievement. They would not be able to properly learn the community language; as we have seen before (cf. Chapter I.8), the basis of a first language is crucial to be able to learn a second language. Moreover, they would not have the necessary support at home to make their homework, or learn their lessons for example. Mouw \& Xie (1999: 245) mention that "this indicates that nativelanguage use has a positive effect on achievement if parents are not proficient in English and virtually no effect if parents are proficient in English". They (1999: 234) however also link language proficiency with Socioeconomic Status (SES) and state that "estimated effects of bilingualism on academic performance are biased downward if this negative association between bilingualism and SES is not properly controlled". This means that children from lower SES tend to have lower academic achievement only when their parents have mastered English. It is however greater when the parents have not yet learned the community's language. Moreover, according to Mouw \& Xie (1999: 246), the results can be explained by the fact that once the parents master some of the community's language, it does not matter which language they speak to their children, therefore leading sometimes to the loss of the mother-tongue, or the cultural language. It can also happen that the children who speak English fluently stop or reduce the use of their parents' native tongue, therefore creating a comprehension gap between parents and children, possibly leading to
lower academic achievement. They concluded that there was "no positive effect of bilingualism on achievement for Asian Americans", but only when parents were proficient in English.

Moreover, in these cases, children might call on CS in order to compensate the lack of proficiency in their two languages. Attriters (the speakers who suffer from language attrition), says Schmid (2013: 118-119), will either use borrowing, for which we have already given a definition, which is here defined as "the use of an item from the L2 in the L1, often in such a way that it is integrated phonologically and/or morphologically". They can also be using restructuring, defined as follows: "the meaning of an existing L1 word is extended to include the meaning of its L2 translation equivalent. This process often involves verbs which have undergone semantic bleaching and been turned into quasi-auxiliaries". There can also be convergence, that is "where both languages offer lexical items that are similar in form but different in meaning (faux-amis), attriters may sometimes be misled to use the L1 term with the L2 meaning". And finally, there can be a shift, which "usually affects areas of the linguistic repertoire which are highly culture-specific, such as politeness systems". In these situations, CS can be of great help when a child does not have great skills in either of their languages and can use CS to link both languages as "one language".

Abdelilah-Bauer (2015, our translation) also states that "according to many researchers, the premature interruption of the mother-tongue's acquisition can have repercussions on the child's cognitive development, adding to the fact that the educational role of the parents is weakened by the use of an ill-mastered language" ${ }^{44}$. The main risk is called semi-lingualism, which is when a bilingual child is insufficiently proficient in their two languages. This risk is higher when the mother-tongue comes from a dialect or a minority language

[^30]and will not be learned at school, or does not have the support that can be found on television or in the newspaper, for example.

We should also mention that suppressing a child's mother-tongue is also linked to suppressing their mother-culture. When a child arrives in a country in which he is forbidden to speak his mother-tongue, and is disconnected from his mother-culture, there is a greater risk of academic failure. Abdelilah-Bauer (2015, our translation) however states that the academic level of allophone children who were schooled in submersion ${ }^{45}$ seemed to perform below the level of their monolingual peers in the English language in the time frame of 3 to 7 years. According to her, "it is only at the end of this period of schooling that it is no longer possible to detect any difference in the linguistic conceptual level between a monolingual child and another child who learned English later" ${ }^{36}$.

Moreover, according to a researcher we have previously mentioned, Lüdi (2006), "submersion teaching in the dominant language leads to the worst results regarding education, may it be academic or linguistic, and more often leads to failure. On the contrary, a bilingual education based on the mother-tongue represents the basis for long term success".

This shows that, when asked about bilingualism and academic achievement, one cannot simply answer with a "yes" or "no" since it is obvious that the study is larger than initially expected. There are several data to take into consideration when analysing the academic achievement of bilingual children such as which language(s) do the parents speak, if the main parent speaks the community language, the child's language or both languages, if the child became bilingual

[^31]before 5 , after 5 and before 10 , or after 10 years old, to mention only a few.

## III.4. Impact of bilingualism for individuals, companies, and countries

First of all, it is important to mention that bilingualism has of course various meanings and purposes in different countries. In this section, we will focus on the link between bilingualism and the economy in Western countries whether it be for the individual, for the companies or for the countries. Since our current study analyses French-English bilingual children, we will focus mostly on one French- and one English-speaking countries (Canada and the USA), as well as Switzerland. Our focal point will be on the USA, France, and Canada since the first country has English for national language and about 80\% of the US population speaks English only, ditto in France, where French in the sole official language since 1992. There are however many dialects and regional languages that are still widely spoken. Finally, Canada has both French and English as official languages, but about $56 \%$ of its population are English monolinguals while most of the French-speaking population resides in Quebec. Around 30-37\% of the Canadian population is monolingual French.

The goal of this section is to present the long-term advantages of being bilingual. Any bilingual growing up into adulthood would wish for this specificity to be useful one day in their work situation, and possibly be advantageous regarding their future wage. Companies and countries can also benefit from this specificity; it may be crucial to make employers see the advantages of employing bilinguals over monolinguals.

In this section, we will present what is found in the literature about the impact of bilingualism in the three countries mentioned above, focusing successively on the "micro", "meso" and "macro" levels.

This section will therefore allow us to present the reasons why all along our study, bilingualism is extolled, and why it is important to not only start at an early age, but to keep going despite the linguistic obstacles that bilinguals may face along the road.

It is however also worth mentioning that depending on the country we take as reference, the languages to be learned and to be bilingual into will also be different. If we take the US for example, Spanish will be the second language to learn since about $13 \%$ of the population speaks it as a mother-tongue (usually in tandem with English). In Canada, French and English are both official languages, but the third language to be learned would be Chinese (both Mandarin and Cantonese) since $3.5 \%$ of its population speaks it. Finally, in France, the second language to be learned is one usually categorised into Arabic languages, that is the Berber language mostly from Algeria and Morocco which is spoken by about $2.2 \%$ to $2.9 \%$ of the population. Thanks to these three examples, we can therefore imagine that, when mentioning bilingualism and its positive advantages and influence on the work place, it usually refers to valued languages whether it be for their historical situation, or for the immigration situation of the country.

## III.4.1. Literature review

In this part, our main source of information will be a literature review by Canadian Heritage (2016: 6). When we observe the advantages brought to a company by bilinguals, they can make use of their "hard, technical 'language skills', as well as 'soft skills'. [...]" The former, "micro", seems to bring benefits on "the micro-economic [level] for the individual, 'meso' level benefits for the company and macroeconomic benefits for the country", which is also the outline we will be following for the literature report section of our study. The latter, "macro", are mostly seen through the greater capacities bilinguals have regarding "mental adaptability; flexibility in task execution;
attention to detail; and, many useful social communication skills", but also "communication skills, listening and interpersonal skills, greater cultural awareness, determination and discipline and a readiness to learn" as stated by Mann et al. (2011: 11) and reported by Canadian Heritage (2016: 11) which is supposedly more transferable in bilinguals.

There are many different reasons to pursue bilingualism and Canadian Heritage (2016: 1) mentions that the "globalization and the implementation of new free trade agreements, such as the Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union, and the Trans-Pacific Partnership Agreement" have forced Canada to make use of all its assets. Among those assets is bilingualism, to "stay ahead of worldwide competition and capitalize on Canada's unique value proposition". All Western countries have seen their bilingualism rate increase. Lepage and Corbeil (2013) report that there were about $17.5 \%$ of French-English in Canada in 2011, while Marian \& Shook (2012: 2) repot that there were around $19.73 \%$ in 2007 in comparison to $10.97 \%$ in 1980, and mentioned by the Canadian Heritage (2016: 6).

Another dimension is the difference in earnings between monolinguals and bilinguals, and especially if those bilinguals are female or male. In our Western society, women usually earn less than men, but CliftonSprigg \& Papps (2021: 79) have found that bilingual women also earn less than monolingual women, and that there is no wage difference between monolingual and bilingual men. They explain this difference in women by the fact that most of them were located in "areas with a high fraction of non-English speakers" since these are places where "there may be limited employment opportunities". Moreover, "a negative earnings effect is only found among bilingual women who speak South Asian or less-common languages". However, overall, they also did not find any correlation between bilingualism and higher earnings (2021: 91), for the selected and analysed languages. They mention that although some spoken languages seem to lead to lower
earnings "perhaps due to discrimination", others do not show lower wage correlation than the ones of monolingual female. They add that "among men, no language has a significant effect on earnings".

## III.4.2. At the "micro" or individual level

Despite the proven executive function and cognitive benefits of being bilingual, there are also several advantages of being a bilingual job seeker. Indeed, Canadian Heritage (2016: 8) states that, thanks solely to the fact that they are able to speak two languages, bilinguals have an "insurance against lay-offs, higher wages and rates of employment, higher paying occupations and industries, greater labour mobility". These few examples can only motivate an individual to learn a second language, but also motivate parents to raise their children in a bi-multi-lingual setting, therefore offering them greater chances later in life.

In Canadian Heritage (2016), Grin (2002: 22) is mentioned as having introduced a new term called "language-economy" 47 to speak of a language which is "spoken by both an employee and a costumer [which] will lead to economic fair in comparison to a costumer and an employee speaking two different languages". There has been a report in a Swiss study (Grin et al. 2009) regarding the raise of a cost of labour and the dismissal of employees. They have found that "bilingual employees are 235 times less likely than monolinguals to be let go" in such a case. But also, "the Swiss LEAP study found that, as wage rates rose by $5 \%$, employers were less likely to let go of bilingual workers (3.7\%) than unilingual workers (8.7\%) despite their higher cost" (Mann et al., 2011, in Canadian Heritage, 2016: 10). A UK study regarding students in different academic pathways reports that those in technical and professional programs "such as law and business" do less well than those in Foreign Language (FL) programs who are reported to be "more likely to be working or in further study"

[^32]and "to have a higher average salary than STEM graduates" (2016: 10). Similar reports can be found in the US since FL students "enjoy a long-term wage differential vs. those who did not" (2016: 11).

Regarding Canada, Canadian Heritage (2016: 11) states that the "rate of employment and average annual incomes are higher for FrenchEnglish bilingual workers than for English-only or French-only Canadians", that is $37 \%$ higher in Quebec and $15 \%$ higher in the rest of Canada.

These numbers clearly show that, for men, being employed as a bilingual worker has great privileges.

In Christofides \& Swidinsky's study (2008: 11-13), there is a detailed description of the wage rate of bilingual vs. monolingual men and women in Quebec and the rest-of-Canada in which they show that in the rest-of-Canada, "the unadjusted mean annual earnings of bilingual men are 14.7 percent higher than the earnings of unilingual men" (2008: 11-12). On the other hand, "the unadjusted bilingual-unilingual earnings differential [of women in the rest-of-Canada] is also higher, by almost 4 percent". It is also shown that in this bilingualmonolingual comparison, "[...] women whose work language is primarily French earn 4.1 percent more than women who do not have French second language skills [...]".

As seen in Illustrations 35 and 36, males bilinguals in the rest-ofCanada tend to be employed more often as professionals than males monolinguals (between $30.6 \%$ and $42.6 \%$ against $21.2 \%$ ), as well as managers (between $16.5 \%$ and $29.3 \%$ against $17.1 \%$ ). Bilingual women in the rest-of-Canada are also hired more often than monolingual women as managers (except for those using both languages frequently at work, or $5.3 \%$ ), that is between $16.7 \%$ and $16.8 \%$ against $11.9 \%$ ), and as professionals ( $38.9 \%$ and $61.5 \%$ against 29.7\%). They are however less often employed as white collars (between $32.5 \%$ and $42.8 \%$ against $53.2 \%$ ). The difference between both bilingual men and women is intriguing since bilingual men who
use more French at work earn less than monolingual men but bilingual women who also use more French at work earn more than monolingual women.

| Anglophone Males Outside of Quebec |  |  |
| :---: | :---: | :---: |
| Men outside of Quebec | \% Employed as managers | \% Employed as professionals |
| Bilinguals who use mostly/frequently <br> English at work | $22.7 \%$ | $34.7 \%$ |
| Bilinguals who use mostly <br> English/frequently French at work | $29.3 \%$ | $30.6 \%$ |
| Bilinguals who use both (bilingual) or <br> frequently French at work | $16.5 \%$ | $42.6 \%$ |
| Unilingual Anglophone Males | $17.1 \%$ | $21.2 \%$ |

Illustration 35: "Anglophone Males Outside of Quebec". (Christofides \& Swidinsky, 2008: 33) in Canadian Heritage (2016: 12)

| Anglophone Females Outside of Quebec |  |  |  |
| :---: | :---: | :---: | :---: |
| Women outside of Quebec | \% Employed as <br> managers | \% Employed as white <br> collar workers | \% Employed as <br> professionals |
| Bilinguals who use <br> mostly/frequently English at work | $16.8 \%$ | $39.1 \%$ | $40.8 \%$ |
| Bilinguals who use mostly <br> English/frequently French at work | $16.7 \%$ | $42.8 \%$ | $38.9 \%$ |
| Bilinguals who use both <br> (bilingual) or frequently French at <br> work | $5.3 \%$ | $32.5 \%$ | $61.5 \%$ |
| Unilingual Anglophone Females | $11.9 \%$ | $53.2 \%$ | $29.7 \%$ |

Illustration 36: "Anglophone Females Outside of Quebec". (Christofides \& Swidinsky (2008: 33) in Canadian Heritage, 2016: 12)

As for Quebec, Christofides \& Swidinsky (2008: 12-13) state that "the unadjusted earnings advantage of bilingual men whose work language is exclusively French is only 16.4 percent" as visible in Illustration 37 in the Rest-of-Canada, while the " 52.5 percent of the 12.448 Frenchlanguage women in the Quebec sample [that] are bilingual [earn on average] 21.9 percent more than women who are not bilingual" as summarised in the Illustration 38.

|  | Sample <br> Size | Percent of <br> Total Sample | Percent of <br> Bilingual | Annual <br> Earnings <br> \$ | Miffercential <br> Pent |
| :--- | ---: | ---: | ---: | ---: | ---: |
|  |  |  |  |  |  |
| Total Sample | 44,557 | 100.0 | - | 52,739 | - |
| Unilingual | 41,580 | 93.3 | - | 52,223 | - |
| Bilingual | 2,977 | 6.7 | 100.0 | 59,922 | 14.7 |
| BIL/MEFE | 2,137 | 4.8 | 71.8 | 60,178 | 15.2 |
| BIL/MEFF | 737 | 1.6 | 24.7 | 60,914 | 16.6 |
| BIL/FRENCH | 103 | 0.2 | 3.5 | 47,49 | -9.1 |
|  |  |  |  |  |  |
| Total Sample | 33,944 | 100.0 | - | 37,154 | - |
| Unilingual | 30,990 | 91.3 | - | 36,567 | - |
| Bilingual | 2,954 | 8.7 | 100.0 | 43,319 | 18.5 |
| BIL/MEFE | 2,030 | 6.0 | 68.7 | 43,269 | 18.3 |
| BIL/MEFF | 718 | 2.1 | 24.3 | 44,971 | 23.0 |
| BIL/FRENCH | 206 | 0.6 | 7.0 | 38,063 | 4.1 |

Illustration 37: Sample size and average earnings for the Rest-of-Canada (Christofides \& Swidinsky, 2008: 30)

|  | Men |  |  |  |  |
| :--- | ---: | ---: | ---: | ---: | ---: |
| Total Sample | 15,836 | 100.0 | - | 46,071 | - |
| Unilingual | 6,454 | 40.8 | - | 39,559 | - |
| Bilingual | 9,382 | 59.2 | 100.0 | 50,559 | 27.9 |
| BIL/MFFF | 3,837 | 24.2 | 40.9 | 46,036 | 16.4 |
| BIL/MFFE | 4,095 | 25.8 | 43.6 | 53,641 | 35.6 |
| BIL/ENGLISH | 1,450 | 9.2 | 15.5 | 54,256 | 37.1 |
|  |  |  |  |  |  |
| Total Sample | 12,448 | 100.0 | - | 34,352 | - |
| Unilingual | 5,917 | 47.5 | - | 30,804 | - |
| Bilingual | 6,531 | 52.5 | 100.0 | 37,563 | 21.9 |
| BIL/MFFF | 2,673 | 21.5 | 40.9 | 37,43 | 21.5 |
| BIL/MFFE | 2,823 | 22.7 | 43.2 | 37,58 | 22.0 |
| BIL/ENGLISH | 1,035 | 8.3 | 15.9 | 37,859 | 22.9 |

Illustration 38: Sample Size and Annual Average Earnings for Quebec (Christofides \& Swidinsky, 2008: 30)

|  | Men |  | Women |  |
| :---: | :---: | :---: | :---: | :---: |
|  | (1) | (2) | (3) | (4) |
| Constant | 9.774 (711.16) | 9.819 (549.66) |  | 9.508 (601.74) |
| Region (Ontario) |  |  |  |  |
| Atlantic | -0.218 ( 19.41) | -0.206 (18.80) | -0.183 (15.04) | -0.183 (15.52) |
| Prairie | -0.163 ( 13.97) | -0.149 (13.08) | -0.169 (13.30) | -0.163 (13.35) |
| West | - 0.012 (1.65) | -0.006 ( 0.92) | -0.032 (3.88) | -0.027 (3.45) |
| Urban | 0.012 (15.71) | 0.089 (12.99) | 0.162 (20.77) | 0.134 (17.70) |
| Marital Status (Single) |  |  |  |  |
| Married | 0.287 (31.76) | 0.252 (28.56) | 0.067 ( 6.67) | 0.040 (4.21) |
| Divorced/Separated | 0.142 (9.61) | 0.126 (8.71) | 0.047 (3.40) | 0.035 (2.67) |
| Experience | 0.043 (35.51) | 0.039 (33.82) | 0.046 (35.79) | 0.039 (31.88) |
| Experience Squared | -0.763 (27.42) | 0.715 (26.31) | -0.845 (27.62) | -0.727 (24.63) |
| Schooling (High School) |  |  |  |  |
| Trade/College | 0.148 (17.44) | 0.119 (14.20) | 0.178 (18.77) | 0.111 (11.87) |
| Undergraduate Degree | 0.490 (45.63) | 0.409 (35.67) | 0.609 (52.12) | 0.464 (37.14) |
| Graduate Degree | 0.561 (34.00) | 0.508 (29.29) | 0.755 (37.84) | 0.595 (29.16) |
| Language (UNIL/ENGLISH) |  |  |  |  |
| BIL/MEFE | 0.038 (2.48) | 0.024 ( 1.64) | 0.066 ( 4.28) | 0.046 ( 3.14) |
| BIL/MEFF | 0.054 (2.12) | 0.030 (1.21) | 0.093 ( 3.71) | 0.065 (2.69) |
| BIL/FRENCH | -0.084 (1.26) | -0.066 ( 1.02) | -0.073 ( 1.58 ) | -0.071 (1.60) |
| Occupation (Occup6) |  |  |  |  |
| Occup1 | - | 0.323 (30.16) | - | 0.369 (12.14) |
| Occup2 | - | 0.048 (3.97) | - | 0.109 ( 3.97) |
| Occup3 | - | 0.211 (18.58) | - | 0.343 (11.22) |
| Occup4 | - | 0.105 (6.71) | - | 0.214 ( 6.95) |
| Occup5 | - | 0.038 (3.37) | - | -0.019 ( 0.66 ) |
| Occup7 | - | -0.013 (1.11) | - | -0.072 (2.14) |
| Industry (Ind3) |  |  |  |  |
| Ind1 | - | 0.042 (3.95) | - | 0.028 (2.34) |
| Ind2 | - | -0.154 (12.92) | - | -0.207 (16.27) |
| Ind4 | - | -0.004 ( 0.32) | - | 0.111 (7.65) |
| Ind5 | - | -0.207 (14.07) | - | -0.126 (11.03) |
| Ind6 | - | -0.336 (21.43) | - | -0.354 (24.06) |
| Adj. R Squared | 0.168 | 0.212 | 0.169 | 0.234 |
| \# Observations | 44,5 |  | 33, |  |

Illustration 39: "Ln Earnings Regression Results for Men and Women in [Rest-ofCanada]" (Christofides \& Swidinsky, 2008: 31).

Nowadays, one of the benefits to bilingualism aside from greater job opportunities as well as being better for one's brain, as explained earlier in this study, is that it can lead someone to have a higher paid job. Christofides \& Swidinsky (2008: 17) provide a table (Illustration 39) "which captures both the inter- and intra-industry and occupation effects, [and] shows that women who are fluent in French but use only English at work earn 6.6 percent more than women who are fluent only in English". Moreover, "those who additionally use French frequently at work earn 9.3 percent more, but those for whom French is the primary work language earn 7.3 percent less". Moreover, Christofides \& Swidinsky (2008: 24) state that "the earnings of men
who are bilingual but work exclusively in French are 7 percentage points higher, and those who frequently use English at work are 20.9 percentage points higher". On the other hand, "the earnings of men who are bilingual but work exclusively in English are 3.8[\%] higher, the earnings of bilingual men who frequently use French at work are 5.4[\%] higher [...]".

It was also found that bilingual workers are more willing and able to move and relocate (in the provinces in Canada, but this is also true in general). This mobility that is given to bi-multi-linguals brings great possibilities to migrate in a country with better economic prospects (2016: 15). In Canadian Heritage (2016: 15), Bernard et al. (2008: 24) states that this occurs three-times more for Francophones outside of Quebec and ten-times more for Anglophones in Quebec. Bernard et al. (2008: 16) also observed that:
> "a number of Canadian studies of interprovincial migration show that, while interprovincial mobility has positive earnings for individuals (and a net positive effect on productivity levels in the country), it also tends to increase provincial disparities in skills and human capital".

In another report by Canadian Heritage (2016: 47), a study by Ipsos for Canadian Parents for French in 2008 revealed that $84 \%$ of employers would favour French-English bilinguals. Another study, by the Canadian Council on Learning (CCL, 2003: 5) and reported by Canadian Heritage (2016: 47), revealed that out of the 133 Canadian businesses questioned, "more than half (55\%)" saw a greater employability in bilingual candidates than monolinguals

In the European Union, the situation is different. Aparicio \& Kuehn (2013: 2) as quoted by Canadian Heritage (2016: 15) have found that despite the great efforts in the EU to have students learn Foreign Languages of European countries in which they could emigrate to,
"youth unemployment rates remain quite high in many parts of the EU". EU universities are however working on increasing French as a Second Language courses.

## III.4.3. At the "meso" level or company level

Bilingualism's advantages can also be found at the "meso" level, as explained by Canadian Heritage (2016) since it has great economic value for companies and sectors. In our $21^{\text {st }}$ century society based on globalisation, it is crucial that companies seek out expansion, and therefore multilingualism as their employers will be driven to interact with more people with different languages, therefore opening the door to more trading possibilities. At the "meso" level, it also depends on the type of companies, whether they are small businesses, or medium sized national ones which both "rely more on official languages as they tend to focus on domestic or internal market" (2016: 17). Then, there are bigger businesses focusing more on their international market and "rely as much or more on English, or the languages of their export markets", therefore needing to employ people who have skills in the different languages.

Canadian Heritage reports results found by a few researchers cited in TIBEM (2006). Many of the larger companies (50-75\%) have been shown to make "FLS a requirement at the stage of recruitment" according to Gielis (2000), Hagen (1992) and Menten (2002), among other studies quoted by Canadian Heritage (2016: 17). These requirements (most especially in Belgium, but also in other European countries) tend to lead "to several jobs being unfilled". One of the bigger problems faced by some of the companies who have not employed bilinguals (about $15-20 \%$ of them) is that they "have lost business due to an inability to communicate in the relevant language" (2016: 18). They maintain that the (non-) employment of an individual based on their linguistic skills really depends on the type of job and communicational needs. Canadian Heritage (2016: 20) explains that if
there is a greater need for costumer/employee interaction, the communicational needs are more important than the professional needs while the latter are more important in other case, in which "the employer was prepared to invest in language training, provided that the candidate was already at least bilingual, or at least had the basics of the required language".

In order to give a few figures, the Grin et al. (2009) LEAP study "found that multilingualism contributed to a wide range of economic sectors, and that Swiss multilingualism generated 46 billion Swiss Franc ( 49 billion CAD), or $9 \%$ of Swiss GDP (cited in Bel Habib, 2011: 8)" (Canadian Heritage, 2016: 21).

In a UK study, it was stated that "the more value UK export managers placed on FLS, the higher their likelihood in making over $€ 750.000$ in annual export turnover" (Canadian Heritage, 2016: 22).

In the EU, there has been downsides of not having FLS employees since "the ELAN survey of 2006 found that $11 \%$ of respondents (195 SMES) had lost an export contract for lack of FLS - worth 1 million euros for 10 of them, and between 8 and 13,5 million euros for 37 of them, and between 16,5 and 25,3 million euros for 54 of them (Hagen, 2011: 4; Bel Habib, 2011: 10). On the other hand, only $4 \%$ stated having lost a contract due to cultural barriers" (Canadian Heritage, 2016: 23).

Moreover, an OECD report (2021: 10-11) mentioned that "a study from the United States shows that college graduate who speak a second language earn wages that are $2 \%$ higher, on average, than those graduates who do not (Saiz \& Zoido, 2002) [...]".

Moreover, Ahmad (2016: 16) mentions that the "employees who have multilingual knowledge sharing network perform better than the ones with monolingual knowledge sharing network". One of the main reasons, according to him, is that "diversity in networks brings different perspectives". The wider access to information thanks to access to different languages is a definite advantage for a company.

The use of CS can also be helpful and raise the company's international visibility and image. For example, if a presentation is made in English for all the employees to understand, but the client is struggling to comprehend a few words, the bilingual employee can easily switch to the client's language and come back to English to help the client understand the words they do not understand. Such cases could not happen with monolinguals who could see their international image impacted because the client could not comprehend everything, potentially refusing to make a deal with the company, contrary to the one with the bilingual employee.

It is important at this level to feed this CS habit as bilinguals grow up (some parents stop their children from CS, which hinders the full potential of being bilingual in our opinion), in order to have future employees who master perfectly this phenomenon. Moreover, the wide spectrum of abilities offered by bilingualism and CS in the workplace supposes also that the bilingual employees be biliterate and therefore would have the ability to read a text (or a presentation) in one language and discuss or present it in another as shown by Moll \& Dworin (1996). This can also widely open the available network in comparison to a company employing monolingual employees.

However, CS in the workplace is normal. We are however talking here about the new definition and use of CS, that is switching behaviour, level of language, for example. In a bi-multi-lingual environment, the employees have the opportunity to select the most polite and adequate word(s) or expression(s) in one of their languages. But CS in the workplace can have more meaning, for example of inclusion or exclusion. De Socarraz-Novoa (2015: 4-5) has found that employees in the workplace can CS for face-saving for example where her study group had been switching language to include their boss in the conversation since they knew her discomfort with her proficiency in English. A bilingual upbringing can help workers in a bi-multilingual environment to feel at ease in such situations. The second reason found by De Socarraz-Novoa (2015: 5) was the expression of
raw emotion which looks like inclusion and exclusion where the external person (in her case) was being rude speaking in English, and everyone commented about it in Spanish once the person left. The expression of emotions in a second language can be tricky, but being brought up bilingual can help with this problem since they would have access to the full range of emotions in both their languages. One of the employees explained that the expression of raw emotion comes usually instinctively in one's native language, which could potentially be easier if there were two native tongues. Finally, the third one was linked with compartmentalisation where the employees would make the difference between their work place's language (English), and their personal life's language (Spanish), and they would CS between the two languages at work, whether they would be speaking about their work or about their personal life.

We should also add that the workspace can also be used by certain communities to pass a political statement, who may be applying a term we have already introduced (cf. Chapter I.1.5.1.): "codemeshing". Some people who have been brought up bilingually, especially with languages that are considered inferior than the community language, use "code-meshing" as an act of resistance to promote the inclusion of these "inferior" languages or dialects into the workplace, as a fight against the oppressing majority language. The aim of the "code mesh" is to increase the acceptance of other types of English, dialects and creoles in public spaces, whereas they were once confined to the private sphere. Those who use this phenomenon generally advocate equality of their own language with English in the public space, but also in the workplace.

## III.4.4. At the "macro" level or country level

Finally, the last level of economic benefits found in bilingualism, the "macro" level focusing on regions and national economies: the countries.

In Canada, "The Conference Board [...] calculated that Canada's imports and exports were US\$3,3 billion higher in 2011 because of the French language skills of Quebec and New Brunswick" (Canadian Heritage, 2016: 24).

However, bi-multi-lingualism does not have advantages in Western countries only since Eastern countries such as India have found the socio-economic benefits greatly improved, especially:
> "the traditionally impoverished lower casts:
> - through the intermediary of their plurilingual MP's pressing for reforms in the national Parliament;
> - with the rise of international demand for low-cost Englishspeaking STEM workers, bringing off-shore jobs to southern India" (2016: 26).

Greater corporations have to follow the movement and expand to the globalisation of bi-multi-lingualism. Many of them "have responded to the global showdown by looking to grow their export and investment activity rather than retrenching". According to The Economist Intelligence Unit (2012), found in Canadian Heritage (2016: 27), these same corporations are finding new ways to expand thanks to bilingual employees by "setting up transnational work teams, and requiring staff with greater foreign language and crosscultural skills".

According to Canadian Heritage (2016: 33), as summarised in Illustration 40, it is stated that "amongst the different languages used, German is used by 159 companies (79\%) and English by 153 (76\%) of companies, while $18 \%$ of companies use Italian and $13 \%$ use

Spanish". Canadian Heritage (2016: 33) also add that "for foreign subsidiaries established in a border region, 89 out of the 201 companies, or $44 \%$, actually use two foreign languages regularly on the job, one likely the language of the corporate head office (possibly German), and the other the language of the most important foreign market, possibly English, or vice-versa".

| Language | No of companies | Percentage of companies <br> responding (out of 201) |
| :--- | :---: | :---: |
| German | 159 | $79 \%$ |
| English | 153 | $76 \%$ |
| Italian | 36 | $18 \%$ |
| Spanish | 27 | $13 \%$ |
| Luxemburgish | 7 | $3 \%$ |
| Chinese | 4 | $2 \%$ |
| Dutch | 3 | $1 \%$ |
| Russian | 3 | $1 \%$ |
| Portuguese | 2 | $1 \%$ |
| Polish | 2 | $1 \%$ |
| Irish | 2 | $1 \%$ |
| Arabic | 2 | $1 \%$ |
| Czech | 1 | $0.5 \%$ |
| Flemish | 1 | $0.5 \%$ |
| Finnish | 1 | $0.5 \%$ |

Illustration 40: "Foreign languages used on the job in foreign affiliates" (Observatoire régional de l'Emploi, de la Formation et des Qualifications de Lorraine (OREFQ), 2010 in Canadian Heritage, 2016: 33).

Canadian Heritage (2016: 34) has detailed who exactly in a company would need to have the linguistic skills in the mother company, as follows:

- "company managers (83\%)"
- "qualified staff (62\%)"
- "skilled technicians (48\%)"
- "unskilled white-collar workers or blue-collar workers whether skilled or unskilled in the company's designated language ( $12 \%, 6 \%$ and $10 \%$ respectively)".

In other countries, FLS workers are valued and used, and some sectors will exclusively employ workers with FL skills (Hall, 2007). In Germany for example, not only is it crucial to have FL skills, but these skills need to be of high quality, and more advanced level of proficiency in a foreign language will be an asset on a worker's resume when applying for a new job (Canadian Heritage, 2016: 35). As an example, Canadian Heritage (2016: 35) states that "in 2006, one in six working German needed advanced foreign language skills for their job".

As we can see, in many strata of the economy, whatever the country, good foreign language skills are extremely valued, raising the quality of the worker (and therefore the company).

If we were to present a few figures from some surveys reported in Canadian Heritage (2016: 39), such as one taken in 2013 and the National Employer Skills Surveys (NESS [National Employer Skills Surveys carried out by the UK Commission for Employment and Skills (UKCES)]) of 2011, they respectively show that "over half [out of 8000] respondents indicated that they did not have the FLS required to internationalize", and that "employers attributed $16 \%$ of their total skills shortages to a shortage of FLS available in the British Labour market, a number which has remained fairly steady since 2005, indicating a persistent problem (Tinsley, 2013: 44)" as visible in Illustration 41.

| Shortage of foreign language skills as a share of: | 2011 | 2009 | 2007 | 2005 |
| :---: | :---: | :---: | :---: | :---: |
| Total skills shortages in the British labour market | 16\% | 18\% | 12\% | 13\% |
| The skills deficiencies of their current staff | 9\% (whole of UK) | 13\% (England) | 9\% (England) | 9\% (England) |

Illustration 41: "UK employers' view on the importance of FLS compared to other skills shortages" (Canadian Heritage, 2016: 40, based on Tinsley, 2013: 44).

Following on this, Tinsley (2013: 47) in Canadian Heritage (2016: 40) also showed that FLS workers are mostly "desirable" (72\%) and "essential" (42\%) when going through job ads by British employers.

In some countries, we can see that workers have more opportunities to be employed if they speak English and another language. For example, in "Germany (70\%), Italy (77\%) or Sweden (81\%)" (Tinsley, 2013: 47), which is a great improvement to the survey from 2006.

It is explained that " $[\mathrm{i}] \mathrm{n}$ the 2011 NESS survey, employers attributed $16 \%$ of their total skills shortages to a shortage of FLS available in the British labour market, a number which has remained fairly steady since 2005, indicating a persistent problem" Canadian Heritage (2016: 40) quoting Tinsley (2013: 44).
> "In response to a question regarding the skills deficiencies of their current employees, employers across the UK indicated that their staff skill deficiencies in foreign languages made up 9\% of total skills shortages. In England, the most internationally oriented of the four UK member-states, in 2009, employers indicated that deficiencies in FLS made up a $13 \%$ of total skills shortages".

Moreover, according to some results from Tinsley (2013: 55) and summarised in Illustration 42, the demands for FLS skills in workers is broad and that their implicit and future characteristics lead them to be hard to anticipate and evaluate.


Illustration 42: "The British Labour Market for FLS" (Tinsley, 2013: 55)

Tinsley (2013: 55) explains the different levels summarised in illustration 42:
"[1]evels $D$ and $E$ are particularly difficult to quantify. The CBI and National Employer Skills Survey data cover mainly Level $B$, with some Level $A$ but are based on numbers of employers, not the number of jobs available within each company. Surveys of job vacancies go further towards capturing the full range of explicit demand (Levels $A, B$ and C), but can only measure recruitment patterns at a set point in time rather than patterns of language skill use within the workforce as a whole".

Canadian Heritage (2016: 41) emphasises the following quote (Illustration 43) from Tinsley (2013: 55) in order to emphasise the way British employers, deal with the lack of FLS skills amongst their employees.
"... UK language skill needs are frequently underestimated by employers who avoid rather than address language barriers, and (also) in skills surveys ... Employers who are aware of their needs meet them in other ways: through training or by recruiting foreign nationals

However, evidence which links language skills to improved business performance and penetration of new markets is strong. This calls for a strategic approach to stimulating demand as well as supply, and support for better management of language skills by businesses in order to derive the associated benefits."

Illustration 43: How British employers deal with the lack of FLS skills amongst their employees. (Canadian Heritage, 2016: 41, from Tinsley, 2013: 55).

It is crucial to understand that many people including immigrants and ethnic communities, are bilinguals.

In the UK, it was mentioned (Canadian Heritage, 2016: 43) that despite all the efforts to introduce heritage language courses in the program, "[...] there were no postsecondary degree courses available in the four most widely spoken community languages: Urdu, Cantonese, Panjabi, and Bengali". This is a perfect example of the way valued languages are put forward while less valued languages, even if they are main community languages, are put at the back of the scene.

Moreover, Melitz (2008) and Fidrmuc \& Fidrmuc (2016) as mentioned by the OECD (2021: 11) report that "foreign language skills can contribute to a country's economy in a variety of ways. Countries with foreign language proficient populations trade more". As an example, Foreman-Peck \& Wang (2014) found that "it has been estimated that a lack of foreign language proficiency costs the UnitedKingdom GBP 48 billion per year, or $3.5 \%$ of its GDP".

In a 2012 survey, out of 542 companies, $72 \%$ of private sectors said they find benefits to have FLS in their ranks for "building relations with customers and supplies, while $28 \%$ found no need for FLS" (Canadian Heritage, 2016: 45).

Finally, Canadian Heritage (2016: 45) states that "[i]t is worth noting Tinsley's (2013: 147) conclusions on the use of foreign languages (Illustration 44) in the UK economy:
> "The picture of language use that emerges from the survey is one of extreme diversity - skills in a wide range of languages are used across the full spectrum of economic life, for a wide range of functions, by employees at all levels in the system. Whilst this conveys a positive message in demonstrating the contribution that language skills are making across the economy as a whole, this very diversity presents a challenge for skills planning."

Illustration 44: "Highlight from Tinsley (2013: 147) in Canadian Heritage (2016: 45).

Spain has shown to put forward FLS workers since skills in another language is "a requirement for companies offering employment" (Canadian Heritage, 2016: 46).

Canadian Heritage (2016: 47/49) also mentions the low demand of bi-multi-lingual workers in job advertisements such as the one from Workopolis reported in the study who found that "online jobs in Canada advertise very little for second language skills:

- $\quad 8.8 \%$ required English-French bilingualism
- $1 \%$ of job ads required another language" of which were Chinese, Spanish, Russian, Italian, and German.

We can also mention the list in Illustration 45 showing how important the employment of bilinguals can be for people living/working in Canada.

| Rank | City | Province | Rank | City | Province |
| :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1}$ | Toronto | Ontario | 11 | Ottawa | Ontario |
| $\mathbf{2}$ | Guelph | Ontario | 12 | Brantford | Ontario |
| $\mathbf{3}$ | Montreal | Quebec | 13 | Quebec City | Quebec |
| $\mathbf{4}$ | Kitchener | Ontario | 14 | Saint John | Newfoundland |
| $\mathbf{5}$ | Fredericton | New Brunswick | 15 | Winnipeg | Manitoba |
| $\mathbf{6}$ | Hamilton | Ontario | 16 | Vancouver | British Columbia |
| $\mathbf{7}$ | Regina | Saskatchewan | 17 | Oshawa | Ontario |
| $\mathbf{8}$ | Moncton | New Brunswick | 18 | Edmonton | Alberta |
| $\mathbf{9}$ | Halifax | Nova Scotia | 19 | Kingston | Ontario |
| $\mathbf{1 0}$ | London | Ontario | $\mathbf{2 0}$ | Cornwall | Ontario |

Illustration 45: "Top 20 Canadian Cities where Bilingual Candidates have Competitive Advantage" (Workopolis, 2015 in Canadian Heritage, 2016: 48)

All over the world, bi-multi-lingualism has entered the race for trading and import-export, and FLS workers can use this skill in their job research. Some are even specialising in bilingualism in the trade field and are creating groups to help people find the perfect job in relation to their FL skills, such as "Languages for Jobs", as reported by Canadian Heritage (2016: 66) which was "[...] established by the European Commission in 2010 to produce policy recommendations to bring about a better match between the demand and supply of FLS in the European Labour market (European Commission (EC), European Strategic Framework for Education and Training (ET, 2020)".

The policy categories which they describe are as follows:

## "1. Demand for languages and communication skills

2. Languages offered by the education and training sectors
a. Including appropriate teacher training, improved materials and methods for languages
b. Language offered in vocational (professional and trade) training
3. Validation or certification of acquired language and communication skills
4. Dialogue between business and the education and training sectors on language needs (EC, ET 2020, Languages for Jobs, 2011)" (2016: 66).

## III.5. How do bilingualism and CS help in the country's sociolinguistic context?

As the final goal is to help bilingual children's inclusion in schools, bilingual education will be analysed successively in an official bilingual country and a non-official bilingual country in order to understand the international importance of being bilingual. But we will also mention Switzerland where the population uses more than two languages on a daily basis. Indeed, our study aims at showing how growing up in a bilingual setting can have great positive advantages, whether it be in the language development as seen in our detailed analysis of different aspects of language, or in the executive function, as mentioned in our literature report, but also in their work environment and adult life.

A few countries have been officially bilingual for decades now and we can take their example to measure the positive sides of being raised bilingual, for example Canada (III.5.2.). Other countries are bilingual, despite their strong fight to remain with a unique and powerful dominant language, such as the USA (III.5.3.). Going through the research on bilingual countries, we have found that there are many different types of bilingual inclusion (or exclusion) in a country, as
well as different aims. In this section, and after listing the different bilingual countries existing on the five continents, we will start by explaining what is involved in a bilingual country. Following this, there will be mention of the "unofficial" bilingual countries that can be found such as the USA.

## III.5.1. A bi-multi-lingual country

The University of Ottawa in Canada has recorded about 55 official bilingual countries.

The first twenty-four are recorded on the African continent and include Algeria, Burundi, Cabo Verde, Cameroon, Chad, Central African Republic Comoros, Djibouti, Eritrea, Equatorial, Guinea, Kenya, Lesotho, Madagascar, Mauritius, Mauritania, Morocco, Namibia, Uganda, Rwanda, Seychelles, South Africa, Swaziland, Tanzania and Zimbabwe.

The next nine are recorded on the Asian continent and are Afghanistan, India, Israel, Kyrgyzstan, Pakistan, Philippines, Singapore, Sri Lanka and Timor Lestel.

The following three are on the American continent with Canada, Haiti and Paraguay.

Then, then next ten are on the European continent and include Belgium, Belarus, Bosnia and Herzegovina, Finland, Ireland, Kosovo, Luxembourg, Malte, Norway and Swiss.

Finally, the last nine are on the Oceanian continent, which bilingual countries are Palau, Fidji, Kiribati, Nauru, New Zealand, Samoa, Tonga, Tuvalu and Vanuatu.

We will make a presentation of how bilingualism is experienced, whether it be for children, for their schools and for their families. The first example is Canada as a somewhat newly bilingual country, but
which has grown to be this way thanks to its school system and immersion programs, in addition to its high immigration rate.

All the countries previously listed are officially bilingual. Many others have an "unofficial bilingualism" such as the United-States for example. In such countries with only one official language, some languages can be spoken to a greater degree, therefore making a considerable part of the population bilingual. The USA have had a steady increase in the number of their bilingual population between 1980 and 2018, going from $10.68 \%$ to $20.55 \%$ ("that is 63 million inhabitants"), as can be seen in Illustration 46 from Grosjean (2018).


Illustration 46: Increase in the number of bilinguals in the USA between 1980 and 2016 (Grosjean, 2018)

But what exactly is a bilingual country? Where could the children that grow up bilingual go and why would it be useful for them to grow up bilingual? What does it bring to life to be brought up bilingual?

When thinking of a bilingual country, should we see a $100 \%$ bilingual place where everyone speaks both official languages? Where all the road signs are in both (or more) official languages? The answer is not as black and white as it may seem. The official governmental texts
and laws should be written in all the official languages from a country, and any state service should be offered to their citizens in the official languages. For example, in Switzerland, which has three official languages (German, French and Italian). It appears that, according to Swiss Info (SWI), (the international unit of the Swiss Broadcasting Corporation (SBC), 2016), "almost two-thirds (64\%) of Swiss use more than one language at least once a week, with $38 \%$ using two, $19 \%$ three and $7 \%$ four or more". This information shows how the population of an official bi-multi-lingual country evolves, linguistically speaking. In this country, it was shown that the part of the population using more than one language daily are "those with a university education ( $76 \%$ ), those aged 15-24 (79\%) and those with jobs (72\%)". Moreover, it is also explained that " $84 \%$ of immigrants and their descendants were multilingual".

Table 26 allows us to see the percentage of Swiss Germans, Italians and French who speak either German, Italian, French or English. It is interesting to notice the distribution of language throughout the country. We can see that German-speakers also speak a greater amount of English as well as French, and a smaller amount of Italian. A greater proportion of Swiss Italian speaks English, French and to a lesser degree German. Finally, a greater percentage of Swiss French speaks English, then German, and Italian. The use of those four languages is distributed between the home environment, the public area, and the work place.

|  | German-speakers | Italian-speakers | French-speakers |
| :--- | :--- | :--- | :--- |
| German | X | $6.00 \%$ | $20.00 \%$ |
| Italian | $6.00 \%$ | X | $12.00 \%$ |
| French | $19.00 \%$ | $11.00 \%$ | X |
| English | $43.00 \%$ | $30.00 \%$ | $38.00 \%$ |

Table 26: Percentage of the Swiss population speaking either German, Italian,
French or English depending in which part of Switzerland they live (SWI, 2016).

SWI (2016) also explains that $77 \%$ of the population of the Romanshspeaking region of Switzerland, Graubünden, speak German and Swiss-German. But then, there are other non-official languages that are part of the Swiss linguistic landscape such as Spanish, spoken by $6 \%$ of the population, Portuguese, spoken by $5 \%$ and Balkan languages, spoken by $3 \%$.

This short presentation of the linguistic reality in Switzerland is one example of the inconsistency that can exist in bi-multi-lingualism countries. This example also shows how being a bilingual does not mean necessarily using $100 \%$ of two or more languages; there are differences and circumstances that may change the degree of proficiency in one of the languages.

Growing up bilingual may help to find a better job, to go to university; it might also expand the possibilities for travelling and expatriation. Bilingualism, despite its benefits on individuals is also beneficial for the country itself. It can attract specific corporations (a bilingual person could therefore be hired by one of these big corporations). Moreover, the salary can sometimes be higher if you speak more than one language.

## III.5.2. The example of Canada

Canada is one of the countries to have managed national bilingualism with both English and French as official languages in the greater part of the country. However, it did not start greatly regarding multiculturalism and multilingualism as its arriving population took upon themselves to erase and break the native culture. The original population of Canada, with its 70 languages was once torn. Children would be taken away from their families and forced into assimilation.

In the latest census of 2016 (Illustration 47), French-English bilingualism amongst Canadians had reached its highest proportion ever recorded of $17.9 \%$, according to Statistics Canada (2017: 1).


Source: Statistics Canada, Census of Population, 1961, 1971, 1981, 1991, 1996, 2001, 2006, 2011, 2016.
Illustration 47: Rate of English-French bilingualism across Canada between 1961 and 2016 (Statistics Canada, 2017)

It has been noted by Statistics Canada (2017: 5) that there is an increase of French-English bilingualism among younger children between 5 and 19 - who have English as their mother tongue. This therefore shows that they have learned French at school. Canada's immersion program has proven successful since a great part of the Canadian population lives a fully bilingual life. Canada has the chance to offer two valued and prestigious languages to its population. Wright \& Baker (2017: 68) provide four conclusions on the Canadian immersion programs. They state that the students can speak and understand two languages, but they can also read and write in both these languages, therefore making them bilingual and biliterate ${ }^{48}$. They can "reach normal achievement levels throughout the curriculum including languages", "have an enhanced appreciation of the traditions and culture of both French-speaking and English-speaking Canadians" and "potentially have an edge in the employment market". Wright \& Baker (2017: 68) have also specified, in their detailed description of

[^33]immersion in Canada, that the aforementioned conclusions however depend on the type of immersion followed by the children, that is either "early, delayed, or late immersion". Their conclusion is that the Canadian immersion program remains one of the best and one that has "the most thorough research of any bilingual education model". We can therefore trust the different claims on their effectiveness. They also mention that the Canadian model of bilingual immersion has been reused in many different countries such as "Finland, the Basque Country, Singapore, Hong Kong, Israel, the United States, New Zealand, Ireland, and Wales", which is a proof of its great efficiency.

What is specific to the Canadian method is that immersion students will learn literacy in French (their second language) before English (their first language), which "also results in considerable success" (Wright \& Baker, 2017: 74) in comparison to other Dual Language bilingual education that usually introduce simultaneous acquisition of biliteracy. May (2016: 3) specifies that in Canada, the type of bilingualism that is developed thanks to immersion programs is an "elective bilingualism" ${ }^{49}$ where students choose to learn an additional language. It is contrasted with "circumstantial bilingualism" ${ }^{50}$, that is "those who are required to learn another language" for diverse reasons such as having a first language that is not the community language (for example immigrants). The other two oppositions are "additive bilingualism" and "subtractive bilingualism". It is explained that "circumstantial bilingualism" may lead to "subtractive bilingualism" which is when "a person's L1 is seen as 'harmful' to the 'successful' acquisition and use of the dominant or majority second language (L2) at the individual level, while the maintenance of the L1 is seen as problematic at the wider societal level" (May, 2016: 4). The point of this explanation is that additive bilingualism like in Canada has been demonstrated to lead the students to succeed educationally whereas

[^34]subtractive bilingualism is harmful to the students' existing bilingualism and reduces their chances of succeeding educationally (Baker, 2011; Cummins, 2000; Genesee et al. 2006).

Some countries (such as the USA) have however sometimes misused the name of the Canadian immersion model in order to create "a monolingual assimilationist program" Wright \& Baker (2017). The point of such programs is to "immerse linguistic minority children into English, without any efforts to develop or maintain students' home languages".

Wright \& Baker (2017) add that those programs have been proven to lead students to have greater educational success than other students. Our own experience as a French native in Vancouver, Canada, shows how this country claims bilingualism. English was not required in the class when we were teaching as we needed and were required to only speak in the target language - French - with the students. It however seemed natural and without trouble for the students that we were exclusively speaking our native tongue.

It is also worth mentioning that not only is Canada an official FrenchEnglish bilingual country, but there are also several native languages that are part of the Canadian linguistic landscape, as briefly mentioned earlier. The Canadian Census data from 2011, there are 1.4 million First Nations, Métis, and Inuit people ( $4.3 \%$ of the population) of whom 240,815 ( $17.2 \%$ of the population) reported being able to converse in an Aboriginal language.

Thanks to the fact that French Immersion programs started in the early 1960s, it is possible nowadays to have clear results on the positive and/or negative effects of the method. Dicks \& Genesee (2016: 458) have gathered the following results: students in French Immersion programs managed to reach a greater level of proficiency in their L2 French than students who had French taught separately weekly or daily. Their conclusion states that these French as a Second Language students' proficiency in "speaking, receptive skills (listening and
reading) approach[es] those of native French-speaking students, whereas production skills (speaking and writing) are less well developed, albeit highly functional". Dicks \& Genesee (2016: 458) have also answered the recurring question about an existing negative effect on the first language of these immersion programs. According to them, there are none of these negative, long-term effects. However, Dicks \& Genesee (2016: 458) also mention that "students in early total [French Immersion] may exhibit initial lags in spelling, reading, and writing in English; but these are temporary", the children even it out with time and eventually "perform better than non-immersion students in these areas". Finally, they explain that immersion students perform equally or better than their non-immersion peers at "content area learning" that is mathematics, science, etc. They have also found that these immersion programs were bringing positive outcomes for socio-economic or academically disadvantaged students, and even those who initially had issues with their first language.

A certain number of issues remains for immersion-students in Canada as they reach secondary level schools to enter university. Only very few English universities offer courses designed for French Immersion program students, therefore leading those students to drop out of French Immersion programs earlier on, in order to focus on English programs. Some of these students would consider the reduced practice of French as a problem when it comes to maintaining a good level of the language, therefore considering that the time spent learning it is not worth it, because they could not continue once in college, which would cause them to lose what they would have worked hard to acquire. Statistics Canada (2017: 5-6) has shown that among children of school age who have English as their mother-tongue, there is an increase of French-English bilingualism. They found that "[ $[7]$ he bilingualism rate has risen among the 5 -to- 9 and 10-to-14 age groups with English as their mother tongue since at least 2001, but has declined until 2011 in each census for people aged 15 to 19 years". Therefore, the rate of French-English bilingualism was the highest at
$14.9 \%$ in 2016 amongst children aged 10 to 14 years old. In order to compare, the peak of bilingualism before 2016 was around age 15 to 19 years old but this group reaches now a bilingualism rate of $13.5 \%$. However, it is up from the 2011 census when the rate for the latter group was $11.9 \%$ as seen in Illustration 48.


Illustration 48: Rate of English-French bilingualism, by age group of people with English as their mother tongue, Canada outside Quebec, 2001 to 2006 (Statistics Canada, 2017)

Statistics Canada (2017: 6) also mentioned that those between the ages of 11 and 17 years old in 2006 were less likely to have become French-English bilinguals by 2016 in comparison to those between the age of 5 and 10 years old as summarised in Illustration 49. Statistics Canada (2017) highlight the importance of school for becoming and remaining French-English bilinguals for these children as the former group mentioned was finishing high-school and going into university or into active life between 2006 and 2016, while the second group was entering high school between the same dates. This confirms the aforementioned results that there is a drastic reduction of French conversation starting at the end of high school and into university or into active life.


Source: Statistics Canada, integrated 2006 and 2016 census data.
Illustration 49: Rate of English-French bilingualism in 2006 and 2016 of a cohort of children and youth aged 5 to 17 in 2006, by detailed age group in 2006, Canada outside Quebec and Quebec (Statistics Canada, 2017)

Another fact about this decrease of bilingualism rate in Canada as children get closer to the adult age is that the proportion of people who were bilingual in 2006 and remained so in 2016 was $94 \%$ in Québec, but only $65 \%$ in the rest of Canada, according to Statistics Canada (2017: 5) as seen in Illustration 50.


Source: Statistics Canada, integrated 2006 and 2016 census data.
Illustration 50: Rate of English-French bilingualism in 2016 of a cohort of children and youth aged 5 to 17, by bilingualism status in 2006, Canada, Canada outside Quebec and Quebec (Statistics Canada, 2017)

These numbers show that despite the country's efforts to increase bilingualism, and despite the fact that it does work, up to a certain age, a few problems remain in order to encourage people to keep learning
and conversing bilingually instead of abandoning one of their languages. Statistics Canada (2017: 11) however makes the following statement:
> "[a]ccording to the Action Plan for Official Languages 20182023, increasing English-French bilingualism in Canada is one of the Government of Canada's priorities with respect to official languages. In this context, particular attention is placed on children and youth within programs designed to promote bilingualism in English and French, because they are more likely than individuals in older age groups to learn both official languages".

Of course, as we reach the end of this section, it should be mentioned that the choice of its title - a bi-multi-lingual country - puts the focus of the study on children's bilingualism (and bilingualism from childhood on), but Canada, like many other countries, is an old land that has welcomed the arrival of many different populations. French and English are second or third languages to many people, but any other language is not an official national language even though many people have to balance the use of their first, second and third languages in their day-to-day life. As a conclusion, Dicks \& Genesee (2017: 464) show the popularity and success of immersion programs in public education thanks to its variety for students and the general communities in Canada.

The conclusions we can retain from this report is that school and immersion programs are crucial to favour a bilingual population in Canada (and therefore in many other countries). The figures showing greater French-English bilingualism among school-aged children compared to university students are sufficient proof of the efficiency of the various bilingual school programs that exist in Canada (Statistics Canada, 2019: 11). The overall measures taken by the Canadian government to promote bilingualism "include supporting French as a second language courses and offering scholarship programs and internships that foster the acquisition and retention of the second official language".

## III.5.3. The example of the USA

The USA has a special status regarding languages as it did not have an official language until 2017. At this date, English became the official language of the country. The USA is a land of great linguistic diversity as it was founded by immigrants from the Old Continent, therefore bringing their own language(s) with them. As aforementioned, according to Grosjean's study (2018), there was an important increase in the number of bilinguals in the USA between 1980 and 2018, growing to 63 million bilingual inhabitants in the country, or $20.55 \%$. The author also compares the USA's bilingual population to the one of France with a "world language as a national language" which still has about $20 \%$ of bilinguals, in comparison to Switzerland where " $42 \%$ of the population use two or more languages in everyday life". Grosjean (2018) presents the great amount of people who do speak English (98.7\%) "according to the 2016 ACS results". In the country, the most spoken language after English is Spanish with 41.5 million speakers, the second most spoken language after English is Chinese with 3.5 million speakers, and the third most spoken language after English is Tagalog with 1.8 million (CIS, 2019). According to Jauregui (2015: 10), less than a quarter of the American population is fluent in more than one language. The former presidency (2015-2020) has been challenging since the beginning in confronting immigration and therefore multiculturalism and multilingualism.

Interestingly enough, both Canada and the USA have dealt with Indigenous populations in a certain way that has violated their dignity, culture and language. If we take a quick look at Table 27, which takes up information found on the website from Government of Canada, we can however see that Canada's history regarding the handling of natives has stopped slightly earlier than the USA with a public apology, whereas the USA has made a National Indigenous History Month almost two decades earlier than Canada:

|  | Canada | USA |
| :--- | :--- | :--- |
| Removals of families and <br> children from their <br> original lands | 1870 s | 1830 |
| Recuperation of languages <br> (USA) or closure of <br> residential schools <br> (Canada) | mid-1970s | 1934 |
| Public historic apology | 2008 | 2009 |
| National Indigenous <br> History Month | 2009 | 1990 |

Table 27: Situation of indigenous population in Canada and the USA from 1830 until 2009.

As we can see, the USA has itself also tried to "'break up immigrant groups ... to assimilate ... these people as part of our American race' by making them give up their non-English native languages" as perfectly stated by Ellwood P. Cubberley ("then-dean of Stanford University's School of Education"), reported by Vicol (2019: 44). The World Wars and Cold War have created yet more fear and rejection of the other, "embedding the belief into American society that even learning a foreign language was unpatriotic". Vicol (2019: 44) makes an interesting timeline where she explains how different states banned the use of languages other than English such as Nebraska in 1919, or Illinois in 1923 which "declared that its official language was 'American', though this was changed to English in 1969". Vicol (2019: 44) also describes the true negative vision existing then towards bilingualism from the 1800s until 1940s. This was not helped by the arrival of a new hypothesis which was mentioned earlier: the SapirWhorf Hypothesis or linguistic relativity. In her study, Vicol (2019) explains that "one's intelligence was in part influenced by the language which one spoke; i.e., intelligence was inherently constrained by the 'simplicity' of one's language", therefore allowing certain people who spoke certain languages to claim their superiority.

As mentioned already, some early studies state that bilingualism was separating the child's or person's brain in half and therefore making them less intelligent. Governments at the time used the results of these studies' results as a weapon to stop people from speaking anything else but English. The more recent studies however led the different governments to change their view on bilingualism as it showed the great benefits of speaking two languages. Vicol (2019: 45) shows that from the 1950s until the year 2000, the opinion on bilingualism changed for the better. From then on, it is quite visible that the American view on bilingualism clearly depends on the general political situation of the country. The politicians at the time, but also nowadays, may link other languages to outsider's threat. They came to this conclusion because of the results of formerly new publications proving the greater cognitive benefits provided by bilingualism, it was making people more intelligent. To progress on the timeline, Vicol (2019: 45) mentions that after the positive vision of bilingualism in the country in the 1990s, it declined again around mid-2000, but then got slightly better around 2010, to then decrease again since 2015 and the then new presidency. She also mentions that it has been getting better since 2015 .

We may also mention the existence of simultaneous bilinguals' schools in German-English in the Midwest mostly, around the 1800, according to Gándara \& Escamilla (2016: 2). They also state that "[i]n 1839, Ohio became the first state to adopt a bilingual education law, authorizing German-English instruction at parents' request", followed by a similar type of law in Louisiana with a French-English bilingual education in 1847, and a Spanish-English one in the New Mexico Territory in 1850.

The USA has made a clear relation between languages and immigration, and the fear of the outsider that has forever been plaguing the country is, at least in part, responsible for the negative view of foreign languages in the country. With the first World War came the end of German language education in the USA and "new
efforts to 'Americanize' immigrants". In Gándara \& Escamilla (2016: 400), Kloss (1998, originally published in 1977) states that English became the sole language for education in 34 states by 1923 in both private and public schools. They explain how the Cuban revolution opened the doors to a new type of bilingual education in the country thanks to Cuban immigrants who opened bilingual school until their return to Cuba. The 1968 Bilingual Education Act came in to provide a new way of educating "Limited English Proficient" (LEP) students, as they were after all young people, as well as older ones, who were unable to speak English. It was unclear whether the text was helping to provide these young people with proficiency in two languages or to only give them access to English. Gándara \& Escamilla (2016: 4) also mention Garcia \& Morgan (1997) who state that "[b]y 1997, 11 states had laws supporting some form of bilingual instruction". As we can see, laws are evolving, so is society, and bilingualism becomes both increasingly mainstream and important. However, many states have since then dropped their bilingual education program to focus on English-only education.

The USA has however failed to follow the ever-growing pace of simultaneous bilingual education. Their "bilingual" program remains for the only purpose of teaching English to English Learners, and is no longer adapted as their audience is now completely fluent not only in English, but also in (an)other language(s). The monolingual standard of the country needs to change in a growing multilingual and multicultural society where the need of biliteracy never decreases. In the country, the lack of bilingual teachers impedes the possibilities of increasing the number of bilinguals and bilingual learners, and of showing the importance of bilingualism and its impact on the brain's development, which could help improve such policies. There is a general interest in learning more than one language - or improving the ones they already have - and laws and policies must be updated to follow on their populations' linguistic needs.

Gándara \& Escamilla (2016: 11) also specify that "[v]irtually all of the recent growth in US public schools is attributable to the children of immigrants" as these are the people who are speaking their heritage language simultaneously with English. Their conclusion clarifies that achievements whether it be academical, social or psychological could benefit from bilingual instruction, and it would "strengthen both their own labor market prospects and the economy of the nation".

It would however be important for bilingual education to teach students for their future professional life, but also to teach them about interdisciplinary connections and partnerships with other countries.

## Chapter 3: Conclusion

Regarding the development of the brain, we have reported that bilinguals and monolinguals alike have very similar developments. Through different explanations of the tools used to analyse the language in the brain, we have seen that the bilingual brain has indeed certain specificities especially regarding switching. It was found that some parts of the brain are specifically implicated during CS: DLPFC, ACC, caudate nucleus, SMG (Luk et al., 2011: 2). Our conclusion is that bilingual brains are not necessarily better, but that they are definitely different, since bilinguals supposedly "recruit a greater extent of the brain's classic language processing tissue than monolinguals" (Kovelman et al., 2008: 13). Moreover, we have seen that there is no confusion whatsoever in a bilingual brain, and that it rather promotes great inhibitory control, led by the language selection skill. Another difference between bilingual and monolingual brains is the grey matter which is more important in areas related to executive function, and an overall "greater cortical thickness" (Abutalebi et al., 2012) in bilinguals than monolinguals. The current chapter also showed simultaneous bilinguals as outperforming their monolingual peers at tests made in the same language. We have mentioned that it is crucial to analyse and evaluate both linguistic systems of a bilingual since their exposure to each language is divided. We have also shown how important it is for the parents to speak at least one of their child's languages, at the risk of leading to academic failure. We can see that bilingualism also provides helpful components to school results, but there are several other variables that need to be considered.

All three countries presented in this chapter - Canada, the USA and Switzerland - all have their very own figures regarding bilingualism and their population. Indeed, all three countries have shown that bilingualism in a country can be handled in varied ways, whether it be opening up its linguistic borders to neighbours, or welcoming those who are part of the country and have shaped it, or refusing to
acknowledge the existing bilingualism all over the country. We have seen that the official definition of bilingualism cannot be the same for each country according to their linguistics policy. But what is certain is the great opportunity that bilingualism brings, which is offered both to the individual and to the country through its businesses.

We have established that a bi-multi-lingual country does not have a population speaking $100 \%$ of all its languages, but rather that a part of the population uses all the languages to different degrees in distinct aspects of their lives. It was also shown that being bi-multi-lingual helps find better paid jobs in comparison to monolinguals in similar companies. Bi-multi-lingualism can also help expand the companies to other countries and therefore increase the countries' GDP. Taking the example of official bi-multi-lingual countries such as Canada and Switzerland, we have reported that there are indeed greater chances for higher paid jobs when being bi-multi-lingual when compared to monolinguals in similar jobs.

As the goal of this study is to bring a better education to bilingual children in schools as well, and to make their parents but also their teachers understand the importance of bilingualism, it was crucial to comprehend the role bilingualism can have in different societies, as well as the point of growing and educating children bilingually. It was therefore presented that bilingualism has a positive impact on big firms as it provides them with more possibilities for globalisation, and therefore for making more money. The bilingual individual becomes an important member of those international companies as they have the ability to bring twice as many customers as a monolingual one. Becoming a bilingual country with a greater proportion of the population that is indeed bilingual can help the said country to become internationalised, and therefore will allow it to increase its GDP as well as its export/import benefits.

As we took Canada and the USA as examples, it was firstly clearly visible that both countries have a common linguistic history. In our
current society, bilingualism can usually simply lead a speaker to have a higher paid job. The results coming out from opposing both countries are that, Canada, thanks to its education system involving a lot of immersion into the second language, is inhabited by an ever time high proportion of bilinguals. On the other hand, the USA, which has however taken example on the Canadian immersion programs, has used them to make "a monolingual assimilationist program" (Wright \& Baker, 2017: 68), but does not have as many bilinguals as their Canadian neighbour. We have shown the unpatriotic vision that can transpire from an American eye when a peer expresses themselves in another language than English. However, just as any program, the Canadian one also has shortcomings that are mostly situated at university level as they do not offer follow up immersion courses for immersion students, therefore leading those students to drop out of their immersion programs in their last years before entering universities. The bilingual programs existing in the USA which were created a few decades ago have since then not evolved. This leads to a critical problem of not being able to keep up with the ever-increasing bilingualism through immigration and students attending these bilingual programs (which were created for non-English speakers) are no longer adapted. Not only can those students speak their own language - whether it be Spanish, German, French, but they can also speak English. The bilingual programs in the USA, that were initially made for assimilation no longer serve the same purpose and should have evolved following the ever-growing bilingualism of the country.

However, as a European example, France, which is not a bilingual country, still has an interesting Bilingual Education (BE) program called "international sections" as presented by Hélot \& Cavalli (2016: 480). Back in 1982, when texts regulating this program were created, students were to follow five weekly hours of teaching in a foreign language, also called "international language". They state that this program was created to support students who were for the most part already bilingual, but in dominant European languages (that is

English, German, Spanish) which is a great provision as "both the home language and the school language are supported". The results from this BE program are "a high level of biliteracy, reinforcing the learners' cultural capital". The main problem of this program's development is the "double monolingualism", according to Garcia (2008: 52) as quoted by Hélot \& Cavalli (2016: 480). Ten years later, "Europeans sections" were created for all students but on a similar model. Following what we stated earlier regarding the importance of bilingualism for countries, parents usually consider those European sections as giving better educational opportunities to their children, offering them better chances for later in life regarding employment (Hélot \& Cavalli, 2016: 481).

However, bilingual education in many different countries has been shown to increase the visibility of "positive languages" whereas immigrants' languages are rendered invisible.

All in all, Ferguson (1997) as quoted by Wright \& Baker (2017: 65), has perfectly explained the different goals of bilingual education.
> " $[$ The goals are] (1) to assimilate individuals or groups into the mainstream of society; (2) to bring unity to multi-ethnic or multilinguistic country; (3) to enable people to communicate outside their country; (4) to increase language competencies that are marketable, for example, to gain employment; (5) to preserve ethnic or religious identity; (6) to harmonize different linguistic and political communities; (7) to spread the use of a colonial language; (8) to strengthen elite groups and preserve their privileged position in society; (9) to give equal status or rights to unequal languages; and (10) to deepen an understanding of language and culture."

Wright \& Baker (2017: 65) "modernize" the list by adding two more goals which are "(11) to preserve an endangered or minority language and (12) to increase curriculum achievement and school performance". All these different purposes can sometimes be in opposition depending on the country to which it is applied.

As we have shown, being bilingual in our globalised society is certainly positive, but bilingualism in certain languages seems to have
a stronger importance. Moreover, one could argue that the development of languages in a country is closely related to the sociopolitical state of the said country. For example, countries such as Ireland, or Wales have seen their languages (as well as those who spoke it) humiliated and limited, bringing a strong opposition in the society between those who spoke English and those who spoke the other languages. The introduction of bilingual education into such countries has helped ease the tensions (for lack of bringing peace and togetherness) between the different populations speaking both languages. Moreover, it also brings to these populations a sense of belonging without having to choose between one or the other language or culture.

We consider the current study as not only short-term results to help the inclusion of bilingual children in schools, but also to understand why it is important in the long-term to raise a child bilingual. This can be done both at the individual level, concerning jobs and wages for example, but also at the level of companies and countries. Indeed, this is all made in order to understand why it is useful for a company to hire bilinguals instead of monolinguals, and why it is useful for countries to develop bilingual educational programs. These measures still need to be improved, even though the number of bilinguals in Canada and the USA has greatly increased. There is no bilingual education to speak of in the USA, which leads to a very low number of bilingual educations in the country.

This not only explains the importance of bilingual education, but also of bilingual awareness and acceptance. Some countries have feared the outsider for too long and now it is hurting the country itself because it is lagging behind. Countries such as the USA have failed to adapt to the pace of bilingual growth, and of its population speaking another language than English. The problem in the USA goes even further as they lack bilingual teachers who could potentially teach and
increase the number of bilinguals. This is a vicious circle, but it can be changed as there is general interest in learning or improving another language. Canada is working on improving its programs while the number of French/English bilinguals is on the rise. This study has shown the importance of a bilingual upbringing and of a bilingual education at school.

## IV- SUMMARY, ASSESSMENT AND CONCLUSIONS

This section will be a summary of all the results obtained in this study. This will help us clearly visualise if our results tally with our hypotheses or if, on the contrary, they go against them. In both cases, we will be able to open to a broader discussion since the matter of language development and bilingualism as well as CS analysis, especially in children, cannot realistically find an end. More questions have arisen and we will see which ones could be developed in further studies. In this summary, we will of course bring a conclusion to the link between bilingualism, and by extension CS, and language development in children up to 5 years old. We will also present the limitations of our study, and what can be done to eliminate them one by one. We will present the implications of our findings and we will finish with a few final remarks and the definite conclusion of our thesis.

Our own study is divided into several chapters and sections all related to the language development of bilingual children, with or without comparison with a monolingual sample. The first analysis was made on language awareness since it is crucial to understand if, and how, bilingual children view their own languages, as well as their surroundings' languages, through the analysis of the words used by bilingual children as well as their parents, their MLUs and MMUs, etc. The hypothesis for this specific section was that bilingual children were indeed aware of their own languages, but also of the ones used by their families and relatives. Reality is somewhat other. Our previous study (Clain, 2015) showed that the bilingual child was deliberately using either one of his languages depending on their interlocutor. We concluded that the bilingual child was CS with awareness and spontaneity. This conclusion was also reached in the current study since we have found, in the language awareness section, that bilingual children have a certain degree of language awareness
since most of the children in our sample make a relevant choice of the language they will be using with their interlocutor. This however depends on their type of bilingualism, if they are balanced or unbalanced bilinguals. Overall, unbalanced bilinguals tend to use their strong language more often, but we have also noticed, as have Genesee et al. (1996) is their seminal study, that even unbalanced bilinguals also use more of the parent's language with said parent, even if it is the child's weak language. On the other hand, the balanced bilinguals made a more considered choice since they chose which language to use with which adult present, but they did not CS so often in comparison with the unbalanced bilingual children for whom the CS appeared as an emergency tool.

The study of language awareness and development included a few children whose data were also used in the seminal study by Genesee et al. (1996). They found results similar as we did with our larger sample (most of the children were using more French with the Frenchspeaking adult, and more English with the English-speaking adult, despite the level of proficiency in both languages. Some children were however using their dominant language in all cases. Moreover, just like in our study, the children in the seminal study (Genesee et al., 1996) also included other adults than the parents, and the bilingual children were using the appropriate language with the other adults.

In our work on language development, we analysed the use of words, with bilingual children being compared to their monolingual peers. In this study, we firstly analysed the GW and LW, including respectively articles, non-qualifying adjectives, conjunctions, prepositions and pronouns; and nouns, qualifying adjectives, verbs and adverbs. The hypothesis for this specific analysis was that bilingual children, before the age of 5, would make a greater use of both lexical and grammatical words regardless of the language. CS is the one tool they could use in these cases since they could call on either of their
language's GW or LW to communicate. This specific study showed interesting results - opposite to what we originally hypothesised. In the analysis of the GW and LW, we found that both samples of children were using more LW than GW, but, in details, bilingual children were using more LW and fewer GW than their monolingual peers. In this dimension of the language development, our conclusion was that up to 5 years old, bilingual children were slightly behind monolingual children since they were using less advanced words (GW) than them.

Regarding CS, our sample of bilingual children did not switch so often, but we found, after evaluating the range of CS with their MMU, that the children did not switch as much as they could have, considering their level of proficiency in both languages. Our conclusion regarding CS is that there were three types of children in our sample: those calling on CS because of their unbalanced bilingualism, who were compensating their weak language with their strong language; those who were not switching because they had full mastery of both their languages and did not feel the need to CS; and finally, those who were dominant in one language and did not often use their second language (even with the parent who was speaking their weak language).

The next analyses of MMU and MLU as well as UB revealed the dominant language of our bilingual children. What transpired here was the fact that bilingual children's use of language was more balanced than monolinguals, with a gap between the greatest and lowest MMU from $6 \%$ to $11 \%$ for bilinguals and $2.1 \%$ to $18.6 \%$ for monolinguals.

On the other hand, the MLU analysis showed that more bilingual children were under the average MLU per age proposed by Miller (1981) in comparison to their monolingual peers.

In the last step, with the analysis of the UB, we have found bilingual children to have a slightly higher UB than their monolingual peers.

These results show that bilingual children's ability to CS also allows them to produce longer sentences than monolingual children.

The following analysis focused on the different uses of word types in bilinguals compared to monolinguals, showed that bilingual children were using more nouns and adjectives, and fewer verbs and prepositions, while monolinguals were doing the opposite: more verbs and prepositions, and fewer nouns and adjectives. As explained by Gentner's chronology of word type acquisition (1982), verbs and prepositions are usually more advanced, while nouns and adjectives are less advanced. The results therefore showed bilingual children to have a slight delay in their language development in the dimension linked to word types.

The analysis of the errors made by both bilingual and monolingual children showed that bilingual children made fewer grammatical, morphological and lexical errors but more phonological and about as many semantic errors as their monolingual peers. Our conclusion is that bilingual children's ability to CS leads them to make fewer lexical and grammatical errors, but the same reason could be used about their superior number of phonological errors. It could possibly be that the fact of CS leads them to have more trouble finding the right words and the proper way to pronounce them.

To further our research, we have also analysed the number of unintelligible words in both our bilingual and monolingual samples. Going against the original hypothesis that bilingual children would have less unintelligible material, it showed that bilinguals were having a harder time pronouncing clear words and sentences in comparison to monolingual children.

The conclusion that emerges from the current study is that bilingualism and the use of CS provide advantages in some areas
regarding language development. CS is the one phenomenon helping bilinguals navigate the monolingual world, as regards to their lower exposure in each of their languages. Even if they do not code-switch very often, the very possibility to do so provides the bilingual child with an open door to the world of fluent conversations.

In the different sections of the current study, we found that bilinguals had better results in comparison to monolingual children in their UB rate, meaning they produce longer sentences, which is definitely helped by the use of CS.

They also have greater results in the study on errors since the only area where they make more errors than monolinguals is phonology, which should be solved later on, with practice. We however found that bilingual children had a slight delay in the use of language.

The analysis regarding MMUs showed that bilinguals had more balanced MMUs in comparison to monolinguals, therefore showing their great mastery of their languages.

Negative comparative results came back for bilingual children's use of GW and LW since they use less advanced words than their monolingual peers.

Similar results were found for the use of word types since bilinguals were using more nouns and adjectives, and fewer verbs and prepositions, the last two being situated later in language development with respect to age.

Bilingual however had lower results regarding MLUs, meaning their language proficiency was lower compared to monolinguals.

As we can see with the summary of our results, the answer to our research question is broader than originally expected. We have seen that this conclusion cannot be straightforward as several results transpired, showing that bilingual children have a better language
development in some areas of the language, but have a slight delay as regards other areas, especially linked to the use of the words in the language (phonology).

We are however able to positively answer our first research question, but only partially since, indeed, bilingual children have shown extended language skills thanks to their ability to code-switch. This leads to the answer to the second research question, showing that the unbalanced bilinguals from our sample are using CS in order to fill gaps in their weak language. The balanced bilinguals however use CS with purpose, in order to direct their speech to one or the other parent. There is however no obvious proof that the children from our bilingual sample have any type of confusion regarding their languages, some of them even label their languages (as well as their parents' language which is not spoken by the children). In order to answer the third research question, we have noticed several advantages of CS:

- the ability children have to label and recognise languages;
- the ability for the children to choose from two different lexicon, therefore reducing the frustration regarding the vocabulary selection;
- the expansion of the horizons in general;
- in comparison to monolingual children, CS seems to help bilingual children to make less errors in general (except for the phonological field), they also make longer complete sentences.

On the other hand CS also has drawbacks:

- bilingual children tend to use fewer advanced words (nouns and adjectives) if compared to their monolingual peers who use more advanced words (verbs and pronouns);
- bilingual children make more phonological errors;
- bilingual children produce more unintelligible sentences than their monolingual peers, which can be linked to the fact that they have to choose and select the language they need to speak in a given time, and which is mostly visible in unbalanced bilinguals.

It is regrettable that this study had two pitfalls: the first one being the small number of children in the samples. Such a study could greatly benefit from having bigger samples. Furthermore, each study could have benefited to be either different or more precise. The study on language awareness could be made with balanced bilinguals: it would be interesting to have the same language spoken by the main parent, but also the same community language, and with no other adult or child present. The study on language development could have profited from being done on bigger groups. Moreover, it would have been more conclusive if the transcripts had been longer, therefore offering more important data. Overall, it would also have been nice to have access to more talkative kids since some of them didn't talk as much as they could have. Finally, and regarding the surveys we wanted to include in our analysis, more people should answer all the questions.

The second limitation was the impossibility to collect the data on the field, therefore hindering our ability to have any sort of saying in the collection in itself. Indeed, the health crisis that began in 2020 made any possibility we had of traveling to get our samples precarious. Moreover, a lot of parents were reluctant to have their children filmed because of image rights issues. There are two aspects to this limitation: a negative one and a positive one. The negative one having been explained above, while the positive shines through the authenticity of the data, since there were no additional people in the household. The children are usually used to being filmed, and they were playing or talking with their parents, without a stranger in their space, whereas such a presence can (and usually does) change the dynamic of the recordings.

It would also have been interesting to have monolingual and bilingual samples for which the socio-economic background of the children was the same, since the use of the language changes according to this specific factor, among others.

However, this does not prevent the study from being useful and having interesting and conclusive results. It presents itself as the beginning of a larger study with more material and more subjects.

Moreover, a further study could be done on non-linguistic switching tasks in order to visualise if the same brain regions as the ones used for CS would be used in bilingual children.

As we have previously seen, our research arose in the continuity of previous works, in particular the seminal study on language awareness by Genesee et al. (1996). But our study goes further into the analysis, and confirms previous results. It also adds onto what was originally found since we have made a detailed analysis of the use of language in order to prove bilingual children's greater language development before the age of 5 . We have indeed confirmed what Genesee et al. (1996) had found regarding bilingual children's language awareness as we have also found a certain degree of language awareness, most particularly in the balanced bilingual children from our sample. However, our hypothesis was disproved by our results: bilingual children before the age of 5 , have a slight delay in their language development as compared to their monolingual peers. However, the results are not as biased as it seems since we also found that bilingual children may be further behind on their phonological errors, but better on their morphological, semantic and lexical errors than monolingual children.

Our research also adds onto the research regarding the future of bilingual children, since it is crucial for the children's parents to know what benefits lie ahead for their children. Raising a bilingual child is no easy task and it is important for the parents to know that being
bilingual may help their children in their academic life, but also to have a better paid job as well as greater employment opportunities.

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## Appendix 1: Corpus (own collect)

## Bilingual children's transcripts

## Transcripts of child $V$.

1/3: CHI You wanna put on a movie?
MOT à peu près $15 / 20$ minutes
FAT Oh maybe we can put on a movie on a little later. Why don't you tell me that story, what happens with the truck?
CHI it's it's have all the robots and jump on a car and break a window
FAT well that's not, that's not with the truck
CHI hey dada
FAT yeah
CHI it's a robot, it's a broken a car. It's gonna break a car. Let's have a candy **
FAT a candy? Hey I'd like a candy, do you have a candy for me?
Yeah one of those I like those
CHI hey dada?
FAT Where did you get that?
CHI it's empty
FAT where did you get that? Did mama give it to you?
CHI it's empty, I didn't get by myself
FAT you didn't get it by yourself, uh?
CHI hey dada
FAT yeah?
CHI it's empty. Hey dada, do you wanna step on it?
FAT no i'm not gonna step on it. You need to pick that up,
CHI hey dada?
FAT *?
CHI you need to step ${ }^{* * *}$ a movie
FAT *. You know you're not supposed to
CHI * you put on a movie! Hey dada?
FAT *. You know you're not supposed to put the papers on the ground.
CHI *** you see?
FAT I see. So what did you do today? Mama said you took a nap.
Mmh? Did you have a good day?
CHI yeah.
FAT did you have to play what?
CHI hey dada?
FAT mmh? That's hay baler
CHI hey dada.
FAT yeah?
CHI it's half no I'm going to. Hey dada?
FAT yo

CHI I'm going to watch a movie
FAT hey *?!
CHI hey dada?
FAT yeah?
CHI I'm going to watch a movie by myself
FAT well why are you gonna watch a movie by yourself, stay
here with me
CHI I don't know what, by myself
FAT *? *!
CHI Hey dada? I'm gonna watch a movie on my room
FAT Well you're not gonna watch a movie in mama's room
CHI Robot! Haha That curse! **
FAT I'm gonna get you
CHI ***
FAT I'm gonna get you
CHI you're a sucker
FAT I'm a what?
CHI don't eat me!
FAT Well you can't *** the things
CHI you don't eat me
FAT what happened in here?
CHI nothing
FAT nothing? Why is all that stuff moved over on the bed? Did you do that or is it mama?
CHI hey dada? it's half right there, and a caca
FAT that's caca?
CHI and right there there there's a caca
FAT did you do caca in bed?
CHI yeah
FAT why?
CHI it's mama bed
FAT yeah okay, and? Let me see, let me see your chickenpox, Hey! You really don't have it that bad buddy. You know, we should clear this up, you * have a closet now. You know where mama went? Are you hungry? What did you have for lunch?
CHI you did noise, get off that
FAT yeah it's the ball on the bed
CHI hey dada had a noise with the ball
FAT hey, be ca, be, be careful! I don't want you to get hurt buddy
CHI hey dada watch this
FAT I'm watching it
CHI I saute on the ball
FAT just be careful buddy, that's not stable, I don't want you to fall over and get hurt. Well you got the chickenpox good uh?
Does it itch?
CHI yeah
FAT yeah. Has mama been putting the powder on it? Mmh? Has mama been putting the powder on it for you?
CHI yeah!
FAT yeah? Does that help?

CHI I'm gonna lick you
FAT don't lick me. Ew! All right that's enough.
CHI my dada, my dadaday
FAT just stop moving, let me see, let me see your face, I wanna see your chin buddy. Well you make sure you don't scratch those.
Looks like you've been doing very good with them, keep it up CHI hey dada
FAT you only have to wait a few more days and you'll be done, ok?
CHI I'm a robot
FAT you're not a robot, no you're a little man
CHI hey dada?
FAT yeah?
CHI watch this?
FAT What is it?
CHI hey dada, it's a bear,
FAT yeah?
CHI it's a bear and a bird and ${ }^{* * * *}$ more bear on it
FAT what else? Show me. Ah! Hey! Oh no, * the batteries are dead on that, please put it away. Well what don't we go back to the living room? Mmh?
CHI it's not dead
FAT oh *, *, it's really creepy when it gets like that. God I hate that, please just turn it off
CHI my like it
FAT I know you do, please turn it off. Please? Please? Ah! Oh * come on!
CHI hey dada? Hey dada
FAT hey *
CHI hey dada
FAT hey *?
CHI hey dada
CHI ** fish and a turtle
FAT yeah it's the one you got at the aquarium
CHI hey dada, my want to
FAT here, give me your hand
CHI my want to going there again
FAT yeah, maybe we can go again but this time you don't act like a butt because last time we went you were a real butt
CHI I'm not a real butt
FAT yeah you were
CHI no
FAT you spent the whole time running around and screaming because we wouldn't let you run around, remember?
CHI yeah
FAT yeah well that's being a butt
CHI not not, me not butt
FAT it is being a butt
CHI I'm not being a butt
FAT come on, mama's busy in here

CHI butt
FAT you coming?
CHI not be a butt
FAT No *?
CHI * not be a butt
FAT actually you were being a butt. We'll go again
CHI Hey dad
FAT what happened? Ohhh
CHI had a caca *
FAT oh come on! * did you make that one?
CHI yeah
FAT * you gotta go to the toilet buddy when you gotta do a caca
CHI hey dada
FAT yeah?
CHI no need to *
FAT Hey what? Hey wanna look at your snails? How are you snails doing? Mmh? How are the snails? Yeah forget about that, just look at the snails. Where are they? there's one, see?
CHI yeah
FAT where's the other one, do you see him?
CHI it's on the grass
FAT your tomato plants are getting big too, look at that, I think it's
CHI It's on the grass!
FAT come on look you have flowers on your tomato plants. You know what that means
CHI my not want flower
FAT but that's where the tomato is coming from buddy
CHI my not want flower
FAT first it makes flowers and then it makes tomatoes. See we'll
have tomatoes from your tomato plants
CHI your head *
FAT your grass is growing too, there's no water in, we're gonna have to put water in. You wanna put some water?
CHI hey dada on
FAT okay yeah that shouldn't be outside, buddy
MOT Tu veux mettre de l'eau avec ça ?
FAT nan pas avec ça
MOT **
FAT use this *, first
MOT ***
FAT just use this
MOT ***
CHI screaming
FAT *.
CHI no
FAT All right, come on
CHI hey dada
FAT yeah?
CHI watch this? It's make a noise

FAT yeah put it * no! No! In the bowl! * put it in the bowl! ** where the big rock is. Try again
CHI **
FAT * in where the big rock i. Yeah that's right
CHI hey dada
FAT yeah
CHI * more water
FAT get more water. There you go, that's right. Put it all in there.
Might wanna do it again once or twice. Go on get more. Ouh!
CHI what
FAT I'm gonna get myself one of those candies. What? They're all gone?
CHI it's all gone
FAT oh come on!
CHI it's all gone ***. Hey dada
FAT hey what, what do you got there?
CHI that
FAT no no no don't take! *! If you takes that off it goes bad!
Don't do that! Why did you do that?
CHI it's not me do that, it's **
FAT ***
CHI It's * me do that
FAT oh great
CHI it's ***
FAT yeah once it's open we're gonna have to drink it fast
CHI and me to *
FAT well you're the one who drinks of that I don't drink that stuff. All right, you're doing very good buddy, come on. Let's go and finish it
CHI you heard that noise
FAT very good, you know that's enough water, you're done
CHI hey dada?
FAT yeah?
CHI you heard that noise?
FAT I heard the noise
CHI that's a noise that I heard in there
FAT that's right. You know I want you to put the * up here. There you go, over here, I don't want it to get broken. Good job buddy.
Now your snails have water
CHI hey dada?
FAT yeah?
CHI I **
FAT come on!
CHI what's that this
FAT what do you want?
CHI my wanna watch the movie
FAT I know you do. Yeah maybe we can watch something a little later, not right this second, now wait please
CHI hey dada?
FAT yeah?

CHI we watch a movie right now
FAT you wanna watch the rest of harry potter?
CHI no! Not harry potter
FAT but you didn't watch the rest of it
CHI not harry potter
FAT all right not harry potter. What movie would you like?
CHI *****
FAT what?
CHI ***
FAT yeah?
CHI I want the robot ***
FAT you want the robot movie again
CHI *** car on it
FAT you like that movie uh? You *** watch it.
CHI ***
FAT Maybe
CHI I want the ***
FAT I'll think about it
CHI I'll show one mama
FAT I think mama's seen it before
CHI uh mama, wanna see $* * *$
FAT I know you do. I wanna eat something first, ok? I'm hungry
CHI not hungry
FAT can you wait until we're done eating? Come on. Won't be that long, it's already time
CHI no
FAT mmh? Come on
CHI oh! You heard that?

2/3: CHI Mama c'est chez moi
MOT c'est chez moi ? Alors, est-ce qu'on voit? C'est encore chez moi ! Ah oui c'est Finlay c'est ça ?
CHI hihi oui
MOT C'est Finlay le bus vert. Alors, à moi. Euh une voiture rouge et verte, c'est une voiture de course
CHI mmh
MOT Euh non regarde. Est-ce que c'est ?
CHI Ca!
MOT ah oui c'est lui mais c'est pas la même image
CHI et maman!
MOT est-ce que chez moi j'en ai une ?
CHI et maman!
MOT oui!
CHI **** toi oh !
MOT Ah il est chez moi !
CHI ***
MOT oui et là ya Flash McQueen dessus et la voiture derrière. Tu sais comment il s'appelle celui-ci? Je connais pas l'histoire CHI Maman !

MOT à toi!
CHI y'a *** là!
MOT une voiture verte! Ah oui c'est chez moi! Ok vas-y, alors c'est moi qui pioche. Um alors c'est une voiture violette avec un chapeau asiatique. Oh!Ben dis donc j'ai encore de la chance il est encore chez moi celui-ci
CHI oui !
MOT à toi! Pioche
CHI ah! Il est chez moi !
MOT ah la voiture bleue c'est elle est chez toi ! Après, à moi !
CHI ***
MOT mm une *** c'est ça ? Alors une voiture bleue avec un ***
CHI maman?
MOT oui ?
CHI c'est monsieur voiture
MOT c'est un monsieur voiture ?
CHI sav moustache
MOT ah oui en effet j'ai vu la moustache. Et là c'est pas chez moi ? C'est pas chez toi, c'est chez moi tu crois? Et à ton avis ça c'est un monsieur voiture ou une dame voiture?
CHI Monsieur !
MOT c'est un monsieur voiture?
CHI ah! Et c'est chez toi!
MOT oui c'est chez moi. Alors à toi ! Alors qu'est-ce qui a ? C'est quoi? Elle est de quelle couleur la voiture?
CHI Jaune!
MOT elle est jaune! Et alors c'est chez toi ou c'est chez moi? Et moi j'ai une voiture jaune là, mais est-ce que c'est la même?
CHI oui, comme ça! C'est chez moi!
MOT c'est chez toi! Et ça ? 123 alors
CHI maman!
MOT c'est qui?
CHI c'est moi !
MOT c'est qui?
CHI * McQueen !
MOT ah!
CHI c'est chez moi
MOT uhuh et alors c'est un monsieur ou c'est une dame voiture
*** McQueen?
CHI monsieur
MOT c'est un monsieur
CHI et à pas moustache. This have *** this. Hey mama, ** watch *** comme ça Flash McQueen?
MOT Encore à toi vas-y
CHI et mama?
MOT alors c'est quoi ça? Tu me le décris?
CHI une voiture vert
MOT une voiture verte ah! C'est chez moi tu crois ? Oui merci mon * Alors, à moi! Une voiture rouge! Oh super regarde j'ai une carte qui est complète

CHI et mama ? ** moi *
MOT à toi! Alors qu'est-ce que c'est? Mm y'a une voiture bleue et une voiture blanche
CHI ah! C'est chez moi!
MOT c'est chez toi ! Oui. Alors à moi. Je vois, alors une voiture à 3 roues, une voiture bleue à 3 roues. Tu as une voiture à 3 roues toi chez toi?
CHI non
MOT mm voyons voir, mm
CHI this have a 3 and 2 roues
MOT ah oui parce que la 3ème est cachée
CHI * c'est
MOT ya 2 roues à l'arrière et une roue à l'avant regarde. Parce que 2 roues ça serait pas une voiture, qu'est-ce qui a 2 roues?
CHI ça !!!!!
MOT une moto ça a 2 roues? Un vélo ça a 2 roues?
CHI mama ** pas un vélo ça là c'est un voiture!
MOT ah ben non c'est pas un vélo, c'est une voiture je vois bien
CHI et mama, *
MOT est-ce qu'elle est chez toi ou est-ce qu'elle est chez moi ?
CHI ***
MOT ah elle est chez moi tu crois ? Ou elle est chez toi ? Oh ben! C'est celle-là ? Je t'ai fait une blague hein ? Alors à toi ! Tiens.
CHI **
MOT mm à oui c'est c'est le même !
CHI oui, ça ça ça !
MOT ha ha ça y est tu as trouvé, la voiture bleue.
CHI ** câlin
MOT mm câlin. Ya pas beaucoup de dames voitures dans ce dans ce jeu dis-moi
CHI I have 2
MOT parce que dans cars. Ah tu en avais 2 ? Parce que dans cars ya * qui est une dame quand même, et Flo aussi c'est une dame CHI et mama
MOT oui
CHI tiens
MOT c'est chez moi ? C'est quoi ? Une voiture ?
CHI oui c'est une voiture
MOT ah oui elle est de quelle couleur?
CHI euh orange !
MOT elle est orange oui
CHI et mama?
MOT oui ? Ah ben la voilà la carte avec McQueen et la voiture de course rouge et verte. Bon alors il nous manque Martin Martin et Finlay, Guido comment il s'appelle lui Chicks? Vas-y. Ah ben voilà Martin! Qu'est-ce qu'il a mangé Martin?
CHI *** aie ! mes yeux
MOT qu'est-ce qu'il a ton oeil chéri ? C'est ton bouton qui te gratte?

CHI nan!
MOT qu'est-ce quia?
CHI c'est le bouton i fait mal * skin ***
MOT ah il est sorti le bouton, fais voir. Oh c'est pas drôle d'avoir la varicelle, mais en anglais c'est drôle quand même chickenpox nan? Mmh ? Comment tu dis? Chickenpox?
CHI chickenpox!
MOT c'est plus drôle que la varicelle ? Oui?
CHI uh mama what's that?
MOT mm? Je
CHI my ** carte
MOT c'est toi qui prends toutes les cartes?
CHI ***
MOT alors moi j'aurais besoin d'une voiture bleue qui a un monocle. Et ouais! Martin et Finlay c'est ça? Et là ? C'est qui sur la carte?
CHI et ça?
MOT ah oui la voiture et euh lui c'est Guido, lui c'est Luigi c'est ça?
CHI C'est moi !
MOT c'est chez toi !
CHI oui!
MOT quelle chance ! Alors encore une carte ? Vas-y pioche. Alors
CHI ah ! C'est chez toi !
MOT ahah oui c'est chez moi la voiture
CHI et mama?
MOT oui? Tu as vu il a comme des lunettes mais sur un seul oeil, ça s'appelle un monocle
CHI monoct
MOT monocle oui
CHI let's have ah qu'est-ce que c'est ?
MOT euh ben non je sais pas pourquoi
CHI ***
MOT dans le temps peut-être parce que ça coûtait très cher, les gens ils mettaient juste sur un oeil
CHI et mama?
MOT oui?
CHI et mama?
MOT oui?
CHI this * a péter !
MOT oui ya juste
CHI ah ! A pété ! Ah j'ai un bouton là
MOT ah ya un bouton là aussi, oui et puis il est très gros. Tu voudras que je mette du produit dessus?
CHI nan
MOT ça soulage le produit? Nan? Tu fais attention de pas grater
? Ca démange les boutons?
CHI oui
MOT oui. Alors, il reste encore 2 cartes, vas-y c'est quoi ça ? Une
voiture violette ? On dirait qu'elle vole, que c'est une voiture volante
CHI oui
MOT c'est **
CHI ***
MOT non c'est pas, oui
CHI et maman ? ** cars
MOT on dirait une fille ça non ? Une dame voiture qu'est-ce que t'en penses?
CHI et maman ? ** cars
MOT mmh.
CHI ** carte
MOT mmh et alors la dernière carte ?
FAT hey buddy
CHI et maman?
FAT ***
MOT oui? Mmh Qu'est-ce que tu me ?
CHI ** carte
MOT ouais ?
CHI and ça carte and ça carte
MOT d'accord. Et la dernière carte alors ?
CHI and ça, and ça $* * * * *$ une bouche, oh, and ça. Ca c'est * MacQueen, ça c'est Martin
MOT C'est Martin
CHI Oh ! And ça, begin
MOT ça démange ?
CHI oui
MOT est-ce qu'avec un câlin tu crois que ça démange moins ? Qu-est ce que tu crois qui t'aiderait pour que ça démange moins?
CHI ça?
MOT jouer avec le fer à repasser ? Tu crois que ça t'aiderait de jouer avec le fer à repasser? C'est une blague? Non c'est pas une blague ?! Et qu-est ce que tu ferais avec le fer à repasser pour soulager tes boutons? Oh oh! Tu m'as léchée! Tu m'as léchée.
Alors et la voiture bleue elle est elle est où ?
MOT Ca y est ça filme, donc bonjour ! Voici, tu dis comment tu t'appelles?
CHI *
MOT tu t'appelles, oh c'est tombé. Alors, voilà, donc c'est toi qui dis comment tu t'appelles ou tu que ça soit moi qui dise ? Tu t'appelles Owen. Voilà. Et Owen a 4 ans et Owen il avait euh envie qu'on filme pendant qu'on parle de ce livre qui est de la petite taupe qui voulait savoir qui lui avait fait caca sur la tête parce que Owen il a une peluche petite taupe. Tu veux montrer la peluche ? Attends attends tourne-la, regarde elle est pas voilà regarde Owen regarde tu vois il faut que tu vises la caméra et là voilà tu vois on voit, donc c'est une petite taupe et qu'est-ce qu'elle a sur la tête Owen?
CHI caca! Donne-moi ça!

MOT et elle sait pas qui a fait caca sur sa tête. Voilà. Alors attends je vais mettre la caméra peut-être là ?
CHI et maman?
MOT oui chaton?
CHI ***
MOT alors on voit pas très bien. Alors est-ce que comme ça on voit mieux ? Ouais ça me semble pas mal
CHI et mama?
MOT oui?
CHI that's it ** avoir un caca tombé ** tête
MOT oui
CHI ah what's that?
MOT mmh alors, on montre ? On montre peut-être les images
CHI oh c'est oiseau, c'est oiseau !
MOT c'est un oiseau et tu sais quel animal
CHI *** d'ouvrir
MOT okay tu as besoin d'ouvrir
CHI ** oiseau for caca, * put the caca dessus on him tête
MOT voilà alors la petite taupe elle va voir le pigeon pour lui demander si c'est elle qui a fait caca sur sa tête, c'est ça ?
CHI oui ***
MOT et le pigeon, et le pigeon il lui dit ? Alors tu montres les pages au fur et à mesure ou tu expliques ?
CHI nan
MOT elle va voir qui après du coup? C'est pas le pigeon qui a fait caca sur sa tête, alors qui elle va interroger?
CHI un caca
MOT elle va interroger le che
CHI che
MOT le cheval
CHI le cheval
MOT voilà. Et alors est-ce que c'est le cheval qui à fait caca sur sa tête?
CHI oui
MOT tu es sûr?
CHI oui
MOT ben non, parce que là du coup maintenant elle va voir quel animal?
CHI vache
MOT elle va voir la vache et elle lui demande "est-ce que tu as fait caca sur ma tête?"
CHI oui
MOT mmh et la vache, qu'est-ce qu'elle lui répond?
CHI elle dit caca la vache
MOT oui elle fait caca pour montrer elle lui dit "mais non voyons moi je fais comme ça" Donc on sait que c'est pas la vache. Alors quel animal va va t -elle voir du coup ?
CHI bee
MOT tu as loupé, nan, cet animal là c'est quel animal ? Ca ce sont des mouches

CHI mouches
MOT mmh. Et du coup qui a fait caca sur la tête de la petite taupe ?
CHI c'est *****
MOT nan c'est pas le cheval qui a fait caca sur sa tête
CHI et c'est robot?
MOT mmh nan, c'est le
CHI **go on
MOT je continue à filmer oui, tu fais des drôles de grimaces ?
Est-ce que tu as envie de dire des choses?
CHI you this
MOT qu'est-ce que moi je dis, tu veux que je lise l'histoire?
CHI nan! You dis ça you dis ça
MOT je dis quoi?
CHI you dis ça picture
MOT je fais une photo?
CHI oui
MOT mmh regarde tack! Ben regarde la caméra alors, schting !
Voilà j'ai fait une photo. Encore ?
CHI maman! You dis à cac you dis à caca
MOT tu veux que je dise qui a fait caca sur la tête de la petite taupe?
CHI oui
MOT alors voyons voir. La petite taupe qui voulait savoir qui lui avait fait caca sur la tête
CHI attends
MOT mmh vas-y tu tournes les pages ?
CHI the caca * là
MOT ah oui ya un caca sur la dessiné sur la page et encore ok et puis
CHI you
MOT je lis?
CHI you lis
MOT alors Verner ** et * de la petite taupe qui voulait savoir qui lui avait fait caca sur la tête
CHI caca
MOT "tous les soirs la petite taupe sortie de tête son museau pointu histoire de voir si le soleil avait disparu. Et voici ce qui arriva. C'était rond et marron, aussi long qu'une saucisse et le plus horrible fut que cela lui tomba exactement sur la tête. Splutsch ! Mais c'est dégoutant rouspéta la petite taupe! Qui a osé me faire sur la tête ? Evidemment personne ne répondit" Et là elle va voir qui alors?
CHI what's that?
MOT le pigeon !
CHI pigeon
MOT mmh "dis donc le pigeon de la * est-ce toi qui m'a fait sur la tête? Mais non voyons moi je fais comme ça. Et splotsch un pâté laiteux vint s'écraser juste devant la petite taupe et moucheta de blanc son pied droit." Donc c'est pas le pigeon. Elle va voir qui
maintenant?
CHI eh cheval
MOT "hey le cheval est-ce toi qui m'a fait sur la tête ? Mais non voyons, moi je fais comme ça. Et pouf pouf pouf pouf pouf il bombarda l'herbe de 5 gros crotins. La petite taupe fut très impressionnée." Donc puisque ça n'est pas le cheval, elle va voir qui?
CHI la la apin
MOT le lapin. Alors c'est une variété de lapin
CHI et maman ****
MOT c'est un cousin du lapin on appelle ça un lièvre
CHI manger une carotte
MOT il est en train de manger une carotte le lièvre, oui voilà.
"Hola le lièvre est-ce toi qui m'a fait sur la tête ?"
CHI nan c'est apin
MOT oui alors c'est un cousin du lapin, c'est un peu plus gros qu'un qu'un lapin comme les petits lapins qu'on peut avoir dans nos maisons et on appelle ça des lièvres, voilà. "Mais non voyons, moi je fais comme ça, et ratatatata 50 haricots tout ronds pétaradères aux oreilles de la petite taupe." Donc c'est pas le lapin. Alors maintenant elle va aller voir.
CHI la sèvre
MOT la chèvre. "Soit franche la chèvre est-ce toi qui m'a fait sur la tête ? Mais non voyons moi je fais comme ça. Et klandiklangdiklang une série de berlingots couleur chocolat dégringolèrent sur la prairie. La petite taupe leur trouva un air fort gracieux." Bon c'est pas la chèvre, là maintenant elle va aller voir un autre animal.
CHI oui
MOT elle va voir
CHI a vache
MOT "Répond la vache est-ce toi qui m'a fait sur la tête ? Mais non voyons, moi je fais comme ça. Et sploutch une énorme bouse verdâtre s'écrabouilla mollement sur le sol"
CHI maman la fait ça
MOT mmh "saperlipopette ! Pensa la petite taupe
CHI maman
MOT c'est une chance que cette chose là ne me soit pas tombée sur la tête !
CHI et maman!
MOT oui oui
CHI You read ça!
MOT ben je l'ai lu ça. C'est quand elle dit "Répond la vache estce toi qui m'a fait sur la tête ?" et là la vache elle lui répond "Mais non voyons, moi je fais comme ça." Et là tu vois le caca de la vache.
CHI oui
MOT c'est une bouse
CHI bouse
MOT voilà alors la petite vache heureusement elle se cache
derrière la jambe de la vache pour pas être éclaboussée. Donc comme c'est pas la vache elle va voir un autre animal. Elle va voir CHI maman
MOT elle va voir qui?
CHI euh cochon
MOT elle va voir le cochon. "à vous cochon! Est-ce toi qui m'a fait sur la tête? Mais non voyons moi je fais comme ça. Et flouf il envoya un paquet brun et mou derrière lui. Beurk! La petite taupe dû se boucher le nez." Toi aussi tu te bouches le nez ?
CHI oui
MOT Bon, um, alors en général on bouche en se pinceant le nez.
CHI oui
MOT mais c'est vrai que mettre 2 doigts dans les narines ça permet de boucher le nez. Comme ça ptt
CHI comme ça
MOT comme ça. "hep vous! Est-ce... commença la petite taupe, mais il n'y avait là que 2 grosses" c'est quel animal ?
CHI kwayaya
MOT nan des mouches
CHI mouches
MOT "qui faisaient bondance, le genre de personnes imbattables sur le sujet. Qui a bien pu me faire sur la tête mesdemoiselles demanda t-elle? Les 2 mouches n'hésitèrent pas longtemps. Aucun doute ma chère, c'est un c'est un chien! Cette fois la petite taupe le tenait le gros malpropre qui lui avait fait sur la tête, JeanHenri le chien du boucher. Sa vengeance allait être terrible.

3/3: CHI *** lego
FAT oh yeah you said something about lego *** me ***
CHI hey dada, watch me I show you Fraggles
FAT you're gonna show me Fraggles where?
CHI * no one
FAT ***
CHI ***
FAT yes
CHI you donne me a Fraggles you donne me a Fraggles
FAT from where?
CHI from you get
FAT well ** Fraggles I guess but
CHI yeah!
FAT show me show me what's the Fraggles
CHI hey dada, we close the window and watch a movie
FAT ah you want me to put Fraggles and the Hole
CHI yeah
FAT yeah. Well you don't
CHI * legos
FAT oh legos not fraggles, you want legos
CHI yeah we need a close a damn door and a damn window

FAT yeah we do need to close that damn door and that damn window
CHI ** goddamn
MOT tu m'expliques ce vocabulaire. Je peux avoir le coussin stp Owen?
CHI hey maman?
MOT yep
CHI you does have a coussin
MOT oui mais j'en voudrais un pour les pieds aussi stp
CHI mais you have un coussin là
MOT ah! Ok
CHI maman * un coussin for ici
MOT mmh
FAT I I I don't see any problem watching a movie buddy, you don't have school tomorrow, we can do it, we can *do a lego movie
CHI hey dada
FAT yeah?
CHI we got Fraggles
FAT ****
MOT ****
FAT quoi?
MOT ***
CHI ah there's a bee right there!
FAT yeah ok, we eat in a little bit, wouldn't you like to take some popcorn maybe?
CHI yeah
FAT yeah, some popcorn with butter and cheese
CHI ah! There's a bee right there
FAT it's a fly Owen, it's a fly
MOT mmh c'est une mouche ça chérie
CHI a fly, a fly got bzzz. I say bzzzzzz. I sound like a bee
FAT it does sound like a bee yeah
MOT c'est vrai que le bzzzz ça fait à peut près la mouche plus
qu'une abeille
CHI hey dada, you get up there and this fly a **
FAT yeahhh no I'm not chasing a fly buddy but you can go ahead
do it, get him!
CHI I can't
FAT wack ${ }^{* *}$ air
CHI hey dada
FAT what?
CHI my can't
FAT sure you can!
MOT haha
CHI my can't
FAT just keep trying it'll come down
CHI my not big
MOT yeah
FAT no

CHI hey dada
FAT what?
CHI my need help for that, I throw that
FAT Owen don't throw it!
CHI hey dada
FAT crazy boy
CHI my want to do that
FAT I know you did
CHI hey dada
FAT yes?
CHI my gonna throw again. hey dada
FAT please please don't throw it again
CHI watch this? Hey dada watch this. Ow my want to do that
FAT ow you think?
CHI yeah
MOT t'as fait une sacrée cascade
CHI my want to do that, my want to do that fell down like a fly. Watch this.
MOT eh attention! Je suis pas une mouche moi
FAT why is your robot in the corner?
CHI oh what?
FAT ***
MOT ah c'est moi qui l'ai mis
CHI what?
FAT no mama did it not you
CHI hey dada $* * * * *$
FAT Owen I say don't throw
MOT ** Owen il fait une blague là
CHI hey dada watch this my want to do like that
FAT I know you did
MOT mmh
CHI hey dada my need a bigger fly bee. Hey dada
FAT just wait until it comes down then you got him but you have to wait
CHI hey dada
FAT yeah? Well if you keep swinging it then he's gonna go up but if you wait he'll come back down. See? Now he's up again. You just have to wait a minute, just sit down, wait until it comes down and then you can get him. He's already down, right, well MOT ou ça?
FAT oh
MOT c'était pas bien là. C'était de courte durée je crois qu'elle est sortie de la pièce maintenant
FAT yeah I think you might wanna **
MOT et ben on est tranquilles
FAT okay wanna make some popcorn?
CHI yeah?
FAT yeah?
CHI we watch Legos. Hey dada
FAT yeah?

CHI * off **
FAT * off top what?
CHI Legos
FAT t'as compris là ?
MOT euh nan il a parlé Legos **
FAT ${ }^{* * *}$ with the legos mais jsais pas ce qu'il veut dire
MOT ah! Aucune idée! Aucune idée, je sais pas ce qu'il veut.
Owen? Owen!
CHI ah! ***
FAT Owen why don't you take out the popcorn machine and put it on the table?
CHI ** a bee * there's a bee!
MOT c'est pas une abeille chéri c'est une mouche
CHI it's not a mouche! Come on!
FAT all right popcorn
CHI ***
MOT yep
FAT all right get the popcorn machine buddy
CHI **** fly away. Hey dada
FAT that's okay
CHI ** bee
FAT it's a fly **
MOT tiens tu te mets là ? Tu vas faire les popcorns?
CHI why not?
MOT tu sors la machine?
CHI *** mal
MOT qu'est-ce que tu fais chaton?
CHI aïe aïe aïe
MOT qu'est-ce, tu t'es fait mal ?
CHI aïe oui
MOT mieux ? Ca va mieux ?
CHI it's not maieux. * mal là
MOT ** te dis
CHI **
FAT oh euh tu en veux aussi?
CHI oui
FAT et ben tu prends les 3 saladiers comme la dernière fois? Oh! Wait here buddy somebody is calling me. Hallo! *
MOT tiens
CHI I cassé ma main
MOT t'as cassé ta main?
CHI oui
MOT tu montes le l'appareil je vais brancher. Allez en route. Ben t'as pas monté l'appareil Owen ! Zou! Tiens, je mets la bestiole FAT ****** ça te dit rien ?

## Transcripts of child $P$.

1/3: CHI woodie
FAT then woodie?
CHI yes, woodie tshirt ** pink buzz and woodie and *
FAT okay
CHI that's her name, that's her name
MOT *****
CHI What?
MOT dans 3 minutes on a des cookies
CHI yeahy
MOT yeahy! Tu t'assoies là ?
CHI ** put this
MOT ok
CHI here
MOT la oh la taupe là
CHI taupe
MOT tiens, you coming?
CHI this that. This this ***
FAT okay
MOT ok
CHI yeah. I ***
MOT mmh *** tiens. Quelle couleur?
CHI rouge !
MOT rouge !
FAT nan
CHI it's there
MOT nan. alors c'est quoi qui est rouge ?
FAT * red
MOT C'est la tomate !
CHI I want that !
FAT not yet
MOT pour avoir ça faut que tu tombes là-dessus. Vas-y
CHI ** red!
FAT red
MOT à moi. Violet !
CHI * oh !
MOT à toi!
CHI yellow!
FAT yellow!
MOT c'est quoi qui est jaune?
CHI this!
MOT la courge
CHI crouge. It's going there?
MOT what? Ben non elle va sur le jaune chérie regarde
CHI d'accord ${ }^{* * *}$ here
MOT ça va là ?
CHI no
MOT no
CHI *** rouge orange ** yellow

MOT à toi !
CHI what's that daddy?
MOT oh! Encore rouge!
CHI encore rouge, oh oui !
MOT oh daddy va gagner. Oh! À toi ! Oh
FAT yellow
MOT eh tricheuse ! À daddy
CHI *
MOT ah taupe! *** À toi. À toi ?
CHI oui. Orange
MOT oh tricheuse, lance le dé. Violet, et regarde t'as pas le violet CHI *
FAT purple
CHI taupe
FAT orange. Orange
MOT nan nan nan, nan nan nan tu le laisses dessus. À toi
FAT I don't need this thank you
CHI ***
MOT ok, ** celui-là. Allez à toi, tu jettes le dé ? Oh ça c'est les cookies!
CHI the cookies the cookies the cookies
MOT va jouer avec daddy j'arrive avec les cookies, va jouer avec daddy
CHI *** cookies cookies cookies cookies Cookies Daddy!
Daddy ! Cookies plenty Cookies plenty Cookies plenty
MOT *
FAT don't know
MOT my turn
FAT yeah (yawning)
MOT did you cheat?
FAT no she
MOT ok it's hot you gotta wait five minutes
FAT you win
MOT ouais!
FAT you win
MOT tricheuse. Will you stop yawning
FAT **
MOT on joue pu?
CHI oui
MOT oui
CHI tada! (french)
MOT tada
FAT ***
MOT ohoh
FAT ***
CHI * that's mine, that's yours. Daddy * your cup of tea your cup of tea your cup of tea
FAT I know
CHI ** playing. wait no!
FAT oh no

CHI yes
MOT **
FAT *** pillow
CHI no
FAT **
MOT tu commences?
FAT ** a nice pillow
CHI oh oui ! Oh oui !
FAT **
MOT how much hein?
FAT **
CHI **
MOT violet! À toi tiens.
CHI **
FAT **
CHI mais c'est, c'est chaud
MOT c'est chaud ben repose-le là
FAT taupe
CHI c'est chaud
MOT nan *** ça c'est le mien
FAT ah c'est maman ça
MOT va t'asseoir, on va attendre 4:10
FAT now
MOT making sure ***
MOT tiens * à toi
FAT you go
MOT à toi * hot, * hot
FAT **
MOT **
FAT ** no.
CHI jaune!
FAT taupe
CHI ***
FAT "whispering"
MOT ouais à toi *
CHI I got mine
FAT mmh here you go ${ }^{* *}$ orange, orange
CHI want purple
FAT purple. Yellow!
CHI *
FAT taupe. Yellow
MOT à toi. * cheat chérie
FAT you rool the die
CHI red
MOT ***
FAT *****
MOT *** what kind of sugar **
CHI I want cookies again
MOT no demain, ok ? Laisse ça tranquille nan. Là, laisse ça tranquille, tu touches pas, nan nan nan nan nan nan

CHI arrête arrête
MOT tu veux jouer au ** Oui ? On fait une cathédrale? *** Oh! Did she slap you?
FAT yep
MOT * t'as tappé daddy. Are you okay daddy? I don't think she meant it did she? Ben demande à daddy si ça va. It's okay demande à daddy si ça va. Tu as fait exprès ou c'était un accident?
CHI c'était un accident
MOT c'était un accident $* * * * * *$
FAT **
CHI sorry daddy
FAT fine **
CHI I do it
MOT tu fais toute seule?
CHI *** *** ***
MOT on fait une église?
CHI yes une église
MOT tiens
CHI daddy not sleeping. Not sleeping
FAT ah I wake up
MOT tiens
CHI *
MOT * bouge t'es au milieu. Nan mais t'es, ugh!
CHI mmh!
MOT mais oui attends faut que maman elle mette la base. Tiens, voilà. On fait la cathédrale? Ben la casse pas. Tiens. Tiens daddy FAT doo doodoo doodoo doo doo doo
MOT ***
CHI wait for you
FAT yep
CHI it's go there. There it's go there!
MOT here, tiens
CHI ** go there. The green is go there. That go there. And door, knock knock knock knock **** I ***
MOT nan nan nan nan nan
CHI I would I would have **
MOT hein?
CHI I can go on there I want to
MOT tu joues pas au ***?
CHI oui!
FAT oh! You okay?
MOT ça va?
CHI "cries"
MOT viens voir maman ***
FAT **
MOT **** ?
FAT **
MOT tu dis ***?
FAT no

MOT ** ou c'est que t'as fait bobo ?
CHI **
MOT "fait un bisou" Ca va mieux ?
CHI oui
MOT *****
CHI ***
MOT allez zou. On range les *** ?
CHI no. I want blanket daddy's blanket, I want ?
MOT tu demandes à daddy avant
CHI okay. Can I have your blanket daddy?
FAT yeah if you want
CHI okay
MOT I didn't hear please
CHI please
MOT * bouge de là ohh. * là-bas! Allez là-bas! Zou! Qu'est-ce que tu fais?
CHI I'm ${ }^{* * *}$ the one, I'm ** the one
MOT oh
CHI this one and that's on daddy and ** okay?
MOT ok
CHI and jump
MOT tu veux pas m'aider à ranger ?
CHI and jump! Ah!
MOT *****
CHI daddy
MOT ***
FAT ***
CHI and saute!
MOT regarde ca fait un arc-en-ciel avec les couleurs. * t'as vu l'arc-en-ciel?
CHI "cries"
MOT kiss *
FAT *
CHI I hit myself
MOT oh that's ok *** yourself
FAT ***
MOT you just had ****
CHI no, I I'm not
FAT ****
CHI no
FAT you're on daddy's pillow
CHI it's you
FAT you got daddy's pillow. Come to daddy, come to me my lovely *** **
CHI ** No no!
FAT come to me my lovely **
CHI noooo
FAT daddy daddy mmh?

2/3: CHI ******
FAT oh you have to put it back in the same box
CHI I did it I did **
FAT no no no throw no throwing it's a box you *** you put it back in that sunbox or that sunbox
CHI that sunbox
FAT ok there you go you put them there
CHI in that one?
FAT well which one did you want it in?
CHI um there
FAT *****
CHI ****
FAT **** **** No we don't eat right now
CHI "screams" yes it's like a dog
FAT oh like a dog
CHI I am like a dog I didn't *
FAT no "tickles CHI"
CHI I'm *****
FAT oh
CHI let me. * let me see too
FAT you wanna play that too, ok ** go over there
CHI ok ** monsieur O *
FAT mmh?
CHI monsieur O him
FAT oh ****
CHI it's him monsieur O
FAT * is that mister O?
CHI yes OOOOO
FAT OOOO
CHI * I don't play
FAT ** what's that one?
CHI *
FAT * where did he go?
CHI there
FAT he was there?
CHI there is a small ${ }^{* * *}$ careful careful is going jump **
FAT oh it jumped!
CHI oh ah!
FAT * one. Which one you like?
CHI purple (fr accent)
FAT I do purple
CHI it didn't jump yet. It didn't jump
FAT no it didn't jump
CHI no I've ** jump ** there
FAT are you doing that one?
CHI yes oui!
FAT you do a green one ok
CHI what is this?
FAT it's like a little key
CHI green

FAT it's green
CHI it's it's ** baby? *****
FAT yes ***
CHI in there? It didn't jump
FAT no it didn't jump no
CHI no
FAT ***?
CHI again
FAT wanna do a blue one now?
CHI I do a blue cheese but
FAT I do purple ok. you go first
CHI I go first. Ah! I didn't jump
FAT no you didn't jump no it didn't jump
CHI ** I didn't jump him ** be careful daddy Daddy you have to be careful
FAT I have to be careful Why do I have to be careful?
CHI because the the * because
FAT very careful
CHI yes ah oh it's out
FAT * fall over again?
CHI yeah that one too and and over there that there and ${ }^{* * *}$ there oh no it's $* * * * *$ and there's no more no more no more
FAT yes. you see that
CHI and this here and this tree there and that's $* *$ there
FAT we're missing one key you find the key?
CHI there!
FAT **** oh *** key ** these keys it kind of missing
CHI these keys. well is missing oh no is missing ${ }^{* * * *}$ come oh is missing * you keys
FAT yeah one of them is missing
CHI one is missing * somebody took her one somebody took one oh daddy
FAT well I don't know
CHI somebody taked her oh I want to make another one do it again? I * one I touch it I touch it daddy I touch it I touch it I touch it!
FAT I know I just want to see *
CHI are you going to look? I touch it $* * * *$ in there ${ }^{* * *}$ let me ****
FAT well I won't look there
CHI yes I turned it
FAT it won't work work in there though
CHI this I'm going hammer hammer hammer
FAT but it's not a hammer *
CHI no it's don't fit
FAT oh but that doesn't fit in here
CHI yes
FAT I don't think it does
CHI it does
FAT uh you'll break it though. Don't do that

CHI monsieur Y (fr accent) chat *** cat is a cat is a cat daddy is a cat
FAT * that cat?
CHI yes
FAT I don't know
CHI it's a cat
FAT I don't know if it's a cat. What do you think?
CHI is it, I think it is a cat!
FAT does it have legs
CHI no uh yes! I see that one. What is that? Is that **? Is that the *?
FAT uh n oh?
CHI I think so it's * for you. I think so * for you. It's not. ** this. This and monsieur M and monstre est pas méchant ${ }^{* *}$ mais monstre ${ }^{* *}$ de monsieur ahhh hahahaha hahahaha hahahaha you hold monsieur O
FAT I hold mister O ok
CHI hahahahaha ahahahahaha
FAT ahahahahaha
CHI fais monsieur O tu fais houhouhouhou ahahahaha ahahahaha ahahaahaah ihhhhh hahahaah ihhhh hahahaahha ihhhhh ihhh ah It jump!
FAT it jumped
CHI it jump again. Oh I think * in there
FAT well that's in there it was in the side
CHI no
FAT it does. Out of your mouth don't do that
CHI in there
FAT no no
CHI in there!
FAT no * in the sides
CHI no ** in there it was moving. It's coffee coffee this one ** there * there *
FAT is there one there?
CHI it's *** yes oh in there too! Again ** that that one ***** It's coming ** It's coming * mouth daddy It is ** mouth ** * ahhhhh ahhhhh mmmmh daddy
FAT mmh?
CHI ** built a castle
FAT d'you wanna make the castle?
CHI I do
FAT ok what do you want to **
CHI ok let me let me this doing again this This is gonna end there that in there not * this in there * this let me play that today
FAT and where's the house?
CHI house, this is a house. I build this
FAT you built a house with
CHI ** and mummy
FAT with we
CHI and daddy and for you too

FAT well I'm daddy
CHI and that's for you to drow for you drove it
FAT ah you want me to drive?
CHI yes for you drive it
FAT oh ok
CHI have a put that up there and that's a for for for the for the fort is gonna ** somebody
FAT ok
CHI and that's ${ }^{* * *}$ on the ${ }^{* *}$ and why,. You see? It's falling hahahah no!
FAT yeah
CHI it's not there NOOOOO don't! Don't break it my house
FAT hahaha I'm not breaking your house
CHI uh hahahahaha you're mixing * I wanna make *
FAT ***
CHI hungry
FAT you're hungry?
CHI it's my belly hungry
FAT oh your belly is hungry
CHI yes your belly is hungry! *
FAT no my belly is not hungry
CHI yes
FAT no it's not
CHI yes
FAT it's not
CHI yes
FAT yours is but daddy's isn't
CHI daddy is
FAT no
CHI is not my * uh! Nooooo don't break it!
FAT I'm not breaking it. Oh well * over

3/3: MOT voilà allez on fait des gâteaux ? Tu mets la farine dans le bol? Vas-y, tu verses la farine dedans? Il faut sur... nan nan dans le bol dans le bol. Vas-y, dans le bol, tout dans le bol. L'assiette c'est pour les bananes. Mmh
CHI *** just one and that is for this
MOT c'est pour ça oui mais d'abord on met la farine
CHI that is for this one
MOT mmh vas-y moi jvais vider ce que t'as mis là-dedans, regarde. Vas-y dedans, encore. Oh là ça sent la catastrophe. Doucement! Doucement! Fini! Fini! Alors attends, nan mais qu'est-ce tu fais, arrête. Attends faut que maman finisse de mesurer, voilà !
CHI yeahy!
MOT attends maman!
CHI that
MOT regarde, le fouet, tu mélanges ? Vas-y mélange. Doucement
! Doucement ! Doucement ! Doucement! Doucement. Vas-y, mets dedans. Uhuh ensuite on va mesurer le sucre. Tiens. Doucement chérie. Doucement. Le but c'est de le garder dans le saladier, pas par terre.
CHI *
MOT Tu mets le sucre dedans ? Attends il faut ta cuiller, tu l'as mise où ta cuiller?
CHI euhhhhh
MOT oh regarde elle est là, vas-y
CHI * this. Mixing cake daddy
MOT no, * there. Ok ok ok là. Mmh. C'est bon c'est fini! Là on met de l'autre sucre. Tu mets dedans?
CHI l'autre sucre
MOT vas-y mets dedans. Et maintenant tu remets ça là et on met l'autre sucre vas-y. Dans ça hein. C'est pas grave on passera l'aspirateur. Encore. Fini. Oh attends. Attends ! Encore un petit peu. Tiens mets ça. Encore un petit peu.
CHI I'm fini
MOT oh fini vas-y mets dedans et touille ! Et tu touilles ! Doucement doucement doucement. Ok doucement, comme ça voilà. Vas-y tout doucement
CHI I done
MOT pardon?
CHI I try that
MOT attends chérie, d'abord on va faire et après tu vas tout goûter.
CHI cake **
MOT Ensuite, si faut un oeuf. Tu veux mettre l'oeuf dedans?
CHI Euh oui!
MOT oui?
CHI please please please please please
MOT alors attends maman elle va écraser. Comment on dit à maman s'il
CHI teplé
MOT oui s'il-te-plaît
CHI I go falling
MOT uh! Tu vas tomber ?
CHI oui ! I wanna do it
MOT pardon?
CHI I wanna, I wanna faire.
MOT tu veux faire ? Ok. Attends j'écrase encore un petit peu et après je te laisse faire
CHI my couteau
MOT mmh. Vas-y, tu fais ? Et après tu peux mettre ça dedans.
Doucement ! Voilà, tu veux mettre le beurre dedans? Tu mets les graines de chia? Vas-y mets les graines de chia. Ouais
CHI it's for, it's for le yaourt
MOT c'est pour la yaourt mais on peut aussi les mettre dans le gâteau. Tiens ! Tu mets le beurre et ensuite tu pourras mettre ça. C'est quoi ça?

CHI It's a
MOT c'est un oeuf, vas-y casse-le. Ouais au-dessus du bol maintenant. Au-dessus du saladier. Ouvre en deux. Comme ça. Mets tes doigts dedans et tire.
CHI can you do it?
MOT hop. Ohoh!
CHI ohoh
MOT tu mets le beurre maintenant?
CHI yeah!
MOT ok tu mélanges un petit peu? Il est où ton fouet?
CHI there
MOT Il est là. Hop !
CHI it's moi
MOT oh encore ? Y'a plus ?
CHI encore
MOT encore? Vas-y touille touille touille
CHI teuille teuille
MOT doucement
CHI ah! I wanna coupe this
MOT mh?
CHI the banana I want to coupe
MOT tu veux la couper ?
CHI oui
MOT ok. Tiens je t'ai sorti ton couteau, regarde.
MOT vas-y
CHI et ça ***
MOT tu les coupes bien hein tu fais attention à tes doigts. Mmh. Tu les coupes toutes? C'est bien.
CHI uhhhh
MOT c'est pas grave, c'est pas grave parce qu'on va les cuire. C'est pas grave si c'est un peu noir. OK ? C'est juste parce qu'elle a eu un coup la banane c'est tout. OK ? Tu continues de couper ? Coupe! Coupe ! Coupe! Et après couper on fait quoi ?
CHI Craser
MOT on va les écraser, c'est bien. Hop tu veux les écraser?
CHI oui !
MOT tiens. Ouais, fort fort fort. Oh! Elle glisse. Tu veux que je t'aide ? Oh ben non tu fais du beau travail. Ouais ! Encore ? Ouais bravo chérie. Hop vas-y écrase-les ces coquines. Tu veux que je t'aide ? Vas-y, 1, 2, 3 ! Urgh ! Encore ?
CHI Urgh!
MOT Encore?
CHI Urgh! Urgh!
MOT mmh encore encore encore. Voilà. Mmh. Ok tu crois que c'est bon maintenant?
CHI Oui !
MOT oui ? Qu'est-ce qu'on fait avec les bananes ? On fait quoi avec?
CHI in there!
MOT on les met dedans? Tiens tu veux le faire avec la cuiller ?

CHI oui. I want goûte ça
MOT tiens. C'est tout, le reste c'est pour les bananes, vas-y mets les bananes dedans chérie.
CHI I want goûter
MOT nan, nan, nan ça c'est pour les bananes on mangera, regarde je t'en ai mis un petit peu dans un bol là. Tu les auras quand t'auras fini, tu fais ta banane d'abord stp? Tu veux mettre le chocolat dedans ? Ok vas-y. Tu pourras manger celui-là après ok ? C'est tout maintenant, tu mets la banane dedans.
CHI I don't want the cuiller.
MOT tu veux que je le, oh tu veux pas la cuiller. Et après qu'estce qui faut faire ? Est-ce que tu te souviens de ce qui faut faire ?
CHI this
MOT faut touiller, ouais. Allez
CHI I fini
MOT t'as fini tu veux le chocolat. Tiens. Maman elle va finir de touiller alors. Là.
CHI *
MOT tu en mets partout !
CHI oui
MOT oh chui une coquine !
CHI ** on the ground
MOT mh?
CHI ****
MOT ok c'est pas grave on va laver les vêtements à la machine après. Alors on a mis la farine
CHI a mine one
MOT et la et les tiens aussi
CHI oui
MOT oui. C'est bon? Mmh. Oh t'en as trouvé d'autres
CHI I trouvé z'autres
MOT t'as trouvé les autres. T'as mordu ta langue ? Ohoh ça va ?
Tu veux de l'eau? Ok, tiens. Vas-y bois.
CHI I want more, more de l'eau
MOT comment on dit ?
CHI teplé
MOT stp encore.
CHI encore
MOT tiens. Est-ce que tu veux m'aider ou tu es trop occupée à manger le chocolat?
CHI chocolat
MOT t'es trop occupée à manger le chocolat, ok
CHI de l'eau. I want more chocolat
MOT nan c'est fini le chocolat maintenant, OK ? J'ai dis non hein.
Hein hein. Je sais je sais
CHI I more
MOT il en reste oui mais ça sera pour faire
CHI ***
MOT ça sera pour faire, ça sera pour faire des gâteaux la semaine prochaine, ok? Oh *

CHI I want more *
MOT oui je sais je sais que tu en veux d'autres par contre maman elle a dit, j'ai dis quoi? J'ai dis non, fini, tu pourras en avoir un, un autre jour quand on refera des gâteaux pour l'école, d'accord ?
CHI gâteau pour, gâteau, gâteau is for me though
MOT tu feras des gâteau
CHI that is for me though
MOT c'est pour l'école mais si tu veux tu pourras en avoir un maintenant quand c'est cuit d'accord ?
CHI that is for, that one is for me though
MOT ok tu voudras manger celui-là à la maison
CHI and that one is for (é)cole
MOT et les autres c'est pour l'école et pour le travail de maman aussi?
CHI oui. I want t'aider
MOT tu veux m'aider. Tu veux finir, tu veux racler le bout ? Regarde, attends écoute-moi attends. Celui-là il lui en faut encore, est-ce que tu veux en mettre dedans? Celui-là là regarde, celui de du milieu, mmh, c'est bien. Tu veux une petite cuiller aussi ? Moi je vais faire à la petite cuiller. Hop !
CHI I wanna do that one
MOT et celui-là, nan nan nan nan nan, oh *! Ceux-là yen a pas besoin, ya pas assez de pâte. Tiens tu le mets dans celui-là ? Tiens. Nan nan l'eau c'est pour.

## Transcripts of child Sa.

$\mathbf{1 / 3}$ : MOT on va lire le livre des dinosaures de "Cherche et Trouve"
FAT we're gonna read a dinosaure book
MOT we have a lot of dinosaure here, on a beaucoup beaucoup de dinosaures. On a cette sculpture là, est-ce que t'es capable de la trouver quelque part dans le livre ?
CHI non il faut pas que, il faut il faut tu dis le nom
MOT c'est quoi le nom papa ?
FAT the name is brachiosaurus
CHI bachiosaure
MOT ensuite on va essayer de trouver les oeufs et le nid. Qu'estce que c'est les oeufs et le nid?
FAT I like that, les oeufs
CHI um je sais pas
FAT qu'est-ce qu'on mange le matin des poules ? Eggs
CHI eggs!
FAT et un nid? Nest
CHI nex
FAT non nest
MOT nest
CHI nest
MOT ici nous avons beaucoup beaucoup beaucoup d'arbres, il y a
de la forêt partout avec les dinosaures. Est-ce que t'es capable de me montrer tous les arbres? Tu peux-tu me dire un gros un petit CHI gros petit gros gros pe moyen gr moy moyen gros gros FAT ok
CHI petit
FAT then find the the river. Where is the river?
MOT what, c'est quoi une a river?
CHI une rivière
MOT oui
BRO une rivière
MOT est-ce que tu peux me trouver la libellule ?
BRO ibeyulle
CHI libellule
FAT ****
MOT chut
BRO bee
MOT oh la prochaine page, je vois beaucoup beaucoup de roches.
Est-ce que tu vois les roches?
CHI oui
MOT peux-tu en compter?
CHI 1, 2, 3, 4, 5
BRO j'ai pété
CHI 6, 7, 8, 9, 10
MOT waou 10 roches
CHI 11, 12, 13, 14, 15
MOT ***
FAT okay *
CHI cinq
FAT Can you count the dinosaurs with the long necks?
CHI 1, 2, 3
MOT en anglais
FAT en anglais
CHI one, two, three, four, five, six, seven, $8,9,10,11,12$
MOT okay on tourne la page wouaou c'est quoi ces dinosaures là *?
CHI des ptéranodons
MOT des ptéranodons, c'est dinosaures qui volent
CHI et même qu'il y a pas de dents, qui sont pas herbivores qui sont pas carnivores
MOT ok. Qu'est-ce que tu peux dire papa?
FAT what is the colour of the leaves of the tree?
CHI orange (french)
FAT the tree leaves. Or red
CHI red? red
FAT eh. What is the colour of this dinosaure?
CHI blue!
MOT quelle couleur ça?
CHI or uh yellow
MOT en français
CHI jaune

MOT oui
FAT on te mélange
MOT on te mélange oui, maman parle en Français papa en Anglais. On a tourné la page, qu'est-ce qu'il fait ce dinosaure ?
CHI il essaie de manger le stégosaure et il coule aussi comme le stégosaure
MOT oh non il essaie de manger le stégosaure
CHI et lui regarde
MOT ouais lui il a la grosse bouche ouverte
FAT il est pris dans la boue
MOT et qu'est-ce que c'est ça ?
CHI un volcan
MOT un volcan
FAT et en anglais c'est quoi?
CHI a volcano
FAT uhuh
MOT bravo
FAT c'est quoi ça ici?
CHI la lave
FAT la lave
MOT la lave
FAT une avalanche
MOT ok, on tourne la page. Dans cette page on voit beaucoup de dinosaures verts, et d'autres qui ont les, quoi d'autres?
CHI les caparaces
FAT what is the name of this dinosaure?
CHI a spinosaure
FAT spinosaures?
CHI yeah
FAT oh yeah spinosaures
MOT spinosaures, bravo. Il connait plus que ** Qu'est-ce que c'est ça ?
CHI a snake, **
MOT qu'est-ce que c'est ça?
CHI is a , is a
FAT en Français
CHI a serpent à pattes
MOT un serpent, à pattes
CHI oui regardez ya des pattes, comme lui
MOT ohhh ouais c'est drôle
FAT ***
MOT oh on tombe sur la page des
CHI marins
MOT des marins. En Anglais ?
CHI mever?
MOT oceans
CHI ocean
MOT est-ce que t'es capable de me dire qu'est-ce que c'est?
CHI un requin-dino
MOT un requin-dino. Papa?

FAT what is this animal?
CHI is
FAT this animal is a... turtle
CHI a turtle
FAT et en Français?
CHI une qortue
FAT tortue
MOT tortue. Ok on tourne la page et on a presque terminé. Uh wow y'a des météorites dans les arbres y'a beaucoup de
CHI volcans
MOT de volcans. Est-ce que tu vois des dinosaures qui sont
CHI morts
MOT morts
CHI je p, je peux les compter?
MOT oui
CHI en Anglais?
MOT en Français
CHI non moi je veux en Anglais
MOT ok
CHI 1, 2, 3, 4, quatre !
FAT five
CHI 5, 6, si, si
MOT six (english)
CHI six (french)
MOT six oui. Six dinosaure (english)
CHI six dinosaures (french)
MOT d. morts en anglais
CHI six (french)
MOT est-ce que tu connais?
CHI je sais pas
MOT dead
CHI dead
MOT oh!
CHI aeroplane, non, euh euh euh ahhhh
MOT c'est tout mélangé?
CHI nah oui
MOT oui parce qu'on est les deux à te parler
FAT héli héli
CHI helicopter ahhhhh
FAT *** di di digger
CHI digger
MOT et là c'est les archéologues font la fouille, ils creusent dans la tare pour trouver les dinosaures
FAT explique-nous qu'est-ce qui se passe sur l'image, dis-nous qu'est-ce qui se passe
CHI y'a, y'a des personnes avec des couteaux pour couter l'herbe **
MOT oui
FAT quoi d'autre
CHI à cause les herbivores il peut pu manger les ça, ça grandit
trop gros pour aller zusque là ils coupent avec des couteaux
FAT qu'est-ce qu'ils font là ?
CHI ils creusent dans le fond fond fond y'avait euh le fossil de géant dinosaures, un tiranosaurex
MOT wouaou
CHI tiranosaurex (english)
MOT est-ce qu'on dit merci ?
CHI merci
MOT byebye
CHI c'est pas fermi
MOT ah c'est pas terminé oh! On est au laboratoire
CHI oui
FAT c'est quoi ici ?
CHI i i il, lui explique de ça c'est euh carnotaure
FAT carnotaure
CHI oui
FAT and here they are looking on the computer
CHI computer
FAT and there's a teacher and the students listening to the teacher
MOT oh!
CHI le parc de jeux
MOT un parc de jeux !
CHI oui. hey! Balloon!
MOT des balloons
CHI the dinosaure
MOT c'est quoi un manège ?
FAT this is what, what is this?
CHI a slide T-rex
MOT a t-rex slide
FAT a t-rex slide
CHI yeah
MOT et ça c'est quoi? un
CHI un manège
MOT un manège. Connais-tu le mot en Anglais?
CHI n, non
FAT ah celui-là c'est roller coaster
CHI roller coaster triceratops
FAT triceratops
MOT oh on a réussi à faire tout le livre ! Bravo *!
CHI look again, ça c'est quoi son nom?
MOT * il aimerait continuer, donc on va terminer sur ça, merci beaucoup!
CHI yeah yeah gaga byebye!

2/3: MOT nous allons raconter l'histoire de
CHI Caillou de pâques, cailloux avec les oeufs de pâques
MOT Caillou et les oeufs de Pâques. On commence. "Caillou aime aller chez ses grands-parents surtout les jours de fêtes.

Joyeuses Pâques lance Caillou ! Joyeuses Pâques à toi aussi réponds Mamie. Le lapin de Pâques est passé, annonce Papi, je crois qu'il a caché des oeufs dans le jardin, à toi de les trouver." C'est qui ici?
CHI je sais pas
MOT est-ce que c'est la maman, le papa ?
CHI le papa !
MOT le papa de Caillou, et ici?
CHI c'est la grand-maman, le grand-papa
MOT ouais et là dans le jardin il y a des
CHI fleurs !
MOT fleurs.
CHI et bébé
MOT c'est son bébé. Sa petite soeur. "Caillou est excité il a hâte de chercher les oeufs. Viens Mousseline dit-il, mais Mousseline ne répond pas, elle dort. Caillou ne veut pas que Mousseline rate la chasse aux oeufs mais il est trop impatient pour attendre, que faire ?" Qu'est-ce qu'ils vont faire *?
CHI il va chercher les oeufs et après il va dire à sa mamie de donner le panier pour les cacher
MOT ah! Il va demander à sa grand-maman un panier, oui, t'as très raison, tu l'as souvent lu avec nous le livre. "Mamie a une très bonne idée, Caillou tu pourras chercher les oeufs tout de suite, après les avoir trouvé tu pourrais en cacher d'autres pour Mousseline. Caillou trouve l'idée géniale, mais moi aussi je veux cacher les oeufs, comme le lapin de Pâques". On est où là ?
CHI le iv ap il va les trouver et après il va les cacher
MOT est-ce qu'on est dans sa cours ?
CHI oui
MOT oui. Qu'est-ce que c'est ça?
CHI un panier
MOT un panier. Et en arrière ici
CHI des de de l'herbe
MOT de l'herbe
CHI et des euh un oeuf de Pâques !
MOT un oeuf de Pâques. Et là on voit
CHI le soleil
MOT le soleil. "Caillou commence à chercher les oeufs, ils sont difficiles à trouver. Soudain Caillou aperçoit quelque chose dans les tulipes. J'ai trouvé un oeuf! s'exclame Caillou. Bravo Caillou s'écrit Mamie. Caillou court partout il a chaud et il enlève ses chaussures. C'est amusant de sentir l'herbe qui chatouille entre les orteils. Caillou à réussi à remplir son panier. Bravo Caillou dit Papi, tu es un vrai champion ! Caillou est très fier de lui". Qu'estce qu'il a enlevé ?
CHI ses saussettes
MOT ses chaussettes, ensuite ?
CHI ses souliers
MOT ses souliers, qu'est-ce qu'il porte sur sa tête ?
CHI une cassette

MOT une casquette ! "Caillou a trouvé tous les oeufs cachés. Mamie lui tend un autre panier rempli d'oeufs. C'est à mon tour de faire le lapin de Pâques ? Demande Caillou tout content. Oui répond Mamie, cache bien ces oeufs. Mais n'oublie pas que Mousseline est toute petite, choisi des cachettes faciles à trouver pour elle." Toute la famille est devant la maison ?
CHI oui
MOT il boit quoi?
CHI du café
MOT tu penses qu'il boit du café ?
CHI oui
MOT est-ce que ça pourrait être de la limonade ?
CHI um oui
MOT oui. Et là ya ?
CHI un écureuil
MOT un écureuil
CHI qui va mettre un un oeuf dans le soulier de Caillou
MOT l'écureuil va mettre un oeuf dans le soulier de Caillou.
CHI reg, il va le prendre
MOT "Caillou veut que Mousseline ait autant de plaisir que lui à trouver les oeufs, il réfléchi bien à chaque cachette. Cette branche est parfaite songe Caillou en se dressant sur la pointe des pieds pour déposer l'oeuf. Mais cette branche plus basse serait mieux se dit Caillou. Soudain Caillou aperçoit un visiteur curieux de voir ces oeufs de plus en plus près. Caillou fait des grands gestes pour le chasser. Houste s'écrit Caillou, va t-en! L'écureuil s'enfuit en poussant des petits cris. Ces oeufs sont pour Mousseline, pas pour les écureuils gourmants, plaisante Caillou." Quelle couleur il est son chandail à Caillou?
CHI euh mau jaune.
MOT et son short?
CHI bleu
MOT bleu, la casquette ?
$\mathrm{CHI} \mathrm{bl} \mathrm{bl} \mathrm{bleu} \mathrm{euh} \mathrm{et} \mathrm{rouge} \mathrm{et} \mathrm{ici} \mathrm{c'est} \mathrm{vert}$.
MOT bleu rouge et vert, bravo. Tu connais bien tes couleurs !
"Caillou a terminé de cacher les oeufs juste avant que Mousseline ne se réveille. Tu peux commencer à chercher tes oeufs dit Caillou. Je les ai cachés comme le lapin de Pâques. Caillou ? Lapin? dit Mousseline. Caillou éclate de rire et se met à bondir autour du jardin. Oui je suis Caillou Lapin." C'est qui elle?
CHI euh je sais plus son nom
MOT Mouss
CHI line
MOT Mousseline. Et Mousseline elle fait quoi ?
CHI il va ch trouver les oeufs
MOT trouver les oeufs. "Mousseline court partout dans le jardin pour trouver des oeufs. Un beau coco rose s'exclama t-elle en riant ! Bravo Caillou! Mousseline rempli son panier mais Caillou s'aperçoit qu'il manque un oeuf. Où est-il ? Caillou ne se rappelle pas où il l'a caché." Il est où ?

CHI euh l'écureuil
MOT l'écureuil?
CHI je veux le montrer
MOT tu veux le montrer?
CHI regardez
MOT ouais de l'autre côté, montrer. L'écureu l'écureuil ici, il va aller le mettre dans le soulier. Il est coquin cet écureuil.
CHI aaaah! Il arrive c'était lui !
MOT "au moment de mettre ses chaussures, Caillou a une surprise. Caillou Lapin a trouvé le coco dit Mousseline. Qui a caché cet oeuf dans ma chaussure ? Je crois que c'est notre petit visiteur dit Mamie. Je ne savais pas qu'il y avait aussi un écureuil de Pâques, s'exclama Caillou en riant."
MOT les l'histoire elle est
CHI terminée !
MOT est-ce que tu as aimé ton histoire ?
CHI oui oui oui !
MOT oui?
CHI ** mon dinosaure ? Voilà !
MOT merci

3/3: FAT ok? "What's happening, blurt Taky the pinguin as he came across his companions Goofy, Lovely, Angel, Neatly and Perfect" CHI tof poufet c'est lui?
FAT euh yes. "we're training" What is training?
CHI c'est trainer
FAT s'entrainer?
CHI s'entrainer
FAT oui, "no we're training like athletes. The winter games are coming and we must be in shape to win." C'est quoi l'hiver en anglais?
CHI snow
FAT nan. L'hiver
CHI euh
FAT la saison, winter
CHI winter
FAT winter. "Looking closely at Taky not the fittest of birds the added let's get going. They raced up steep hills." Répète, "they raced up steep hills"
CHI ils marchent sur des montagnes !
FAT répète en anglais "they raced up steep hills"
CHI hey met up steep hills
FAT steep hills. "Ils ont joués à la corde à danser", dis-le en anglais
CHI ils ont $v$
FAT they jumped
CHI they jump
FAT rope

CHI rope
FAT rope. "They did 100 sit ups a day, they lifted weights
CHI quoi, * a day
FAT lifted weights? Or 100 sit ups a day
CHI lui il fait des ** eux il fait de l'exercice et lui il fait des bouilles
FAT they rode bikes, c'est quoi bicyclette en anglais ?
CHI lui il roue une bicyclettre tout petite, une roue une roue de bicyclette
FAT oui. Et eight special training meals
CHI c'est quoi meals ?
FAT meals? Des repas
CHI ah
FAT dis-moi nomme-moi les choses ici en anglais.
CHI um *
FAT donut
CHI donut. Pizzia
FAT pizza
CHI et bananas. Chip!
FAT chip! What are they doing here?
CHI il fait des dodos
FAT en anglais
CHI he's sleeping!
FAT sleeping, oui. What is he doing?
CHI i ils dorment pas. Il écoute la la télé trop
FAT en anglais
CHI tôt
FAT trop tard. En anglais?
CHI it's $t$ the tv tele $t v$
FAT watching television
CHI tv TV
FAT they do sky jumping
CHI schi j
FAT ski
CHI ski
FAT jumping
CHI jumping
FAT speed skating
CHI speeg stinking
FAT staking oui
CHI staking
FAT c'est quoi en Français?
CHI patins !
FAT à glace
CHI à glace
FAT "they came from the highlands, the lowlands, the funlands and of course nice icy land. Ratata boom boom boom they march ahead. Taky march to a different drummer. This is the opening ceremony. "For the big show the pinguins all join in singing the winter games anthem". On va pas la chanter. "after lighting the
torch and exchanging high flippers as a sign of friendship, the athletes filled out pass the display of medals."
CHI c'est quoi tu peux dire tout ça ?
FAT c'est quoi cette couleur là en anglais ?
CHI non toutes c'est un
FAT or, on va dire c'est quoi or
CHI yellow
FAT gold
CHI dold
FAT argent
CHI arzent
FAT c'est silver
CHI silver
FAT et bronze?
CHI bronze
FAT bronze (english)
CHI bronze (english). tu peux dire toute ça ?
FAT mais c'est rien c'est not bad, pretty good, big winner. The sun rose, qu'est-ce que ça veut dire the sun rose?
CHI faire la course
FAT no, sun rose ça veut dire le soleil s'est levé
CHI le soleil s'est levé
FAT répète the sun rose
CHI the sun sun rose
FAT the sun c'est le soleil. "they are belly sliding. He charge under surprise, under his surprise team rate and spat them down crossing the finish line in a record time. But wait the official announced, this is a bob sleigh lass race you have a bob sleigh. Goofy Lovely Angel Neatly and Perfect tried to explain, but it was not a bob sleigh it was a pinguin. Doesn't look much like a pinguin the official said, not much of a bob sleigh either, don't know what that is, anyways no medals for you illegal equipment." Qu'est-ce que ça veut dire illegal equipment?
CHI pas de medals
FAT nan illegal ça veut dire pas légal
CHI pas légal
FAT équipement, CHI équip
FAT l'équipement était pas légal
CHI l'équipement était pas légal.
FAT "in the afternoon the ahtletes dropped frozen fish on their feet." C'est quoi frozen fish ?
CHI c'est ski fff fi poisson
FAT fish c'est poisson
CHI oui
FAT dis-le en anglais
CHI fish
FAT frozen c'est quoi?
CHI f froid
FAT gelé

CHI gelé
FAT dis-le frozen fish
CHI frozé
FAT frozen fish poisson gelé
CHI poi
FAT "the jumpers waited their turn Taky spent just a few moments but in the ${ }^{* *}$ toes thing is" toes c'est quoi toes?
CHI pieds nan orteils !
FAT orteils, dis-le en anglais
CHI toes
FAT "by the fire"
CHI by the fire
FAT c'est quoi ça veut dire "by the fire"?
CHI fir feu
FAT proche du feu
CHI proche du feu
FAT wh when do sport wonderful. "one after the other the athletes made graceful jumps and lovely landings"
CHI * blue stain blue stain
FAT oui
CHI blue stain blue stain
FAT bedingbeding
CHI bedingbeding bedingbeding bedingbeding
FAT "he come down the hill"
CHI ils tri wouahhh
FAT okay assieds-toi tu dois être dans la vidéo
CHI garrrrrr bouiiiiii
FAT Taky okay okay calme-toi
CHI il fait ça, il fait des
FAT "in the evening, the speed skating relay race was the final event. Last chance Taky. Taky looked mighty, well tacky." On va prendre un autre livre avec des choses dedans.
CHI pourquoi tu veux le fi pas le finir? Pourquoi tu veux pas le finir?
FAT ** le faire en français tu vas le dire en anglais
CHI ok. C'est de difficiles *?
FAT viens dans viens dans la vidéo
CHI non t'as oublié les pa les pazes pages
FAT "il était une fois un ours polaire." C'est quoi un ours polaire en anglais? C'est quoi ours? bear
CHI bear
FAT polaire ?
CHI polar
FAT polar bear
CHI polar bear
FAT "voulait prendre des vacances dans le sud et il s'est acheté un billet d'avion, c'est quoi avion?
CHI plane
FAT plane. Nomme-moi les animaux ici en anglais
CHI um frog, turtle nan turtle?

FAT mmh
CHI lion
FAT pelican
CHI pelican, dog, duck ? marmotte
FAT je sais pas, marmot
CHI marmot
FAT fox
CHI fox
FAT moose
CHI mouche, elephant, giraffe (said gi like in french and raffe like in english)
FAT giraffe oui. Name this one
CHI monkey!
FAT this one?
CHI s s s snake!
FAT this one
CHI mouse
FAT they're sitting on
CHI sol
FAT sand
CHI sand
FAT he's eating,
CHI uhhh
FAT what is this?
CHI uhhhh s uhhhh
FAT ice
CHI ice!
FAT ice cream!
CHI ice cream
FAT what is on his hat? What colour is the hat?
CHI red!
FAT red and what what is this animal? Seal
CHI seal
FAT what are they drinking?
CHI uhhhhh mmm
FAT lemonade
CHI lemonade (not a)
FAT mmh. What do you look outside?
CHI ihih
FAT windows
CHI windows
FAT ok.
CHI non c
FAT attends ça c'est terminé on va regarder lui.
CHI nan ya un autre livre dedans
FAT nan si je sais mais on les a pas. Ok ici. What is this colour?
CHI red
FAT ok. Count the red
CHI 12345678
FAT oui. What colour is this?

CHI green
FAT mmh. How many are orange?
CHI 12345
FAT mmh. What is this in english?
CHI uh
FAT c'est quoi en Français?
CHI lunettes
FAT en anglais? Goggles
CHI doggles
FAT what is this animal?
CHI ciger
FAT tiger. Ca ?
CHI Ca? Sac
FAT backpack
CHI backpack
FAT what colour is this? On the
CHI yellow!
FAT yellow! How many ducks?
CHI 12345
FAT 5, what colour is this?
CHI nan tout ça.
FAT Count how many colours, wh how many yellow objects
CHI 123456
FAT 6. What colour is this?
CHI purple!
FAT purple. Woops. What colour is this?
CHI um orange
FAT and all the rest is
CHI green
FAT what colour?
CHI green
FAT green. What is this object?
CHI um
FAT a tree!
CHI tree
FAT tree. And this?
CHI frog
FAT ok. Which animal here you like the most? What is this?
CHI lezard
FAT lezard wow
CHI *** le mot lezard lézard en esp en anglais
FAT mmh. Lezard. Ouais tu les connais
CHI oui
FAT ok. What is this animal?
CHI dolphin
FAT dolphin. And what colour is the dolphin?
CHI blue!
FAT blue. Count the number of blue objects.
CHI 123456789 !
FAT 9. this one is not blue?

CHI no
FAT what colour it is?
CHI red!
FAT mmh. What here can you eat?
CHI le um that!
FAT what is this?
CHI cake!
FAT cake. What else can you eat?
CHI that.
FAT what's that?
CHI mmh.. pangpang
FAT popcorn
CHI popporn, nan
FAT anything else you can eat?
CHI um
FAT raisins
CHI raisint
FAT mmh
CHI tu sais en français poccorn c'est maïs soufflé
FAT oui t'as raison. Ok the colour mixing, what colour do you mix to get orange? You mix
CHI red is yellow!
FAT red and yellow gives
CHI or
FAT orange!
CHI orange
FAT après ça ici
CHI yellow make
FAT no yellow and
CHI blue
FAT make
CHI make, green!
FAT et ça ici?
CHI blue is red make purple
FAT purple! Ok look. On va regarder un autre chose
CHI nan tu dois tout faire ça
FAT mais nomme les couleurs alors en faisant un
CHI red blue red blue red blue red blue, purple yellow purple yellow purple yellow purple yellow
FAT on va changer
CHI non tu dois
FAT what's what's what are they doing?
CHI on doit le finir
FAT nan **** what are they doing here?
CHI non,
FAT mais yen a trop
CHI non. Orange green Orange green Orange green Orange green. Red red blue red red blue red red
FAT nan tu l'as fait déjà. You did it already, next one. Blue orange yellow

CHI blue orange yellow blue orange yellow blue orange. Purple green purple purple green purple purple purple
FAT au revoir. What are they doing here?
CHI steady
FAT ice skating
CHI ice steaty
FAT oh what is this?
CHI uhhhh
FAT archery
CHI archery
FAT goofy
CHI goofy
FAT avec des
CHI flèches
FAT c'est quoi des fl what is flèches
CHI lui il fait à l'envers
FAT what is flèches in english?
CHI ffl
FAT arrow
CHI ar lui il fait à l'envers
FAT oui il est **il est

## Transcripts of child $A$.

$\mathbf{1 / 3}$ : MOT what you going to draw?
CHI a cat
MOT a cat. is that your favourite animal the cat?
CHI yeah
MOT who's your favourite cat that you knew?
CHI well B.
MOT oh, B.
FAT c'est qui B. ?
CHI elle est um she is a cat she is my Grannie's cat
MOT mm and she died didn't she?
CHI yeah
MOT who's your favourite cat now?
CHI i don't really know
MOT do you think of one that comes in our garden?
CHI oh yeah Squicks
MOT what did Squicks do?
CHI oh he always comes for our building
FAT il est gentil Squicks?
CHI oui
MOT oh that cat is a little bit fat **
FAT tu trouves qu'il ressemble à Squicks ce ce chat ?
CHI oui
FAT pourquoi, qu'est-ce qu'il a comme la même chose que Squicks? Comment il est par rapport à Squicks?

CHI mm parce que of his whiskers
FAT comment on dit ça en Français ?
CHI je sais pas
FAT les moustaches
CHI parce qu'il a une moustache
FAT il a des moustaches ouais
MOT c'est quoi ça c'est un collier ou ses pattes?
CHI ses pattes. Maintenant je fais son collier.
MOT mm . Wait what is he eating to be that fat?
CHI well, soup
MOT soup? Cat, soup?
FAT tu mettras le, si tu devais faire de la soupe pour les chats qu'est-ce que tu mettrais dedans?
CHI bah les bah du poisson !
FAT du poisson
CHI euh
FAT quoi d'autre?
CHI pineapple
MOT pineapple!
FAT comment on dit ça ? Comment on dit ça en Français ?
CHI les nananas
FAT ananas ouais
CHI et
FAT de l'ananas dans ta soupe toi tu mettrais ?
CHI et des oranges
FAT des oranges
CHI kiwi et kiwi
FAT dans de la soupe?
CHI oui
FAT c'est une drôle de soupe ça hein ?
MOT and ten he get really fat on that *
FAT tu fais une sorte de jus de fruits là hein
MOT what's that you're drawing?
CHI a drink
MOT what's in the drink?
CHI some juice
MOT what kind of juice for a cat?
CHI well orange juice
MOT what other animals do you like *?
CHI well sausage dogs
MOT oh yes we know some sausage dogs don't we?
CHI one is one I really like is Smudge
MOT mmh
FAT alors * est-ce que tu peux expliquer qu'est-ce qu'on fait dans le jardin en ce moment?
CHI well we're trying to re* the conservatory, I do a bit ** where we can put our bins
FAT mmh tu sais dire ça en Français?
CHI nan
FAT comment on dit ça conservatory?

CHI la véranda
FAT ouais et qu'est-ce qu'on fait avec la véranda?
CHI on la casse
FAT on la casse parce qu pourquoi on la casse la véranda?
CHI um parce que on veut mettre les poubelles
FAT les poubelles. On va faire une extension?
MOT we're gonna build another room aren't we?
CHI yeah
MOT yeah. but you're right we will have a new space for our bins, very important. What's your favourite thing to play *? When you like to play what's your favourite thing to play?
CHI well bo well my baby
MOT your baby really?
CHI yeah
MOT I didn't see you play with your baby very much. You like drawing don't you?
CHI yeah
MOT you're good at drawing, you let you do lovely colouring in, don't you? Mmh? Really good at that. Do you like that? You like art
CHI yeah
MOT what's your favourite drawing or painting or something else?
CHI well I like painting a cat or a sheep on a pebble
MOT on rocks, rock painting
CHI yeah
FAT tu fais ça à l'école desfois ?
CHI euh oui
FAT ouais, à l'école? Qu'est-ce que tu fais à l'école comme?
CHI ben moi ben des choses importants et et je fais de l'écriture
MOT don't do that, gentle
CHI et aussi
FAT * tu veux raconter un peu cette histoire ? *** regarde les images ? Tu racontes ce qu'est-ce qui se passe, c'est juste les images t'as pas besoin de le lire
CHI mmh nan
FAT regarde, c'est M. qui nous l'a donné, il nous l'a prêté
MOT oh ** these pictures
FAT c'est bien ça. Et qu'est-ce qui fait lui ?
CHI il tape sur son tambour
FAT ouais, tu veux dire ça à maman? Tiens explique à maman qu'est-ce que tu vois là
CHI je vois le petit garçon et le singe !
FAT ouais
CHI et le petit garçon il tape sur le tambour
FAT ouais
MOT is that a hot country do you think or a cold country?
CHI a hot
MOT what makes you say that?
CHI because it's a well bit with euh

MOT it does * hot colours doesn't it warm colours like the sun?
CHI yeah
MOT yeah I think you're right
FAT et regarde qu'est-ce qui est ce qu'est-ce qu'il a sur lui là
CHI c'est le singe euh qui qui euh fais ça
FAT ouais
CHI son cou
MOT why how does he look the little boy, do you think he's
happy to see him?
CHI yeah
FAT uh et là qu'est-ce qui se passe ?
CHI y'a un lion qui vient
FAT il a l'air gentil le lion tu trouves?
CHI nan
FAT mmh
MOT what is happening?
FAT uh et là qu'est-ce qui se passe ?
CHI y'a y'a un comment ça s'appelle?
FAT c'est un renard je crois
CHI le renard il sort
FAT un chacal nan un chacal
CHI le chacal il sort et il regarde
MOT regarde
CHI le son
MOT * the lion ***
CHI no
MOT is that how a normal lion looks
CHI no
MOT why is he like that * what's happened to the story?
CHI oh I don't know
MOT remember
CHI well il tape sur le tambour le lion il vient et puis le re et puis le la chose l'animal là
FAT chacal
CHI le chacal il est là et et il est pas très content
FAT ah nan il est pas très content. Il est où le soleil là ?
CHI pas
FAT oh on voit plus le soleil
CHI parce que c'est la nuit
FAT ahhh c'est la nuit
MOT how do you know it's the nightime?
CHI parce que la lune est là et c'est tout noir
FAT tout noir
MOT what else can you see that tells you it's nightime?
CHI and the stars
MOT yeah.
FAT ouais
MOT you like looking at the stars?
CHI yeah
MOT oh dear what do you think he's gonna do in that picture?

CHI he's going to hit him
FAT oh nan avec quoi ?
CHI avec un bâton
FAT oh oui
MOT but how is he escaping? What happened? How many owls were there in the tree look?
CHI one two
MOT * things he's gonna come out of this one. Does he come out of that one?
CHI no
MOT no what does he do?
CHI he comes out **
MOT he sneaks out the other side and what is he gonna do? He's gonna creep
CHI around
MOT behind the lion
FAT uh
MOT oh! There he is!
FAT oh! Qu'est-ce qu'il fait ?!
CHI il lui prend le bâton et quand il dort maintenant et maintenant il il saute et le frappe
MOT oh no
FAT oh nan
MOT do you think he's really asleep or do you think he's pretending?
CHI he's pretending
MOT I see
FAT tu crois?
MOT let's have a look
FAT oh nan moi j'ai même l'impression qu'il s'est bien pris le bâton sur la figure
MOT oh aouch
FAT oh regarde regarde il a même cassé
MOT look he's got a big bump on his head. Aouch, remember when you had a bump on your head?
CHI oh yeah
MOT yeah how did you do your bump on your head?
CHI well I fell down pointy stone and had a bump
MOT yeah you hit your head on a stone didn't you?
CHI yeah
MOT you had a bump just like the lion's only on the front of your head and not on the back
CHI ***
MOT yes **
FAT alors qu'est-ce qui se passe ensuite ? Oh !
MOT oh no
CHI le serpent est là
FAT le serpent arrive holala
CHI et il tape et il se cache encore et lui il le regarde le serpent
MOT what's the snake doing to him while he's looking at him?

CHI il essaye de l'attaquer
MOT how?
CHI de mettre, oh how? Um how, he bits his long snake tail down and he turns around his body
MOT * around his feet
CHI yeah
FAT ah comment on dit ça en Français?
CHI ben je sais pas
FAT tu sais pas, avec sa
MOT why is he doing that, what is he gonna do there?
CHI because parce que il s il l'attaque
MOT mmh
FAT oh! Oh nan qu'est-ce qui s'est passé ?
MOT oh dear
CHI i il a mis sur son nez et sur il a tiq il a et il est il est sur son cou
FAT il a enrou
CHI enroulé
FAT ouais. Il manque une page, hou!
MOT oh look at the ***
FAT oh yeah
MOT what is he * gonna do?
CHI i dont know
MOT he's all squashed in misshape and isn't he and zigzagy? He's not having a good day is he?
CHI no
FAT regarde qu'est-ce qu'il fait le serpent? Qu'est-ce qu'il essaye de faire le serpent?
CHI il ess il essaye de l'attaquer et hop il saute !
FAT et qu'est-ce qu'il fait?
CHI il court !
MOT he's very clever isn't he?
CHI yeah
MOT what has he made here, look what's this?
CHI il a fait un noeud
MOT yeah and what's he what do you think he's trying to do here?
CHI il court
MOT do you think he's trying to do another knot?
CHI yeah
MOT let's see
FAT oh! Regarde là le serpent !
MOT oh no is he he's in a knotted ball. That serves the snake right doesn't it for trying to eat him
FAT et qu'est-ce qu'ils font eux deux là ?
CHI ils ils va à sa maison
FAT ouais ils partent en faisant de la musique en tapant sur le tambour. Ah alors * raconte qu'est-ce qu'on a mangé ce midi ?
CHI well
MOT ***

FAT ***
MOT mmh
CHI ***
FAT alors qu'est-ce qu'on qu'est-ce que qu'est-ce que tu veux CHI ***
MOT what time ${ }^{* * *}$ yeah yeah what did you eat then for di for dinner
FAT c'était un manger qui était un peu spécial, qu'est-ce qu'on a mangé ce midi ?
CHI party foot
FAT c'est quoi party foot?
CHI c'est um c'est des nourriture mais c'est pour um c'est pour des fêtes
FAT ah et c'est quoi ton préféré ? Ce que t'as ce que t'as préféré ?
CHI it is le sandwich
FAT le sandwich 2 sandwich c'était ça ton préféré?
MOT what?
FAT ahah c'est pas très party foot ça hein
MOT what else did you like?
CHI le concombre
FAT ah ouais?
CHI et la vinaigerette
FAT et la pizza?
CHI oui!
FAT ah la pizza ça **
MOT and the chicken nuggets
CHI and the chicken nuggets
MOT what's you absolutely favourite food *?
CHI well
MOT do you want to draw it for me?
CHI yeah
MOT if you had to eat just one thing, it's locked ** to unlock it what what would you eat?
CHI well I'll I'll tell you it would be pointing saying the word FAT **
CHI tomato
MOT tomato is your favourite food?
CHI yeah
MOT oh wow
FAT wow ****
MOT you wrote it really well you just missed the o, to.ma.to, you went tmato
CHI toMAto
MOT there's an o after the $t$ but good try
CHI tomoto
MOT what else do you like to eat? Here you go, I asked you a question
CHI hey * oh
MOT what else do you like to eat?
CHI uh well wait

MOT let's see the * after you do the word *
CHI kiwi!
FAT kiwi!
MOT what do you think daddy's favourite food is
CHI oh
MOT what's daddy's favourite food?
CHI he likes spicy foods
MOT spicy food
FAT ahh toi t'aimes bien toi les
CHI ah nan, beurk
FAT pourquoi?
MOT you like it a little bit you like mustard don't you?
CHI yeah
FAT ah ouais de la moutarde t'aimes ça t'aimes bien ça toi
MOT that's spicy
CHI mais ça pique la langue
FAT mais desfois t'aimes bien quand ça pique un peu. Mais t'aimes bien le gingembre par exemple
CHI nan nan nan
FAT mais si on en avait eu un petit peu tu te rappelles dans le plat, on avait mis un peu de gingembre
CHI oui
FAT et c'était très bon ça piquait pas trop hein?
CHI oui. Je vas faire du ging
MOT what do you think my favourite food is?
CHI je va juste dessiner du gingembre, so
MOT that's a bit tricky to spell darling * French
CHI mmh
MOT what is it in English?
FAT gambe jambe
CHI jambe jambe
FAT euh * est-ce que tu peux raconter
MOT ginger!
FAT ce que t'as joué tu jouais sur le téléphone de maman là tout à
l'heure ? Qu'est-ce que tu faisais sur le téléphone de maman ?
C'était quoi comme jeu?
CHI hey daddy
FAT et c'est quoi qu'est-ce qui faut faire dans ce jeu?
CHI il faut um et c'est um parce que parce que les pieuvres il dit treasure et euh elle dit oh it's just a button
FAT ah
MOT yeah you're treasure hunting
CHI yeah et puis l'autre il dit treasure! ribit ribit
FAT comment ça, essaye de dire ça en français maintenant
CHI il dit il dit euh how do you say treasure?
FAT un tré
CHI un trésor ! ribit ribit Oh ah c'est juste un une grenouille
FAT une grenouille, c'est pas le trésor c'était. Et toi toi toi t'as trouvé le trésor toi
CHI nan

FAT nan t'as pas trouvé le trésor?
CHI ça c'est parce que we have to tap on the squirrels to find them
FAT ah ben oui, pour trouver des, CHI hey daddy!
FAT comment on dit ça squirrels en français?
CHI euh je sais pas
MOT but squirrels is
FAT des écu
MOT it's not really squirrels it's the name for the * students they're called the squirrels
FAT ah
MOT so the people the little children are the squirrels aren't they?
CHI yeah
FAT d'accord
MOT they're not actually squirrels is that right?
CHI yeah but they but are squirrels
MOT one of them is a jellyfish you can't be a squirrel and a jellyfish, one is that some kind of I don't they're a bit odd looking aren't they?
CHI but y'a y'a jellyfish rhino doggy is a dog
MOT yeah it's a bit of a mix isn't it?
CHI yeah. I just thought ** ** ** look likes

2/3: FAT Alors on va lire les livres, alors vas-y, tu lisais ça, tu lisais ce livre là tout à l'heure
CHI oui **
FAT alors vas-y raconte-moi qu'est ce que c'est quoi les histoires CHI je lisais celle-là, que, euh
FAT ouais?
CHI et c'était les personnages de l'histoire Sami Julie Tobi Papa Maman Papi Mamie Léna, Br Br Brazile, Léo, Tom
FAT ouais alors tu me racontes l'histoire ? C'est quoi l'histoire ?
Ca parle de quoi là ?
CHI les galettes de rois
FAT c'est quoi ça la galette des rois?
CHI c'est um c'est une type de gâteau
FAT ouais
CHI mais c'est une galette dre rois et je va te montrer qu'est-ce que c'est, c'est ça
FAT ahhh et qu'est-ce que, avec quoi, euh qu'est-ce qu'on met, comment on fait cette galette ?
CHI alors, pour cette galette on a besoin de
FAT et comment on fait un gâteau?
CHI um de mettre du sucre des noix
FAT c'est quoi? C'est des, des a
CHI zamandes
FAT ouais

CHI et
FAT c'est quoi ça?
CHI et des oeufs
FAT ouais
CHI et de la farine
FAT ouais
CHI et euh beaucoup de
FAT voilà et ensuite qu'est-ce qu'on met dedans ? On met une CHI fève
FAT ouais ! Une fève. Et c'est quoi une c'est quoi la fève ?
CHI c'est, je va vous montrer, c'est
FAT non mais explique, faut pas montrer, explique, explique ce que c'est la fève
CHI um la fève elle elle um elle elle est petite
FAT et on la met où ?
CHI on la on la met on le met dans une um
FAT on la met dans la galette
CHI oui et puis um
FAT et qu'est-ce qui qu'est-ce qu'on avait fait la la galette qu'estce qu'on faisait, qu'est-ce que toi tu faisa, que ce que toi tu devais faire?
CHI moi je doivais y aller en dessous de la table et dire qui avait avoir la galette de (r)ois
FAT ouais, nan tu devais dire quoi toi ? Qui avait, à qui on donne la part
CHI oui
FAT ouais, c'est ça. Et um d'accord, et c'était qui qui avait qui avait eu la la la fève cette année ?
CHI moi.
FAT c'était toi ! Et c'était qui ton roi?
CHI c'était *!
FAT mais nan
CHI euh je veux dire Papa
FAT c'était moi! Et on avait fait 2 couronnes tu te rappelles?
CHI oui
FAT ah! Alors ensuite, t'aimes bien ces livres là, c'est quoi ces livres là ? Tiens tu veux expliquer, qu'est-ce que c'est ces livres là ?

CHI c'est
FAT ça parle de qui?
CHI c'est um old bear et puis euh y'a mais c'est écrit en anglais
FAT ouais
CHI et c'est de
FAT nan mais explique l'histoire, pour quoi t'aimes bien ces histoires?
CHI parce que j'aime bien old bear, *** et aussi
FAT tiens c'est quoi l'histoire là c'est euh petit ours, qu'est-ce qu'il lui est arrivé à petit ours?
CHI que il a perdu ses pantalons
FAT il a perdu son pantalon? Uh et et alors qu'est-ce qu'il a fait?

CHI alors il a y aller, ah old bear il va demander si il a vu, si um ses pantalons il a dit oui je l'ai don donné à cameau
FAT à chameau
CHI à chameau
FAT ouais
CHI puis il a curru à chameau il a dit non c'était pas confrontrable et j'ai préféré tes petits chapeaux et je l'ai donné à et je l'ai donné à sailor
FAT ouais
CHI et sailor il a dit
FAT qu'est-ce qu'il a dit?
CHI j'ai do j'ai donné les pantalons à, à le chien
FAT au chien! Oh wow
CHI et le chien il a dit non je l'ai pas parce que mes mmm mes
FAT mes, je sais pas, mes os? Les os?
CHI mes os, um dans dans les, les os ils glissaient toujours dans dans les pantalons alors je l'ai donné à, à lapin
FAT ouais
CHI et lapin. Et lapin il fai il faisait le tour de les escaliers, comme ça
FAT ah d'accord wow
CHI ouiiiiiiii psch
FAT sur la rampe
CHI et puis il a dit non je l'ai donné à zebra
FAT au zèbre
CHI et zebra
FAT au zèbre ouais
CHI et puis il elle a dit non je l'ai pas je l'ai donné à à canard et le canard à dit je l'ai pas je l'ai donné à * et * elle dit je l'ai et c'était bien pour faire deux deux deux propres icing
FAT ouais pour mettre du glaçage sur le gâteau
CHI et il a dit nan nan c'est c'est mes pantalons
FAT oh
CHI mais je croyais c'était pour c'était pour le glaçage. Et ils ont fait
FAT ouais et après qu'est-ce qu'ils font? Qu'est-ce qu'ils font à la fin?
CHI ils ont mangé, nan et puis euh c'est old bear qui lui demande si il peut avoir ses pantalons
FAT ouais
CHI il a dit oui et les *il l'a pris et il a il a enlevé le glaçage et il a mis et aussi il a mis ses um ses pant s et puis t'a ro mm le canard il a um il a il a lavé et puis il a fait sécher et puis les * il peut les um avoir sur lui

## FAT ah!

CHI et c'est les fins
FAT alors * demain c'est une journée spéciale, pourquoi c'est une journée spéciale demain? Qu'est-ce que tu vas faire?
CHI parce que parce que on peut retrourner à l'école
FAT on peut retourner à l'école! Ca fait ça fait qu'est-ce que t'a
t'allais pas à l'école avant?
CHI oui
FAT tu faisais quoi alors?
CHI avant je me rappelle pas parce que
FAT ben si tu faisais toujours l'école mais c'était où ?
CHI c'était à la maison
FAT ouais et
CHI avec maman
FAT et t'aimais bien ça?
CHI euh nan j'aime pas trop faire ça
FAT oh ben tu
CHI j'aime juste le faire à l'école
FAT ah pourquoi tu préfères l'école?
CHI parce que um Mrs. G. elle elle est gentille
FAT ah elle est gentille ? Mais aussi ya ya pourquoi d'autres qu'est-ce que t'aimes à l'école?
CHI j'aime aussi faire des maths à l'école
FAT ouais mais t'aimes, qui est-ce que tu vas voir à l'école ?
CHI toutes mes amies
FAT ah alors raconte nous c'est qui tes amies ?
CHI c'est A*
FAT ouais?
CHI et P. H.
FAT ouais et à quoi tu joues avec elles ?
CHI A. Euh moi ? Ils jouent pas ils jouent pas souvent avec moi FAT nan **
CHI um A. Et P. ils jouent souvent avec moi
FAT ah ah d'accord mais à quoi tu joues avec elle?
CHI ben moi je joue aux glaces
FAT aux glaces?
CHI oui et euh av et euh et euh * et on et on et et aussi à manger, euh comme quelqu'un il vient et nous demande
FAT ah vous vous jouez vous vous faites des glaces et vous mangez des glaces c'est ça ?
CHI oui
FAT ah des jeux hein
CHI oui
FAT ah d'accord. Alors quel temps il fait aujourd'hui?
CHI il fait beau
FAT il pleut ou ya du il fait beau?
CHI il fait beau
FAT ouais
CHI et ya
FAT il fait est-ce qu'il fait chaud dehors?
CHI dehors il fait un peu froid
FAT ouais et qu'est-ce qu'on a fait ce matin on est sorti ce matin, on est allé où ?
CHI oui on a y aller um à côté de la mer
FAT ouais pour faire euh comment? t'as marché ?
CHI nan j'ai y aller sur ma trottinette

FAT ah toute seule ?
CHI nan
FAT que tous les deux alors toi et moi ?
CHI nan nan nan
FAT y'avait qui d'autres qui est venu?
CHI *
FAT ah * c'est qui *?
CHI c'est mon frère
FAT ah ouais il est gentil *
CHI oui
FAT ah et euh et qu'est-ce qu'on va faire cet après-midi ? Qu'estce qu'on a dit qu'on allait faire avec maman ?
CHI um
FAT on va faire une pro
CHI promenade
FAT ah et on va aller où ?
CHI on va y aller à $T$.
FAT ouais et t'aimes bien aller à T. ?
CHI oui
FAT et faut des faut quoi comme chaussures pour aller à T. ? CHI des bottes, parce
FAT pourquoi?
CHI parce que ya de ya de la boue
FAT ya de la boue! Uh ohhh qu'est-ce qui se passe si t'y vas en chaussures normales?
CHI um ça va y aller sur tes pantalons
FAT ouais et après on est tout sales hein?
CHI oui et on doit avoir un bain
FAT ah oui un bain mais de toute façon tu dois avoir un bain la dernière fois que vous y êtes allés même vous avez les bottes vous étiez tout sales
CHI oui
FAT haha um on va arrêter peut-être ?
CHI au revoir.

3/3: CHI pig's egg
MOT all right *
CHI yes
MOT you talk to me about your favourite book?
CHI yes
MOT which one is your favourite
CHI pig's egg
MOT pig's egg? Why is that one your favourite?
CHI because it's a bit funny for me because he says at that's that it is eggs
MOT show me, show me
CHI but that's that's not a egg it's a turnip!
MOT it's a turnip! And he thinks it's his egg?

CHI yeah
MOT that's funny. Is it the right shape to be an egg?
CHI no
MOT no, it does look a little bit egg like doesn't it? But it's not, what do eggs look like?
CHI euh round they're round
MOT are they rough or are they smooth?
CHI smooth
MOT smooth aren't they? What does that look like? Does it look rough or smooth?
CHI rough
MOT it does look a bit rough doesn't it?
CHI mmh
MOT what else do you, tell me what happens in the story. What's the story about?
CHI because at, it's a turnip but eggs look like that
MOT mmh and who lays the eggs?
CHI hens
MOT yeah **
CHI *** and little baby and little baby ducklings come out of it but if the ${ }^{* *}$ is if the farmer feed them that means they lay a egg because there's no ducklings and they give it the eggs to us so that we can crack and eat them
MOT yeah some yeah some are for eating and some aren't for eating are they?
CHI yeah
MOT mmh they're cute aren't they little fluffy chicks
CHI yeah
MOT do you have a favourite animal?
CHI yes
MOT what's your favourite animal?
CHI a cat
MOT a cat? Why do you like cats
CHI because uh no I mean dogs because I like baby dogs. I like Smudge
MOT Smudge isn't a baby he's a sausage dog, he's a small dog
CHI yeah I like small dogs and sausage dogs
MOT mmh. Oh what can you see on this picture?
CHI because caterpillars
MOT what can you see?
CHI did you know? *** the caterpillar
MOT oh is that the turnip
CHI s yeah yeah
MOT did the caterpillar eat the turnip?
CHI no he didn't, he ate lettuce, look
MOT haha
CHI caterpillars don't eat lettuce!?
MOT yes they do
CHI oh
MOT haha what do caterpillars turn into?

CHI butterflies
MOT yes * one day is he gonna have a baby?
CHI yes
MOT is he gonna have a baby caterpillar for always?
CHI yeah
MOT no he's gonna he's gonna turn into a butterfly isn't he? And fly away! No he is look!
CHI yeah. And he's flying off
MOT flying off
CHI and then at the beginning it's the same he's flying off and then the caterpillars *
MOT should we look at another book?
CHI yes. Now this one
MOT what's that one called? Can you read that?
CHI "the cave"
MOT well done
CHI it's funny because the wolf says "come out to play lit litle creature" but he's not because he he's he's the wolf says " come out to play little creature" but he's not a little creature, he is
MOT how do you know he's not a little creature? What tells you that?
CHI because he has big eyes
MOT very big eyes doesn't he? He can't be little
CHI and, yeah! And and he is A BEAR
MOT haha is a bear bigger or smaller than a wolf?
CHI bigger!
MOT do you think he'd eat the wolf?
CHI yeah
MOT what else do bears like to eat?
CHI uh people?
MOT people!?
CHI HONEY!
MOT do you have a favourite picture in this book?
CHI uh no
MOT no. What are your favourite colours *?
CHI pink and purple
MOT mmh that's a nice pink sky isn't it? Pinky orange
CHI yeah
MOT that's really nice
CHI there's pink on the donut
MOT what's that on there? What's it called on top?
CHI icing
MOT icing with
CHI sprinkles
MOT have you ever had one of these, haven't you?
CHI yeah, I did a long long time ago
MOT a long time ago
CHI with granny
MOT let's have a look at this one. The girl the bear and the
CHI magic shoes

MOT magic shoes. Would you like to have magic shoes?
CHI yes
MOT what would you, where would your shoes take you if you could have magic shoes?
CHI um like like uh I want the same as Josephine's
MOT yeah but she had loads of pairs of shoes, which ones would you, should we have a look at the different types and you tell me which time you fancy? Uh! Look in the shoe shop. "There once was a little girl called Josephine who loved running" You like running don't you?
CHI mmh
MOT "her old running shoes were too tight so she went into a shoes shop and tried on some new one. They were red and they had a label saying
CHI magic shoes
MOT what's magic about them asked Josephine? Haha wait and see, said the shoe shop lady. Josephine bought the shoes and decided to go for a run." What's your favourite shoes in this picture?
CHI well I like
MOT which one would you choose for parties?
CHI well I would choose those
MOT yeah they're nice, they're pink aren't they?
CHI yeah
MOT which would you choose for school?
CHI for school I will choose that one
MOT yeah that looks nice and warm doesn't it?
CHI yeah
MOT which one would you choose for a snowy day? Not that we have much snow
CHI snowy one, snowy
MOT like to keep your feet warm?
CHI boots, this, those
MOT mmh, wellies don't really keep your feet warm but they do keep them waterproof don't they?
CHI I like the lady
MOT those look nice and warm look
CHI yeah. I would like those
MOT which one looks like it's got an animal hiding in it? Do you see? No
CHI there
MOT no, that's next to it it's not inside it
CHI mmh
MOT no have a look at the shoes see if you can spot one where an animal is hiding in it. No have a look. Yeah you see the top of the cat's head, he's in the welly!
CHI hahaha
MOT has to be a small cat
CHI I think it's a big one
MOT "pitapat pitapat went the shoes, but then she heard another
sound" what sound did she hear?
CHI clic clic clic clic
MOT "josephine turned around, a bear with a backpack was following her! Clic clic went his claws on the road. Josephine ran faster, so did the bear! Pitapat clic clic!" Would you be scared if a bear started chasing you?
CHI uh y yeah, I would I would I would
MOT I would be scared too it doesn't look very friendly does it?
CHI I I will think he was going to I he was catching me because I wan he wanted to eat me
MOT he does look a bit fierce, doesn't he? He doesn't look very kind or very friendly, does he?
CHI yeah I think he's going to eat her
MOT mmh "they both went uphill. Up and up it went until it stopped at the bottom of a snowy mountain. Josephine stopped too. I'll never get up there she said. Yes you will ah yes you will! Just start climbing and don't stand still. Came a voice or rather two voices. The voices seem to be coming from josephine's feet! Josephine looked down and was amazed to see her new running shoes change into" what did they change into?
CHI snowy
MOT blue snow boots!
CHI snow boots!
MOT they look nice and warm and snuggly
CHI yeah
MOT "qwuntch qwuntch qwuntch josephine qwuntched away at the snowy mountain but"
CHI the bear was still following her!
MOT does he look friendly now?
CHI no
MOT no "josephine reached the top of the mountain, I'll never get down there she said, oh yes you will just start skiing and don't stand still" So what did the shoes turn into next?
CHI skis!
MOT skis! Wee wizz josephine skied down the mountain. What's happening behind her?
CHI the the bear is sliding on his bottom!
MOT that looks more fun doesn't it?
CHI yeah
MOT I think do you think that'd be us on our bottoms rather than on the skis?
CHI uh uh I would like bottom
MOT it looks a bit hard doesn't it skiing?
CHI yeah
MOT don't know I think sliding down on my bottom sounds a lot easier
CHI yeah. And for me
MOT mmh. Oh no what's at the foot of the mountain?
CHI a bog
MOT a bog. "the mud was"

CHI deep
MOT "and thick. I'll never get through this said josephine. Oh yes you will! Just start squelching and don't stand still!" They turned into... what do you need in a bog?
CHI boots!
MOT welliiiiies! Squelch squelch squelch" ohhhh does the bear got wellies on?
CHI no
MOT no, he's just got his feet
CHI yeah that's because bears hasn't bears ha can't wear boots or shoes.
MOT oh why not?
CHI because their feet is too big
MOT ah what ${ }^{* * *}$ have you never seen any shoe shops with bears?
CHI no
MOT "josephine came to a lake. I'll never get across she said.
Yes you will oh well you will, just start
CHI swimming
MOT and don't stand still, came the voices again and the wellies turned into orange
CHI flipper
MOT flippers. Splish splash josephine swam across the lake but splish splash the bear was swimming after her. He was getting closer!" There's a birds' nest on his back. Are they ducks you think?
CHI yeah. And baby duck
MOT well that's a nice resting place don't you think? "Then she came to an island in the middle of the lake" What can you see on the island? What's that animal?
CHI **
MOT I'll give you clue, in my window there's a chocolate
CHI *reindeer
MOT mmh what's my **** on my window
CHI mmh
MOT a chocolate
CHI moose!
MOT moose. That's a moose.
CHI haha moose
MOT moose
CHI chocolate moose
MOT "Josephine waited out at the water, she kicked off her flippers and climbed up a tree. The bear climbed out and still at the bottom of the tree". What did he say?
CHI "come down"
MOT "but you'll eat me! Said josephine. What does the bear say?
CHI "No I won't said the bear"
MOT **
CHI "Then why were you for chasing me? Ak asked josephine"
MOT well done. "I was chasing you because you left your old
shoes behind in the shop! Said the bear. The shoe shop lady asked me to give them back to you. And he took them out of his backpack. Josephine climbed down the tree. Thank you she said but what were you doing in the shop?" Bears don't need shoes, do they? "Oh that was a mistake said the bear, I didn't mean to go into the shoe shop, I meant to go into the
CHI fish shop
MOT next door". You like fish
CHI yeah
MOT what's your favourite fish?
CHI slurp
MOT you do know that * to eat, what the * fish do you like to eat? What's your favourite dinner with fish?
CHI slurp fish and chips
MOT fish and chips yum yum
CHI miam!
MOT "then the flippers laughed hahaha hohoho time for a dance now! Off you go. And they turned into a pair of pink dancing shoes"
CHI shoes
MOT they're pretty aren't they?
CHI yeah
MOT josephine put the dancing shoes on and she and the bear danced all around the island until it was time to splash squelch crunch wizz and run all the way they came". Are they friends at the end?
CHI yeah
MOT Does the bear look friendly now and happy?
CHI yes
MOT he does doesn't he? That's nice that they became friends, isn't it? Oh what are those?
CHI the magic shoes!
MOT they turned into
CHI slippers
MOT a pair of slippers. They look a little bit like the bear don't they?
CHI mmh
MOT oh that's a nice story. What other sport do you like to do, cause you're quite sporty aren't you?
CHI mmh
MOT you like running, what else do you like to do outside?
CHI doing swingball
MOT swingball. What else do you like to do?
CHI sit
MOT sit? What else do you like to do outside? Come here
CHI um well play in the playhouse
MOT uhuh. What have you just learned to do?
CHI riding my bike with two wheels
MOT wow do you go super fast?
CHI yes

MOT yeah? Mmh

## Transcripts of child I.

1/3: MOT alors t'es prêt chaton?
FAT ***
MOT we turn the card. Um
FAT is that my is that my turn then?
MOT uh um
CHI can * put this
MOT mets là
CHI here
MOT oui. Attends ça va tomber dans le trou là chaton. Allez vasy à toi
CHI here
MOT mais c'est trop loin là, allez à toi. Regarde bien tes cartes, qu'est-ce que tu as? Est-ce que tu as un 5 ou un vert?
FAT *
MOT je te mets ***
CHI sneezes
MOT à tes souhaits !
CHI *** turn you have to shout the colour *
FAT blue
MOT bleu, bleu. Oh oui est-ce que tu as du bleu ?
CHI yes
MOT ben tu mets du bleu alors ? Ah bon alors. +2 pour papa
CHI 2 for you dad
FAT mmh
MOT ah tu peux pas jouer, à moi
FAT it's mama's turn
MOT à papa. 3
FAT now it's your turn
MOT 3, 3 bleu est-ce que tu as un 3 bleu ? Un 3 ou un bleu.
Mets-les toutes là si tu veux tes cartes, devant toi
CHI nan je peux mettre
MOT ouais
FAT think you might need
MOT nan tire pas, alors tu pioches. You might need the pack a bit closer
CHI can you this uh
MOT tiens normalement tu le mets à côté de l'autre là, allez. Oh wow allez tu peux mettre
FAT haha
MOT et tu choisis une couleur et moi je dois piocher 4 cartes.
Choisis une couleur
CHI uh
MOT regarde tes cartes pour choisir la couleur
FAT is it everyone or just the next person?

MOT me, the next person
CHI uh
MOT quelle couleur tu veux ? Regarde tes cartes, combien de couleur tu as beaucoup de beaucoup ?
FAT you've got pretty much a similar choice, euh 3
MOT euh 222 bon comme tu veux
FAT which colour do you like the best in those 3 ? these cards
CHI red
MOT red. ok. Rouge
FAT red it is then
MOT attends c'est à papa. Attends c'est à papa
FAT well you * could be your turn then
MOT vas-y
CHI hahaha haha haha
FAT shhh
MOT à toi, est-ce que tu as un 6 ou un bleu?
FAT yeah yeah you've got
CHI 6 (french)
MOT 6
CHI non
MOT si si c'est là-bas
FAT well yeah, the line goes underneath the number
MOT à moi. Attends
CHI shout out a colour
MOT quelle couleur il dit papa?
FAT yellow
MOT jaune
FAT good job
MOT tu as un 4 ou un jaune?
FAT no
MOT ah faut que tu pioches une carte. Nan c'est pas c'est pas comme ça
FAT * this thumb like that
MOT tu mets le pouce, tu mets le pouce * voilà. Ah tu as de la chance!
FAT what's that nine?
MOT euh euhhh bleu
CHI pas de bleu
FAT how do you know?
MOT ****
CHI il faut que
MOT attends attends
CHI il faut tu pioches et puis t'as pas de *
MOT euh tu pioches oui tu pioches mais papa il aurait pu changer de ah ben non. Mmh
CHI mmh
MOT très bien. Attends nan c'est pas à toi
FAT you have to play a card don't you?
MOT you have to play a card
FAT if you can

MOT well no there's I saw the rule when I checked again you can pick if you don't want to play the cards you've got. Ahhh oh. That means we need to mix all the cards
FAT I mean
CHI you shouldn't have that
FAT I mean it's pretty simple
MOT ça ça veut dire qu'on mélange toutes les cartes et on les redistribue. The question is who do we start with for? Who gets the first card?
FAT um well not me, cause it should be, you know what I'm saying, uh it should be uh
MOT et ben did you
FAT at my advantage. But then it should've gone the same, the same way
MOT right it's however you want. That's what I did, well no sorry that's the direction we're playing
FAT * how did you
CHI I did *
FAT hahaha
MOT ah nan celle * elle elle reste là * nan ! Elle reste là là
FAT how did you get that one *?
MOT and daddy needed to say a colour
CHI shout a colour
FAT green. We haven't swapped, swapped directions have we *?
MOT no
CHI and green
MOT ohoh 2 cartes pour * Oh tu en as pris 2 chaton. Allez tu, vert?
FAT woop woop
MOT attends ten ten ten
FAT wait
MOT euh nan c'est la carte de là chaton, tu as du vert mets du vert. Celle-là elle est bien pour quand tu peux pas jouer
CHI you have to *
MOT no it's * for when you can't play
CHI you have to turn it ${ }^{* * *}$
MOT ça veut dire que c'est oui c'est ça donc c'est à papa maintenant
CHI you have to turn it ${ }^{* * *}$
FAT yes
MOT wow papa il a pas de vert
FAT no * shuffle this *
CHI you can have that one
MOT non
FAT thanks *
CHI to save you
MOT c'est tu la gardes dis-donc tu peux gagner avec celle-là
FAT let's have a look what I picked up blue?
CHI shout out a colour!
MOT oui attends il va regarder quelle couleur il a le plus

FAT it's your turn
MOT mmh? But you need to say a colour
CHI shout out a colour
FAT oh I said blue
MOT ah I didn't
CHI Blue
MOT bleu. À toi chaton, tu as du bleu? Nan alors tu peux mettre ta carte. 4 pour papa!
FAT what colour are you gonna choose *?
MOT quelle couleur tu veux ? Rouge regarde regarde tes cartes
CHI rouge
MOT regarde tes cartes
CHI red!
FAT I got one of them
CHI I've got 2 of them
FAT ohh * what are you saying?
MOT et tu dis? Qu'est-ce qu'on dit quand il te reste une carte ?
CHI UNOk
MOT c'est marqué quoi là ?
CHI euh je sais pas
MOT regarde
CHI UN UNO
MOT UNO!
CHI UNO!
MOT UNO
CHI ** again yeah?
FAT you are on the * you are on the **
MOT attends attends attends
FAT if mum doesn't get an 8, you are on the * or funny card she has to play. You're on the ***
MOT ***
FAT boom!
CHI *
MOT t'as gagné 2 fois!
CHI I I I I win two twice!
MOT twice
FAT well done * twice two in a row
MOT twice c'est bien * You won twice
FAT now you quit
MOT tu veux encore jouer?
FAT never playing again never playing again
MOT tu veux encore jouer ou pas?
CHI oui encore
MOT you can mix because everytime I mix you say I don't
shuffle properly
CHI **
FAT let's see what I had
MOT mmh ah this one comes out ***
CHI and I get
MOT à papa à papa à papa

CHI hey dad I have to put it here
MOT nan papa il va mélanger tu lelaisses faire
CHI you gonna mix and I'm trying to put this blanket so so the hole can be gone you can put it the middle of it so the card can't fold in in the hole * hole can't
FAT they didn't fall in the hole first
CHI ok it can't fall **
FAT yeah I got it
MOT oui on a compris chaton. On a compris
FAT on a compris
CHI qu'est qu'on fait?
MOT on attend papa
FAT you get 3 in a row now *?
CHI yeah
MOT attends attends
FAT it's pretty straight forward
MOT tu commences chaton ? Là regarde. Et quelle carte tu mets
FAT you get 2 cards then?
MOT nan mais non
CHI pourquoi
FAT what colour have you got *? You should be
CHI blue!
FAT you should be able to put a 2 on that
CHI zero (english)
MOT non chaton nan
FAT *
MOT elle quelle couleur la carte ? C'est un rouge ou +2 . Voilà CHI ****
MOT c'est à papa. A oui tu peux jouer regarde tu as un
FAT is that $* * *$ ?
MOT yeah yeah ***
CHI I can play
MOT c'est à papa. À toi
FAT it's your turn again *
CHI j'ai vert euh
MOT jsais pas ya des gens qui crient dans la rue
CHI je vais ***
MOT non on va pas on va pas tu vas $r$ tu vas tout faire tomber reste ici chaton
FAT who's too * Who played that?
MOT I did
FAT is it my turn?
MOT it is
CHI play
MOT chaton tu descends? Ah descends. À toi, à toi, où elles sont tes cartes allez vert
CHI one. You got 3 now
MOT ben c'est à papa
CHI mixte

MOT encore ?!
CHI **
MOT papa il joue toujours ces cartes
FAT how many you got? four
MOT four
CHI got always that one
MOT mmh ouais ça fait la deuxième fois que papa il a cette carte
CHI ** ten times ${ }^{* *}$ ten times
MOT did you can you pick a colour? I don't know whether you're supposed to pick a colour before you got your card * but
CHI I got no cards
MOT I guess you can wait
FAT forgot it I'll pick around I can pick around now because I won't know what I'll get right?
MOT but you might be maybe you're allowed to pick when you get your cards. Arrête chaton CHI dad you pick
MOT so it has to be advantageous. It wouldn't be advantageous if you if you didn't
FAT blue
MOT bleu chaton est-ce que tu as du bleu?
FAT come on
MOT ouais du bleu !
CHI bleu
FAT * fast forward **
CHI hey (ma)man j'ai dis bleuuu haha, comme ça bleuu
MOT ouais allez concentre-toi sur le jeu. Ohoh papa il a pas de jaune, à toi
FAT good boy
MOT mmh chaton chaton chaton
FAT ah You're gonna need to pick up some cards until you get an 8
MOT nan nan nan
FAT or green
MOT qu'est-ce tu fais?
FAT top card
MOT allez prends la pioche proche * regarde comme ça tu fais tu app tu prends, Yep bravo!
FAT there you go. Tss that was easy
CHI what what what what pourquoi des gens ils crient dedans
MOT je sais pas
FAT ts je sais
CHI papa ${ }^{* * * *}$ t'as chaud
FAT beh je sais
MOT tu crois qu'ils sont à la manifestation? Moi je crois qu'elles ont peut-être trop bu
FAT moi je sais
MOT elles ont trop bu de l'alcool. Aie aie aie aie aie aie
CHI ** we can see **
MOT bleu

FAT uh which way is it going? This way?
MOT yeah. attends chaton
CHI dans ça
MOT non tu peux pas parce que j'ai demandé bleu
CHI a pas de bleu
MOT faut que tu pioches, pioche
FAT sorry * I had no choice there
MOT oui oui oui oui oui prends celle-là
FAT whistles
MOT tu veux quelle couleur?
FAT what do you want? This one? Which colour do you wa
CHI jaune!
FAT ok
MOT attends c'est à papa
CHI no
FAT haha
CHI it's red!
MOT oops il a mis un 9 sur un 9 , allez à toi
MOT pioche nan pioche tu peux pas jouer chaton faut que tu pioches
FAT your fa hahaha
CHI you have to **

2/3: MOT Il veut voir comment on parle, pour les enfants qui parlent Français et Anglais. D'accord?
CHI oui
MOT bon alors qu'est-ce que, il est où le, il est où le camion, tu veux faire lequel ? Celui-là ?
CHI non cui-là
MOT mmh um alors
CHI maman
MOT yes on fait quoi comme roues
CHI maman?
MOT oui
CHI il euh tu vois? Il tourne avec ça
MOT oui oui mais comment tu vas accrocher le cheval, tu veux faire de avec de reindeer avec le renne de l'autre jour?
CHI c'est la
MOT ouais
CHI c'est là c'est une grande et là c'est plus
MOT elle est plus grande que les autres mais j'ai trouvé un, peutêtre qu'il lui faudrait une bouche. Qu'est-ce qu'on peut lui faire comme bouche? euh
CHI non euh * pas de bouche
MOT avec ça on va faire
CHI euh *****
MOT tu mets ça regarde si on fait ça um comme ça ça fait peutêtre plus la bouche alors qu'avant on avait pas trop la bouche.

Mmh il faut une petite euh tsk tsk tsk toute petite euh un petit comme ça?
CHI here you go maman
MOT voilà j'ai réussi et tu mets un oeil là.
CHI *
MOT Alors on va dire que ça fait un peu plus cheval ça ?
CHI oui * le cheva
MOT ** les cheveux du cheval ?
CHI oui
MOT um
CHI ****
MOT mmh. Mais après faudra faut mettre les barreaux là tu sais pour que ça fasse comme une accroche ? Là t'as vu normalement il s'accroche euh comme ça, est-ce que tu crois qu'on a ce qu'il faut pour faire ça ?
CHI peut-être peut-être n'on pas crendre ça
MOT ça ? Regarde ça ? Ah oui tu veux accrocher, oui t'as eu raison on peut faire avec ça à la place. Euh nan parce qu'en fait quand ça va tourner je sais pas si ça va, est-ce que est-ce qu'on prendre avec les dures
CHI regarde
MOT oui mais les chaines normalement je sais pas si c'est
CHI et
MOT parce que ça regarde il faut l'accrocher au truc qui tourne, il est où le truc qui tourne? ${ }^{* * *}$
CHI ben peut-être lest où le truc qui tourne?
MOT je sais pas tu l'avais dans la main tout à l'heure. Euh CHI *
MOT tu l'as encore dans la main
CHI ah non
MOT tu l'avais encore dans la main. Ok si on accroche ça, il est où le cheval? Il est là. Um on peut peut-être accrocher ça
CHI rgarde, regarde maman
MOT comme ça sur le cheval
CHI regarde regarde comme ça
MOT oui tu lui mets des chaines plutôt que ça?
CHI non
MOT tu veux pas mettre des barres?
CHI non
MOT tu mets des chaines?
CHI oui. Je veux des chaines
MOT non, tu me donnes euh le rouge là, le bleu pardon. Un bleu, oh hisse,
CHI non non
MOT comme ça?
CHI non il faut met comme ça je vais faire
MOT et le camion, um
CHI oh oui comme ça
MOT elles sont où les autres grosses roues ? Mmh ça y est t'as fini de

CHI regarde, regarde
MOT super, ça, non c'est pas la bonne *
CHI c'est c'est ça, ***
MOT *** oh 'tention
CHI regarde il manque les deux
MOT ben oui regarde c'est les deux roues comme ça. Ah tu dis qu'à l'avant ça tour ça doit tourner c'est ça? Oh hisse. Euh il est où le truc qui tourne tu mle donnes? Dans ta main? Comme ça ça va tu crois?
CHI mum non stop
MOT il faut il faut mettre un peu plus haut c'est trop bas pour que ça tienne
CHI mum il faut m'*
MOT oui mais il faut mettre avec regarde il faut tout mettre en même temps alors euh um attends il faut d'autres trucs dessous.
C'est sur ça que s'accroche le cheval mais le truc qui tourne c'est à l'a c'est derrière, c'est derrière le cheval. Regarde oh normalement c'est un truc comme ça. Euh
CHI les chaines *
MOT alors on accroche ***
CHI c'est où les chaines?
MOT * voilà et tes chaines elle va là devant
CHI pourquoi elle va dedans? Devant? Comme ça
MOT voilà tu essayes de mettre par terre pour voir si ça marche ?
CHI et *** aussi ?
MOT oui. Ouais t'as vu ça marche. C'est bien
CHI mmh . Et quelqu'un dessus
MOT ouais faut lui mettre un siège et faire un peu le truc sur les côtés pour que euh ya de la place. Mais il faut juste que je soulève parce que là c'est un peu trop bas maintenant parce que l'avant il est plus haut. Donc il faut mettre 2 il faut mettre un peu plus haut voilà un comme ça. Arrête de bouger comme ça stp
CHI mum
MOT oui?
CHI parfois je peux faire comme ça, en haut là
MOT mmh
CHI et aussi là
MOT ben oui mais tu m'as dit que tu voulais faire celui-là d'abord chaton. Alors comme ça. Après tu fais faut construire le siège pour le monsieur
CHI oui
MOT et le truc à l'arrière pour mettre les choses pour charger les choses dans le dans la charette
CHI maman pourquoi dans longtemps les gens * les chevaux parce que y'a pas des vans, pas de camions, pas de vestures
MOT ça existe pas ça existait pas avant les voitures et les camions. Ca existait pas donc ils étaient obligés de faire avec les chevaux qui tiraient parce qu'ils avaient pas de camions y'avait c'est les moteurs ils avaient pas été inventés. Ils savaient pas faire des moteurs

CHI savaient pas faire moteurs
MOT donc c'était les che c'était le grâce aux chevaux qu'ils pouvaient tirer les choses lourdes
CHI *
MOT parce que sinon c'était eux qui devaient les porter et c'était lourd donc ils utilisaient les chevaux
CHI et parfois parfois parfois les gens parfois les gens tier poussent la et tier là
MOT oui parfois c'était les gens eux-mêmes qui devaient pousser et tirer donc c'était mieux quand y'avait les chevaux parce que comme ça c'était les chevaux qui faisaient et c'était moins fatiguant pour les monsieurs et les dames qui faisaient ça
CHI rom rom rom
MOT allez faut faire un siège pour le monsieur?
CHI oui
MOT euh
CHI regarde il faut passer quelque chose là
MOT ben non regarde c'est normal c'est devant. Mais qu'est-ce qu'on met pour que ça soit le monsieur?
CHI euh euh
MOT mmh ah si peut-être regarde on met les ** au milieu met le violet là, l'autre violet, voilà et lui pourra s'asseoir au milieu
CHI là ?
MOT nan là regarde, on va mettre euh nan ils sont ** fais voir les petites quel monsieur tu veux mettre?
CHI euh lui
MOT mmh tu l'asseois? Il peut s'asseoir là ?
CHI regarde regarde
MOT oui
CHI ça *
MOT super
CHI et les chevaux?
MOT le cheval il est là
CHI nan non non
MOT tu veux qu'il tienne le cheval c'est ça ?
CHI et les cheveux ?
MOT ah les cheveux ! Les cheveux euh qu'est-ce que tu veux comme cheveux ? Euh
CHI toi regarde quels cheveux tu veux
MOT tiens tu peux mettre ceux-là
CHI garri pas sans
MOT mmh ? C'est bien
CHI euh oui On va moncrer papa
MOT il est pas là papa, il est allé faire les courses
CHI et ben tu peux faire un photo
MOT on fera une photo après. Il est bien comme ça ça te plaît ?
CHI oui
MOT et qu'est-ce qu'il va faire ? Il va acheter des choses ? Qu'estce qu'ils disent sur le livre? Euh mmh
CHI là il peut porter

MOT ils disent que
CHI les bouts de bois peut-être
MOT oui les bouts de bois, est-ce qu'on a beaucoup de bouts bois? Oui tu peux oui les les des briques
CHI non only bouts de bois
MOT les bouts de bois. Alors attends on va ranger ça. Mais tu sais où ils sont les bouts de bois ? Um. Il était dans la maison avant là euh là pour l'arbre on avait construit l'arbre avec arrête de faire du bruit chaton. Et ça ça peut être des petits bouts de bois aussi ?
CHI non pas ça. Regarde !
MOT oui ah oui c'est tu as trouvé ?
CHI c'est là, c'est là. On peut porter des bouts de bois comme
MOT transporter ah ouais comme un arbre qu'ils avaient coupé et ils transportent?
CHI oui
MOT et ils l'amènent au château il faut qu'il ouvre la porte. On va mettre on va ouvrir la porte du château
CHI nan stop stop ${ }^{* * * *}$
MOT tu veux le mettre tu veux le mettre par terre ?
CHI oui par terre. Maman? Et ça par terre.
MOT oh
CHI nan là là
MOT oui attends oh
CHI mmh
MOT on descend la porte. Je sais pas s'il va passer tu crois qu'il passe ?
CHI peut-être peut-être peut-être les gens nan peut-être ils vait la porte et lui
MOT et c'est les gens qui vont venir chercher les le bouts de bois, venir décharger les bouts de bois? C'est ça ?
CHI oui regarde
MOT Et c'est qui qui dans le château ? Lui peut-être
CHI look look là
MOT et le monsieur il amène les bouts de bois pour qu'il fasse du chauffage tu crois? Pour se chauffer dans le château quand il fait trop froid? Dis merciii
CHI et aucre chose
MOT qu'est-ce qu'il peut amener d'autre ? Euh du foin pour les chevaux pour manger aussi ? Euh Qu'est-ce qu'on peut faire comme foin?
CHI ne pas des chevaux **
MOT des foins pour donner à manger aux chevaux
CHI mmh oui mmh
MOT ils transportent
CHI je veux paire ça
MOT tu passes il arrive à passer le cheval ou pas?
CHI nan stop stop popopopo popopopo
MOT tu sais il faudrait faudrait qui y ai une petite charette tu sais un petit charriot pour qu'ils ramènent les choses dans le dans le
dans le château. Ils descendent comme ça ça descend du de la petite de du petit euh de la charette
CHI regarde regarde regarde peut-être
MOT et regarde tu vois il a une petite ça il met dessus le monsieur il peut prendre les choses il peut prendre le foin il les met sur la petite charette et après il le pousse pour le mettre dans le château
CHI mmh
MOT alors il met les ça là. Ça là par dessus ça dessous et après regarde il peut tirer prendre avec la main. T'arrives à l'accrocher? Super. C'est bon, tu fais juste *** Voilà. Super! Et après il peut passer dedans et aller dans le château. Ca marche ?
CHI oui regarde
MOT oui ça y est il est passé et il en donne * voici du foin. Voici du foin! *Regarde **** Et là y'a les chevaux ah oui j'ai oublié qu'il y avait un cheval là ouais. Et après il peut il peut laisser il peut laisser la charette là. Il peut laisser la charette là ça yen a pas besoin le petit charriot nan? Est-ce qu'il a fini maintenant?
CHI y'a pu f il a pas fini
MOT il a pas fini y'a encore des choses qu'il faut emmener?
CHI beaucoup des choses qu'il faut ramener
MOT ah euh qu'est-ce qu'on peut ramener d'autre ? Um. Ca on peut dire que c'est
CHI regarde regarde les chevaux peut sauter
MOT oh wow ils sautent?
CHI kek ça c'est ?
MOT du pain? Il est allé chercher du pain à la boulangerie et il a ramené du pain?
CHI oui
MOT um tiens y'en a encore un petit peu. Hop du pain.
CHI parfois parfois il tombe tombe tombe tommmmbe là voilà MOT mmh
CHI allez là. Est tombé.

## 3/3: FAT ***

CHI I wanna do this
FAT what is this activity? What does it say here * it says find Foxy. "Foxy is at the pond today" Can you find him, that's what he looks like
CHI mmh
FAT what colour is this? * * What colour is this? * what colour is this?
CHI o
FAT yeah or
CHI o orange
FAT yeah. And what colour is his tail
CHI white
FAT yeah ok. Where is he do you think? Where is he gone? What
is he doing? Mmh so many things are happening here, it's hard to tell, so much so much going on. Hehe you found him! What is he doing?
CHI uh turning in in in a boat
FAT hihi there's not much space in the boat though. Does want to find her * Look it's the little, little bird
CHI I wanna do this one
FAT you wanna do this one? Can I have a first look. Oh too quick! Too quick! You know what it is?
CHI um this
FAT what are they doing? Tell me what are they doing? Can you see?
CHI eating
FAT yeah and drinking ***
CHI and ****
FAT what's this one doing? Do you know what that's called?
CHI no
FAT water skiing
CHI that's *
FAT yeah. What's the next one? What's this?
CHI *** a frog
FAT what's the frog doing? What's the frog got on his head?
CHI um um
FAT umb
CHI umbrella
FAT umbrella
CHI the snail gone
FAT what's not a snail * what's this? I think you know what this one is. It's a wor
CHI worm!
FAT worm!
CHI a worm is here doing a ta ta ta ta ta
FAT mmh
CHI **
FAT yeah
CHI ** one and he do that and that's *
FAT cracked
CHI house
FAT yeah
CHI toni toni fun
FAT you had fun on this one * what's this? Oh too quick!
CHI um
FAT way too quick for me
CHI and this duck
FAT but which duck is it, which one. Yeah why is it that one?
CHI because it opening his mouth
FAT why do you think he's opening his mouth?
CHI to
FAT what does is sound like when a duck is opening its mouth?
CHI coin coin and look a boat **

FAT why are they doing that * that's silly. She she knows she shouldn't be doing that. He knows he knows he shouldn't and he's doing at the same time. What are the bees doing?
CHI come out and
FAT are they happy?
CHI no, look at that, du du du du
FAT mmh what's that?
CHI a mouse, and look he did he turn the hole up there to to for the ants can go down
FAT and do you think he's happy?
CHI no
FAT you know why he's not happy?
CHI no
FAT what are these people doing here? What are these animals doing?
CHI he's itting
FAT yeah but what's what's what's here what's happening here?
CHI doing music
FAT and do you think the music is loud?
CHI yeah
FAT * loud music and the mask and here the mask is probably trying to sleep and the mask is going ** **
CHI and the **
FAT oh yeah like this one mmh
CHI **
FAT mmmh yeah it's the same object
CHI ***
FAT yeah it's not the same colour but it's the same it's doing the same thing. He's singing with a microphone, you can * this, strange
CHI ****
FAT yeah
CHI like euh that's his house
FAT mmh
CHI ** mmh
FAT I said mmh that means yes mmh
CHI look there there the the *
FAT yeah
CHI and ** climb up
FAT they're climbing up the leaves of the palm
CHI it's from this
FAT mmh
CHI like a *
FAT yeah
CHI what doing there?
FAT they they are reading a book. No no they're taking a photograph I think or a video
CHI that tuff is enormous
FAT that stuff is enormous. Yeah it's a lot bigger than the little bugs, I mean a lot smaller. What's this one doing?

CHI euh cooking and he and and and
FAT mmh
CHI labud
FAT ladybug yeah
CHI a ladybud
FAT mmh
CHI ist is need that's to to to to to do it
FAT to what's this? You know what this is called?
CHI uh
FAT stoo
CHI stirring
FAT no oh yes yes yes he's stirring but what's he standing on?
CHI uh tabouret
FAT stoo
CHI stool
FAT that's it stool
MOT ****
FAT what's going on here? What's this mole doing? It looks like the mole from your book
CHI which book?
FAT the book with the mole and there's something very smelly down its cave. I don't know the name of that book but I just know **

CHI oh look ** the stick
FAT well I dont know * you shouldn't get a stick and hit a bee hive with it, it's not
CHI fair
FAT it's not advised, it's not a nice thing to do
CHI ah and also
FAT mmh
CHI and look
FAT where?
CHI here, these these windows
FAT ahah yeah there are windows it looks like there are windows there, and on top in a
CHI flag
FAT a flag
CHI must be a house
FAT ahah yeah
CHI look at that
FAT what's that?
CHI animal animal animal animal animal animal
FAT stink of something
CHI animaux animaux animaux animaux animaux animaux
FAT it's these animals are having a good time aren't they outside
CHI and als
FAT yeah
CHI so
FAT also yeah
CHI those are are there's some eyes up them

FAT eyes on the mushrooms and the turtle CHI instresting
FAT interesting?
CHI yeah
FAT yeah
CHI etttttt boom! Doom doom doom. * look at them, they * ***** and woooooo
FAT there rall themselves up until a ball
CHI yeah. Ummm
FAT this one is relaxing on the towel on the beach
CHI I wanna turn the page, what's next? ***
FAT oh *** that one * look **
CHI **
FAT should I read a poem *?
CHI **
FAT should I read this? I read this?
CHI no. I wanna do that again
FAT again?
CHI why we see backwards?
FAT that's not backwards, if we do a m maze backwards you'll always find the right way to go. It's a it's not a it's another way to do
CHI ****
FAT you gotta think
CHI mmmh
FAT yeah ** maze always
CHI look in here
FAT train
CHI ****
FAT **** no *** of a tree
CHI a people * no those bush
FAT yeah that is not people that's the bush itself
CHI **
FAT it's a tree

## Transcripts of child La.

1/3: CHI ici je pense
BRO * ya beautoup de *
MOT no. Mais regarde ce qu'il y a ici là
CHI tadeau
MOT un cadeau mmh
CHI hey mum je pensais aussi ça était le pôle nord parcete les pindoings habitent auss où y'a de neige les pindoings
MOT mmh
CHI so je pensais y ça était aussi le pôle nord
MOT mmh ok mais les manchots habitent au pôle sud alors des 2 côtés de la carte on a 2 pôles mais parce que ça c'est le nord on
appelle ça le pôle nord et ça c'est le sud donc on l'appelle le pôle
BRO sud
CHI sud
MOT ouais ok
FAT ok c'est le tour de qui?
CHI um
MOT the point is that you speak in English
FAT oh. So who's turn is it?
MOT ohoh jpense que c'était
FAT mmh * where are these pieces supposed to be?
MOT oh no!
BRO mmh je pense te vous deux étaient ici et * était ici
MOT yeah ouais c'est vrai. Ok qui a le dé?
BRO ti (qui) a um *
FAT *
CHI je je a le dé
MOT ok j'ai le ok. Mais toi tu viens d'aller ça c'était ton tour CHI oh
MOT alors jpense que maintenant c'est le tour maman
BRO ouais
MOT peux-tu m'aider à compter ?
BRO six (fr) !
CHI six (fr)
MOT ok alors aide maman à compter
CHI and BRO un deux
BRO trois tatre cint six
MOT mmh
FAT mmh
MOT ok
FAT ok my turn. six (eng)
BRO six (fr)
MOT ok
FAT mmh ok
BRO papa va se pousser
MOT oh oui parce qu'on avait commencé sur le même carré
FAT mmh
MOT maintenant c'est le tour de
CHI *
MOT yeah ok tiens
BRO and CHI quatre!
MOT ok
BRO un deux trois tatre
MOT mmh oh !
BRO oh
MOT et * qu'est-ce que ça veut dire quand on voit cette image là ?
CHI je ne tais pas
MOT on avait on vient de le dire. Ca c'est quelle direction? Si la boussole, et ça c'est nord, est, sud, ouest
CHI je va aller nord jes (est)

MOT hahaha
BRO oh fiouf
CHI j'ai *
BRO il est pas arrivé sur la baleine de **
MOT non. Mais tu es arrivé sur quoi?
BRO un sous à main
MOT un sous
BRO marin?
MOT mmh right
FAT mama's turn?
MOT yeah
BRO mmh d'attord
MOT merci. Qu quatre. Hey!
BRO et tout le monde se tousser là se tousser (pousser)
MOT yeah attends là attends. Ok * aide-moi à compter
CHI un deux
CHI and BRO trois
BRO tatre
MOT mmh et ça c'est quoi?
CHI euh un retin (requin)
MOT mmh est-ce que ça c'est un requin ou une baleine?
BRO mmh je sais pas
MOT je pense que c'est un requin
FAT ok I rolled on 3 * you help me move?
BRO mmh ça c'est papa
FAT mmh
BRO un deux trois
FAT ok
MOT yeah
FAT hey *
MOT et savez-vous c'est où ce continent?
BRO euh l'afoute
FAT and MOT mmh
CHI l'afrite
MOT et qu'est-ce qu'on voit en Afrique?
CHI je savais c'était l'afrite parce j'a vu ça *
MOT mmh
FAT I thought you were gonna say because you can see *
Francine *
CHI mmh naaan
FAT nann
MOT hahaha et on voit quoi d'autre en Afrique ? On voit la giraffe et on voit quoi d'autre ?
BRO oh oui et et aussi *** en Afrique
MOT oh jpense que ça c'est au Maroc parce qu'on voit les épices
BRO pourtoi y'a des épices
MOT ben parce que au Maroc on voit beaucoup d'épices mais on les tu vois ils sont comme dans la forme d'une pyramide ici et avec les couleurs très vives mais quand maman et papa ont été au maroc on voyait partout des épices comme ça mais au canada
quand on va au magasin est-ce que les épices se vendent comme ça?
BRO nan
MOT non on les achète dans les petits sacs haha alors ça c'est très particulier jpense au maroc mais c'est pour ça qu'on a inclus dans la carte
CHI c'est toi de maroc?
MOT le le maroc c'est un pays comme le canada est un pays la chine est un pays
CHI c'est toi en chine?
MOT ben j'ai dis la chine parce que souvent avec grandma et grandpa tu parles de vous faites semblant d'aller en chine
FAT mmh it's china
CHI oh
MOT yeah c'est quoi le jeu avec grandma et grandpa ?
FAT you go on a train to china right?
CHI oh right
MOT peux-tu nous expliquer ce jeu? Que faites-vous quand vous allez en chine avec grandma et grandpa?
CHI euh je * tant (quand) on a allé à maison et on a allé au chine ça ça a jeu c'était dôle parce que Drangpa * à dit il a oublié ses chausettes sales
MOT haha il a oublié ses chaussettes chales ses chaussettes sales en chine ?
CHI oui sous le train
MOT oh ok
CHI so il pouait pas le mette dans son on satados
MOT haha il est drôle grandpa * ok là c'était le tour de *. *
BRO oui?
MOT c'est ton tour mon amour
BRO six (fr) ***
CHI nice
BRO un deux trois aaa quatre cinqr oh six !
MOT and FAT mmh
CHI * nice
MOT nice haha
CHI j'a dis nice parce six entend tomme nice
MOT mmh ouais ça res ça ressemble un peu à nice
CHI oui. Et six
MOT est-ce que c'était comme * dans la présentation de Debbie ** quand tu t'appelais * au lieu d'être *?
CHI *
MOT haha as-tu raconté à papa ce qui s'est passé ?
FAT no tell me the story, what happened?
CHI no **
FAT what happened you tell me. ** papa
MOT qui était *
FAT mmh
CHI "being silly"
FAT mmh mmh mmh I've never heard of a * before, who is *?

CHI "being silly"
FAT you tell me
CHI ****** well si * si droit with so she and she say and she **** with with trayons
FAT mmh
CHI and and and she drawed with trayons $* * * *$ and she she and one of them told *
FAT mmh
CHI people inside the the door
FAT ok
CHI roar
FAT ohhhh
CHI did I * you?
FAT mmh mmh
CHI why not? Why not a lot?
FAT one two three four five six
CHI why didn't
FAT ok *'s turn
CHI "being silly"
FAT ok you roll you roll right there
CHI ah
FAT how many is it? You count them?
CHI one two three four five six
FAT six (eng) you're right! All right
MOT mmh et c'est quoi l'âge de * ?
CHI sept?
FAT yeah
CHI "being silly"
FAT ok so which so which one are you *? are you this one? Or are you that one?
MOT mmh * c'est qui son personnage ?
CHI so so I'm this one
MOT as-tu as-tu les jumelles?
CHI I'm this one. I'm this one.
BRO euh moiiii je suis je suis ici
MOT and FAT ok
FAT ok so * you move six
CHI moi j'ai les jumelles
FAT ok * that. One two ***
CHI four
FAT and this is three
CHI five
FAT three four five six
CHI six
MOT ***
FAT oh what's the problem?
CHI I don't know what what you were tounting (counting)
FAT we were counting the pieces do you see the puzzle pieces?
Maybe it's easier at the bottom you see there's a piece there's the next piece there's a piece there's a piece. So we start with this
piece this piece right here one two three four five six right there at the very bottom of Africa
MOT en afrique du sud
FAT ok * your turn!
MOT pourquoi tu souris mon amour? Que vois-tu?
BRO où est le dé ?
CHI où est le dé ? où est où est le dé ?
FAT mh oh here it is
CHI où est le where was the dé? Tatre. Deux
MOT * t'as déjà eu quatre
BRO ** je vais faire *
MOT ben c'est ça que tu as eu la première fois
BRO d'attord. Une deux trois tatre
MOT ohhh tu vois
FAT ohhh
MOT ça c'est une bonne chose maintenant tu peux monter
FAT you just * that giraffe's neck
BRO yeahy haha je suis ** oh
MOT ok. Mais là jpense que
BRO as-tu des
MOT on est un peu mêlés là. On était où là ?
BRO ben moi z'étais ic ci non non moi je je j'étais ici avant CHI nan je suis twès *** giraffes
BRO oh non
CHI ouais ah je vais
MOT on se calme *
BRO ***
CHI ahhh je va tomber youdidoupdidoupdidoup
FAT ok give it back this *
CHI ****
MOT ok alors ça veut dire que c'est le tour de mama
CHI * deux
MOT deux ah merci * tu m'aides à compter ?
CHI un
MOT un
CHI tu es pas beau
MOT deux
CHI mais tu n'as pas tous tes boutons
MOT haha mais parce que deux c'est pas très haut un deux puis après ça c'est fini hein
FAT one two three oh I'm going up the giraffe too!
MOT oh! Mmh chanceux !
FAT * I'm with you at the top of the giraffe
BRO haha
FAT ok now *'s *
CHI oh one mmh ya pas un bouton
MOT c'est pas grave c'est pas grave
CHI je va
MOT peux-tu prendre ton mer ton personnage et puis avancer un carré?

CHI *
MOT et ça ça c'est combien?
CHI one two three four five six six
MOT ok alors veux-tu avancer un carré ou six carrés ?
CHI six carrés
MOT ok mon amour vas-y
CHI euh mais tu tu fais
FAT one two three four five six you're in australia *!
MOT est-ce que tu sais c'est où l'australie ?
CHI ici
MOT mmh et qu'est-ce que les gens font en australie ? Quelles sont les images qu'on voit?
BRO euh
FAT ${ }^{* *}$ which way should we go that way now
CHI um
MOT connais-tu cet animal?
BRO euh yeahy je suis avec les éléphants
MOT *
CHI um je sais c'est je pense c'est un toala
MOT un koala ouais bravo !
FAT ok mama
CHI et dans dans australia il fait des photos?
FAT and MOT hahaha
MOT mais jpense que mmh pourquoi est-ce qu'on voit cette image papa sais-tu?
FAT ***
MOT qu'est-ce qu'elle fait qu'est-ce qu'elle fait ?
FAT taking a picture?
MOT oh ok
FAT that's what he said
MOT moi je
FAT maybe a picture of that whale
MOT ok moi je vois l'image à l'envers alors j'ai j'ai pas trop compris c'était quoi
FAT mmh even the pinguins are taking pictures
MOT haha ok maman avance un carré un
CHI mais tu n'as pas eu beautoup
MOT ben c'est pas grave. La seule raison pour laquelle papa et * sont plus loin c'est parce qu'ils ont pu monter le cou de la giraffe FAT *
MOT mais * savais-tu que dans ce jeu on peu facilement monter mais on peut également descendre ?
CHI nan
MOT ouais. Par exemple si on arrive ici on veut pas on veut pas atterir sur le carré ici parce que si on attéri sur le carré ici il va falloir qu'on redescend jusqu'au bateau là
CHI entore
FAT do you remember how many that is?
CHI one two
FAT no * do you remember you got that last time? Do you
remember the numbers?
CHI no one two three four five six. Yes I remember it was six FAT and MOT hahaha
FAT you're a monkey
CHI why I'm a montey?
FAT you're a funny guy
CHI I'm a funny duy?
MOT hahahaha
FAT ok you need to move six
CHI right you do!
FAT here one two
CHI ** more
FAT three four
CHI my *
FAT five six ohoh the lama is spitting on you oh yuk
CHI oh
FAT *
CHI ton tour (eng r)
FAT pardon?
CHI is it your turn?
FAT *'s turn
BRO one on était sur celle-là je me rappelle
FAT ok mama's turn
MOT ok merci five oh wow chui vraiment en retard par rapport aux autres un deux trois quatre cinq oh et c'est le tour de papa
CHI mais maintenant tu n'es pas en retard
MOT oui regarde toi t'as 2 carrés de plus que moi
FAT one two three $\mathrm{mmh} *$ some musicians and some kids paddling in a boat
CHI oh oui
MOT * a whale
FAT mmh
CHI oh there a lama is spitting on me
FAT oh yuk! Yuk yuk yuk! Ok your turn *
CHI euh this
FAT yes
CHI euh one two three four five five! You do
FAT one two three four five oh and now you're in the rain forest
with some monkeys and a cup of coffee a very big cup of coffee
MOT as big as the monkey's head
CHI yes
FAT *
CHI dad the lama is anymore spitting on me
FAT ok good. Maybe it'll spit on mama when she goes by
MOT hey
FAT you can borrow the
MOT a bullet from the
FAT a bullet from the easter islands
CHI tatre
BRO tatre un deux

MOT oh jpense que tu vas dans l'autre direction *
FAT nan nan c'est bon
MOT oh désolée
BRO un deux trois tatre
FAT good
BRO hop je vais monter dans le pont
MOT nan c'est dans l'autre direction * c'est si tu arrives ici il faut redescendre
BRO ah
MOT all right oh mon dieu
FAT oh!
MOT haha
FAT you don't even get to get spit on by the lama yet
MOT oh oh
FAT so one two three four five six ok *
CHI my turn?
FAT yes your turn
CHI where?
MOT ici le dé est là
CHI d'accord
MOT I probably should stop *
CHI not the same
FAT oh do you remember now what number it is?
CHI no

2/3: MOT * reviens
CHI woof woof woof woof woof
MOT on continue le dessin
CHI woof woof woof je suis fini
MOT tu as fini ? Oh mais viens voir ya des choses que tu dois ajouter
CHI toi
MOT mmh alors là t'as fait la moitié de la roue. Veux-tu continuer l'autre roue? Penses-tu que ça devrait être bleue aussi?
CHI nan je veux ça soit blanc
MOT mais est-ce qui ya d'autres couleurs que tu veux ajouter ?
Veux-tu ajouter une couleur à la flamme ici ?
CHI mmh oui mais je ne sais pas tell touleur
MOT mmh ok ben qu'est-ce qu'on quelle couleur veux-tu? Rose rouge orange bleu ?
CHI le même chose ah oui je faire ça *
MOT oh euh alors le le crayon feutre comment t'as commence à être un peu usé?
CHI oui
MOT oui veux-tu qu'on cherche un autre bleu dans le bac?
CHI oui. La veste je mets sur le tomptoir
MOT veux-tu veux-tu ce bleu là ?
CHI oui, oui!

MOT veux-tu un bleu foncé?
CHI ou oui mais ça mmh ****
MOT ouais on devrait mettre ça à la poubelle jpense
CHI *****
MOT mmh
CHI mais ça wessemble tomme
MOT à ça ressemble à ?
CHI um l'au l'au euh
MOT l'autre l'autre crayon feutre?
CHI l'autre crayon feutre tomme ça qui a ça Pat'Patrouille * ti est rouge et ça wessemble ça marse pas est-ce te tu le wois pas où je le ou te l'ai pour tout
MOT ouais ben jpense jpense que ces crayons feutres là sont ne sont pas de bonne qualité
CHI c'est toi qualité?
MOT c'est quoi qualité ! Euh ca veut dire que quand tu les utilises le crayon qui colorie commence à être usé plus vite qu'un autre crayon feutre qui est de meilleure qualité que tu peux utiliser plus longtemps
CHI pourtoi ça le fait pas plus longtemps ?
MOT ben regarde regarde ici qu'est-ce qui est plus grand ?
CHI euh ça a
MOT ouais celui-là mmh alors je pense que les enfants aiment bien les crayons feutres avec les images de Pat'Patrouille mais ces crayons feutres sont peut-être pas les meilleurs pour faire les dessins
CHI mais sur le rouge est peut-être plus meilleur mais c'est bizarre parce que ça wessemble tomme c'est trop petit mais ça on peut le utiliser très bien. En rouge $* * * * *$
MOT mmh ouais mais alors veux-tu * le bleu comme ça ?
CHI non parte c'est trop petit
MOT ok
CHI mais je veux * ca
MOT ok. Et je pense que je vais jeter les autres comme ça on va pas on sra pas tenté de les utiliser une autre fois
CHI mais mais je veux pas que tu jettes le rouge
MOT nan je vais pas jetter le rouge je vais jetter le bleu et je vais jetter l'orange
CHI d'atord
MOT oui
CHI ils sèchent les deux ?
MOT les deux ouais
CHI d'atord. Tu jettes les deux
MOT ouais seulement le bleu et le et l'orange. Mmh ouais parce que ça ça marche très bien. Mais jpensais que tu voulais faire la fleur
CHI ah non mais je va faire le
MOT je vais
CHI je vais faire le roue
MOT d'accord. Et veux-tu que je commence à chercher un
masque à imprimer ?
CHI um le personne
MOT mmh
CHI oui
MOT ouais ok. Tu veux faire un masque avec quel genre de de personnage?
CHI um * je veux les cheveux soient violets
MOT hahaha ok mais c'est c'est toi qui va euh c'est toi qui va colorier alors c'est toi qui va ajouter la couleur aux cheveux. Alors si tu veux un personnage aux cheveux violets c'est toi qui peut c'est toi qui peut faire ça avec euh avec un crayon feutre violet
CHI oui je sais
MOT ouais ? Ok. * comment déjà tu, peux-tu me raconter comment tu savais que les gens pouvaient avoir des cheveux violets?
CHI je de le personne qui habite à les deux chiens
MOT mmh
CHI avec
MOT mmh oui. T'as vu qu'elle avait des des cheveux violets ? CHI oui
MOT mmh. Et peux-tu me raconter l'histoire de quand on avait vu ses gros chiens?
CHI telle histoire?
MOT mmh qu'est-ce qui s'est passé cette journée là ?
CHI ah mais je vois pas * tsk tsk je allais faire du vélo sur euh sur le vélo orange et après les deux chiens ont venus et après tu as dit de * et moi de aller dans le maison et je oublié le reste
MOT mmh.
CHI et twès longtemps
MOT ouais ça ça fait à peut près un mois mais t'as quand même une bonne mémoire si tu te rappelles que le maître du des chiens avait les cheveux violets parce qu'elle est venue seulement à la fin les récupérer
CHI oui
MOT te rappelles-tu des couleurs des chiens?
CHI euh je pense c'était un blanc et l'autre peut-être noir
MOT ouais, ouais non t'as une très bonne mémoire
CHI c'est bien?
MOT oui ! Oui y'avait un chien noir et l'autre chien était blanc mais je pense que les chiens étaient des amis ils jouaient ensemble
CHI mais ils mais pourtoi ils ils fait des wouaf wouaf twès bruyant?
MOT haha ils faisaient beaucoup de bruit bé c'est parce que normalement je pense que ses chiens étaient renfermés CHI c'est toi renfermé?
MOT Bé parce que la maison où ils habitent est très petite et ils n'ont pas une cours où ils peuvent courir et jouer dehors alors quand les chiens ont réussis à s'échapper ils avaient beaucoup
d'énergie ils japaient beaucoup ils courraient très vite pour dépenser toute l'énergie
CHI mais c'est pas bien
MOT non c'était un peu dangereux
CHI pourtoi
MOT ben c'était des moi j'ai eu peur que les chiens se fassent heurter par une voiture dans la rue
CHI quoi toi heurter
MOT euh frapper
CHI oh
MOT ouais je voulais pas que les chiens se fassent frapper par une voiture
CHI pourtoi
MOT ben parce que c'est triste quand un animal se fait frapper par une voiture. Et est-ce que les voitures conduis vite dans notre rue
CHI non
MOT non t'as raison notre rue est plutôt tranquille mais quand même quelqu'un qui conduit sa voiture et qui ne voit pas des chiens arriver pfouuuu vite parce que les chiens ils courraient très vite n'est-ce pas?
CHI oui
MOT ouais ils courraient très vite puis ils se faufillaient par ci par là dans la cours chez nous dans la cours en face ils auraient pu se faire frapper si une voiture arrivait dans la rue
CHI oui. Maman?
MOT oui?
CHI est-te tes pawents sont ils sont morts? Est-ce te ils ils est-ce te ils est-ce te les pawents ils sont morts peut parler?
MOT non une fois que tu es mort tu peux plus parler
CHI pourtoi?
MOT ben parce que quand tu es mort ton cerveau arrête de fonctionner
CHI pourtoi?
MOT et c'est ton cerveau qui euh te permet de de former des mots, et pas juste des mots des pensées alors quand tu es mort et ton cerveau ne fonctionne plus tu arrêtes de penser et réfléchir et si tu ne peux pas penser et réfléchir tu ne peux plus parler parce que t'aurais plus rien à dire. Mais est-ce que les chiens peuvent parler même quand ils sont vivants?
CHI non
MOT hahaha
CHI ils ils peuvent pas mais je veux dire ils peut tand ils sont vivants mais ils peut seulement parler dans leur langue des chiens
MOT hahaha ça ressemble à quoi la langue des chiens ?
CHI wouaf wouaf wouaf wouaf
MOT haha
CHI wouaf wouaf
MOT et qu'est-ce que ça veut dire dans la langue des chiens ce que tu viens de dire là ?

CHI mmh tu n'as pas vraiment de *
MOT nan nan t'as pas dit wouaf bonjour!? Wouaf j'ai faim! Wouaf joue avec moi!?
CHI wouaf wouaf ça veut dire bon jouw bonjouw wouaf wouaf wouaf wouaf
MOT et * j'ai une idée, je sais que tu voulais que j'imprime une feui un masque à découper d'un personnage, veux-tu que ça soit un chien?
CHI oui
MOT ouais ? Et comme ça tu peux faire semblant d'être un chien CHI oui. Ahhh et maman?
MOT oui mon amour?
CHI tand vous * morts papa et toi tand vous * mort?
MOT quand nous serons morts?
CHI oui
MOT oh ben * on sait pas j'espère qu'on sera morts vraiment dans quand on sera vieux
CHI mais vous dois * mais euh mais je je veux vous dois je veux toi dois mort quand je suis un adulte parce te je parce te si vous étez morts tand on était * et moi étaient enfants tell mama ou papa de habiter avec *
MOT mmh ça c'est une très bonne question * mais si maman si jamais jamais jamais jamais quelque chose arrivait à maman et papa jpense qui ya beaucoup de personnes que tu aimes beaucoup dans notre famille qui pourraient prendre soin de toi et * . Pensestu que Grandma and Grandpa te prendraient dans leur maison?
CHI tomme tu veux te Grandma * peut-être?
MOT mmh peut-être tu pourrais aller habiter avec eux
CHI oui je veux
MOT haha. T'aimerais ça habiter avec eux de toute façon jpense CHI oui
MOT ou tu pourrais déménager à Carlisle et habiter avec Aunt L. et Uncle J.?
CHI euh oui
MOT mmh et L. et B.
CHI oui
MOT parce que quand tu parce que Grandma * et Grandpa * commencent à être un peu vieux alors si quelque chose arrivait à maman et papa jpense que ca serait un peu difficile pour Grandma * et Grandpa * de prendre soin de vous parce que bientôt ils seront un peu plus vieux un peu plus fatigués. Peut-être ils seraient moins capables de jouer avec vous tout le temps mais jpense que Aunt L. Et Uncle J. ils ont le même âge que maman et papa ils sont jeunes ils ont assez d'énergie pour prendre soin des enfants
CHI tand mais mais ça sewait un pwoblème parte tant ons est adultes on va habiter avec Grandma * et Grandpa *
MOT mmh. Ouais tu vas habiter dans la même maison ou tu vas être les voisins avec Grandma * et Grandpa *?
CHI on va habiter avec eux

MOT tu vas habiter chez eux ?
CHI oui
MOT mmh. Et qui va préparer les repas ? Est-ce que ça va être toi ou est-ce que ça va être toujours Grandma *?
CHI mais euh ben ben je va faire des repas
MOT oui qu'est-ce que tu vas préparer ?
CHI mmh macaronis (english)
MOT ah des macaronis
CHI et et *** cheese
MOT mmh ouais ça serait très bon
CHI et et et aussi ya du egg cheese
MOT du quoi ?
CHI du egg cheese
MOT aux oeufs? Un sandwich aux oeufs?
CHI non je veux dire un shandwich mais dedans il a des oeufs et du fromage
MOT wouah un sandwich aux oeufs et au fromage !
CHI oui
MOT mmh ça ça serait un bon repas
CHI un jouw à le dîner ** je je j'aime manger
MOT mmh haha
CHI tu vas pas le
MOT mais penses-tu que tu serais capable de préparer les oeufs?
Sais-tu ce qu'il faut faire pour préparer un oeuf?
CHI mmh nan je et avec du fromage
MOT mmh mais le fromage c'est facile tout ce qu'on a besoin de faire c'est de le couper
CHI prrr
MOT haha
CHI et après on va dans le sandwich
MOT mmh veux-tu apprendre bientôt à couper le fromage ?
CHI oui
MOT mmh ok
CHI "making sounds"
MOT mais si on utilise un couteau qu'est-ce qu'il faut faire ?
CHI a attention
MOT de faire attention oui. Veux-tu me montrer avec ton crayon comment on pourrait couper le fromage avec un couteau?
CHI tomme un * met nos mains loin sur le sauge (chose) on tient
MOT sur le couteau
CHI oui
MOT mmh
CHI on peut le mettre loin
MOT ouais il faut il faut tenir ta main loin de de la lame du couteau pour ne pas se couper. Comme ça, si ça c'est du fromage.
Comme ça tut tut tu
CHI et tomme ça tut
MOT mmh. Penses-tu que tu pourrais préparer d'autres repas?
CHI je ne sais pas
MOT mmh ben tu pourrais ben je sais que tu m'as déjà aidée à
préparer des biscuits
CHI peut-être on faire des biscuits
MOT mmh que mettrais-tu dans tes biscuits ?
CHI je est-ton peux mettre du fromage dans les bistuits?
MOT haha mais moi j'ai jamais goutté à des biscuits au fromage CHI pourtoi?
MOT mmh ben normalement les biscuits sont sucrés et le fromage est salé
CHI c'est toi salé?
MOT ben ça veut dire qui ya du sel dedans mais c'est vrai que desfois on peut mélanger les ingrédients sucrés avec les ingrédients salés ça fait un très bon mélange
CHI um et aussi j'aimerais met mett des *
MOT des quoi?
CHI pipites de sotolat
MOT haha des pépites de chocolat ouais
CHI mmh
MOT mais penses-tu que les pépites de chocolat sont sucrées ou salées
CHI sutrées
MOT ouais ouais très sucrées
CHI je pense c'est pour ça le sotolat ti est sutré
MOT mmh ouais t'as raison. C'est pour ça qu'on l'aime beaucoup le chocolat parce que c'est sucré. Mmh as-tu mangé d'autres choses qui sont sucrées?
CHI mais mais je nsais pas je nsais pas spourtoi Drandma * et Drandpa * n'aime pas le chocolat si c'est sutré
MOT haha mais * ça c'était une blague parce que à * Grandma * et Grandpa * ont dit qu'ils n'aimaient pas le chocolat et c'est pour ça qu'ils allaient nous en apporter mais vraiment c'était une blague Grandma * et Grandpa * aiment beaucoup le chocolat et c'est c'est qu'ils ont achetés du chocolat en surplus pour toi et ton frère.
CHI c'est toi surplus ?
MOT ben ils ont acheté beaucoup de chocolat à *
CHI oh c'est oh peut-être ils voulaient donnent un peu à nous
MOT mmh

3/3: CHI and then one ${ }^{* * * * *}$ the twain twacks ok? K? K? K? K papa?
FAT yeah ok
CHI toutudoutidoutidou
FAT so can you do the puzzle?
CHI yes
FAT ok
CHI *** start to put that there ${ }^{* * *}$ there ${ }^{* *}$ I thought you were going to help
FAT yeah **** *****
CHI and and I thought this here

FAT * so should we flip over all the ones so we still see the pink?
So they're all flipped over? Yeah good. $* * *$ ok
CHI *** a bit ***
FAT oh ok
CHI *** there so I put that here and I put this like that *
FAT mmh ok
CHI ***
FAT do you see any more that goes across the top of the puzzle? CHI uh I don't think so
FAT mmh no? Turn around and see if you can find some more There it goes at the very top
CHI no I mean cause I saw this part of a wing
FAT oh ok. Oh I think there it goes right there
CHI yeah
FAT mmh.
CHI **** that *
FAT how do you think we can make that wing attached to that wing here?
CHI don't know I turn * I don't know
FAT uh keep trying
CHI *** I don't know
FAT well there you have that part attached to here right. Turn turn, ok turn ok. Mmh but this must be over here right? Yeah right there and look what do you see here? What colour?
CHI uh
FAT ok do you see orange on there?
CHI like that ok
FAT there we go good job!
CHI but I thought that does (goes) here
FAT oh well it's the same it goes on the same butterfly but it went on the other wing. That's ok
CHI *** there
FAT ah yeah. You were a bit confused that's ok. OK so what else, can you find more pieces that would go across the top here?
CHI uh t how is this ***
FAT mmh well I don't think it's ready to attach yet I think we need to find some more pieces first
CHI mh so, so this need ${ }^{* * *}$ right here ${ }^{* *}$ that does (goes) there **
FAT ok
CHI **** this no that ** does (goes) *
FAT there look ok maybe this goes across the very top? CHI yeah so that *** add **does (goes) here
FAT ok good job
CHI ok I think maybe this *
FAT mmh maybe
CHI yes I think * yes ** does (goes) here
FAT ok good. ok should we find some more pieces that go across the top?
CHI yeah. Some more goes at the top

FAT so the pieces that go across the top are all gonna have this line right?
CHI yes
FAT ok. Do you see any more?
CHI I don't think so. ${ }^{* * * * *}$ go at the top. Need to ${ }^{* * *}$ so this will supposed to do (go) this yellow line?
FAT yeah the yellow line ${ }^{* *}$ go across that. So we need to find another piece but the rest of that wing right?
CHI yeah
FAT yeah. Where could that be?
CHI mmh
FAT mmh well that one ${ }^{* * * *}$ goes across the top does it?
CHI no I like it there
FAT Ohhh it goes there. ok you're right. Ok. Ok let's look at this piece. Where do you think this one goes? Do you think it goes across the top like that?
CHI no
FAT no? How do you think it goes? Maybe it goes on the side?
CHI mmmmh yeah yeah
FAT do you think it goes on that side or the other side?
CHI maybe the other side
FAT ok. Yeah * go over here right there. I think that's right, ok.
What about this one do you think this is at the top or on the side?
CHI on top
FAT ok
CHI oh! I found a wing on it!
FAT oh you found a wing good job! ok. How about this piece where do you think that one might go?
CHI ah **
FAT ha ha well mmh
CHI but
FAT doesn't quite fit hey?
CHI no
FAT mmh. Do you think do you think you could attach it to this part?
CHI yeah
FAT mmh ** haha
CHI ahhhh so so in but
FAT so that means I think that must go a little bit further down away there maybe. Right?
CHI yeah
FAT ok oh how about that piece? haha
CHI I put ** 'cause I saw that there was and I saw it bum
FAT you saw the bee's bum?
CHI yeah
FAT yeah?
CHI s on a bees where I knew it **
FAT good thinking
CHI and before I knew this one here ** I saw the wast (last) and the wing of the butterfly

FAT right, good. OK
BRO papa, it says 21 minutes
FAT ok. Ok so I think we're almost finished the top right? But we need another piece here. What do what do you see here that's gonna be on that piece? This, * what what do you see here?
CHI a cloud
FAT a cloud that's right. So can we find a piece that would go right there with a bit of the cloud on it?
CHI mmh I don't know I don't know. **** a cloud aou
FAT haha
CHI I saw it I knew 'tause I saw a torner
FAT you saw a corner good thinking ok
CHI and I knew there were already a torner here so I knew * one there
FAT good job
CHI and I also saw a cloud
FAT mmh ok so now should we go down the side next?
CHI yeah
FAT ok
CHI yeah
FAT so we need to find more with this line to go down the side right?
CHI yeah. So this a piece on the bottom
FAT right
CHI but this a torner on the bottom
FAT mmh. So do you think
CHI aaaaooouuuu
FAT what?
CHI I bite my tongue
FAT oh aouch. Here do you think this might attach to this one?
CHI * does (goes) there *
FAT haha ok so there this is gonna be at the bottom then here and that's the other corner right? Where's the other corner gonna go?
CHI right here
FAT right
CHI * to do (go) here maybe?
FAT mmh
CHI right here
FAT yep ok. So what what's gonna go right here? It's gonna be a bit of a cow's face and it's gonna have that line right?
CHI yeah yeah so maybe *
FAT oh
CHI that do (go) there
FAT oh good
CHI mmh that does (goes) there ***
FAT ok do you wanna find some more at the bottom? Do you wanna look? Ok what's this do you think? What do you think that is?
CHI mmh a a * well um that in there
FAT yeah

CHI um that's that's um that's that's this I ****
FAT well do you think it's a little bit like that one?
CHI no
FAT no? What do you think it is?
CHI I think that * do (go) there
FAT do you think it's a flower?
CHI mmh yes
FAT yeah there we go. All right ok can you find more piece at the bottom?
CHI but but I mean didn't know what this is here **
FAT oh the stem
CHI oh ** stem
FAT yeah you're gonna find more pieces?
CHI but **'s like ro(pe)
FAT it's like a rope?
CHI yeah
FAT yeah it looks a bit like a rope. So do you see more pieces that look like they might go on the bottom?
CHI I don't know
FAT mmh
CHI this **
FAT mmh
CHI and no does (goes) here
FAT Ok
CHI * this ***
FAT ok. Ok can you find some more pieces that have the border like that line and also some flowers?
CHI and also the yellow line
FAT right
CHI uh is the border is the pink and and and is it this is the border?
FAT yeah that's the border. The yellow line is part of the border too
CHI why has a border
FAT mmh well the border makes it a little bit easier to find the pieces because we know if we see a piece with the border on it it's going to go around the edge of the puzzle right?
CHI yeah
FAT yeah. So can you find some more pieces with the border?
CHI tsk tsk tsk. What did you say?
FAT can you find some more pieces with the border on them?
CHI mmh *** um border border border border border
FAT yeah good job
CHI border border border
FAT so can you attach it here?
CHI no
FAT ok what about to the other side?
CHI yes
FAT mmh ok very good
CHI I knew that that one has a ${ }^{* * *}$ and has $* * * *$

FAT and it wasn't the right chick that fit together right? CHI yeah
FAT yeah ok. mmh so what do you see in this picture? CHI another one
FAT mmh. and what do you think of these things there?
CHI um um late of one
FAT wait
CHI of of of giraffes
FAT they're not giraffes
CHI I mean cows
FAT cows that's right

## Transcripts of child Sh.

1/3: MOT ok so you wanna hear my story *?
CHI yeah
MOT ok so my story is I went outside and I sat down next to my beautiful daughter on a beautiful bench and I said "ouch! there's splinters in my butt! This bench isn't ready to sit on!" The end.
CHI ok ** so daddy
FAT oh **
CHI ***
MOT oh it's a it's a *
FAT oh * c'é c'était quel c'était quel banc ? C'était le banc dehors là ?
CHI ouais ça * et ** daddy * chair with *** garden as I saw all those spiky spiky flowers
MOT oh you saw some spiky flowers. Can you sit up in your chair please?
FAT ouais tu peux t'asseoir dans sur la chaise * stp ?
CHI that's how we sit
FAT assieds-toi stp
MOT yeah good job thank you ok it's your turn to tell a story ok
CHI I just told you my story
MOT oh ok who's turn is it now?
FAT *
CHI mommy!
FAT * tu connais
MOT oh there's a splinter it's still there!
FAT tu connais l'histoire de la petite * qui mangeait son dinner?
CHI that not a story
MOT that's not a story?
FAT ah ouais ? Pourquoi ? Ca, ça n'arrive jamais ?
CHI no
FAT no?
MOT um * when I'm eating my dinner I prefer that you sit in your own chair
CHI there's splinters here

FAT * * tu peux t'asseoir dans ta chaise ?
CHI ** here
FAT * *!
MOT * please go sit in your chair
FAT assieds-toi sur ta chaise
CHI you're you're pushing me
FAT oui
MOT then go by yourself
FAT assie-toi sur ta chaise *
MOT * it's not comfy for me
CHI but I like it's comfy for me
MOT well it's not all about you, i'm not comfortable
F A T
MOT you see I'm trying to eat and this is what's gonna happen
FAT * va t'asseoir sur ta chaise * !
MOT so please go over here
FAT va t'asseoir sur ta chaise. *! Maman elle va te pousser maintenant
MOT ok what kind of food sounds tasty to you?
FAT qu'est-ce que tu aimes manger *?
CHI I don't like *** story and I don't * story
MOT ok what story do you wanna tell?
CHI I don't know a story it's dancer * tell us story
FAT ok
CHI d'atord
FAT et une histoire en français?
CHI yeah
FAT ok
MOT * get off of my chair. Hey daddy is gonna tell you a story FAT alors * * maman elle vient de quel pays ? * maman elle vient de quel pays alors ?
CHI *****
MOT * I don't feel like you're respecting me and that makes me really sad
CHI but you're making me mad
MOT well you're making me sad
CHI you're making me mad
MOT when I say that I don't want you in my chair and you don't
listen I don't feel respected
CHI well you're making me mad.
FAT qu'est-ce que tu qu'est-ce que tu fais * ? * qu'est-ce que tu fais?
CHI see you! That I see you dad!
FAT ok
CHI mum I see you
MOT I see you
FAT qu'est-ce que tu vas faire qu'est-ce que tu vas faire maintenant *?
CHI I tell you story
FAT tu vas nous dire tu vas nous raconter une histoire?

CHI yeah
FAT ok
CHI *** there was two little *
FAT two quoi?
CHI ** chair and ${ }^{* * * *}$ change it their rainbow taco
MOT oh it's a rainbow taco?
CHI yeah with 2 sides with red
MOT what was it before it changed to a rainbow taco?
CHI *
MOT did you say it was a pinecone?
CHI no
MOT no ok
CHI look I see you dad
FAT ah ben je te vois aussi *
CHI boo see you mum see you mum! See you!
MOT you have a telescope?
FAT *
CHI yeah!
FAT * * tu me donnes le taco ?
CHI my teeeelescope!
FAT tu veux pas partager le tac le taco ?
CHI why?
FAT pourquoi?
CHI why do you want the taco
FAT ben je veux voir comment il est. Nan tu veux pas me donner le taco?
CHI you have to tell us a st. If I give you the taco will you tell us a story?
FAT tu connais l'histoire de de Mili?
CHI what?
FAT Mili.
CHI what?
FAT Mili c'est une petite fille qui mange tout ce qu'il y a devant elle. A chaque fois que c'est l'heure de dinner, ses parents ils mettent de la nourriture de dans son assiette et puis Mili elle mange tout et euh et comme ça
CHI **
FAT elle a jamais faim elle va toujours au lit elle a jamais faim et elle se réveille le lendemain matin et elle est très contente de ses nouvelles euh de la nourriture nouvelle. Tu connais cette histoire?
CHI good story
FAT yeah. La fin
CHI *** could I have the colour the the the taco?
FAT ok donc tu aimes bien la la l'histoire de Mili ?
CHI merci. yeah it's good. ** tell me the story
MOT * what country is mummy from?
CHI ba tell us a story you need to tell us a story ** here
FAT c'est pas une histoire c'est une question
CHI it's your turn

MOT right um
FAT it's a tadem
MOT totem?
FAT no the the ${ }^{* * *}$
MOT mm yeah I have the talking stick? Ok mm one day I took * to school and she was wearing a super cool princess dress and then * said "bonjour !" and I said "have a nice day! Goodbye!" and then I got in my car and I left. The end.
FAT ok
CHI daddy * daddy *
MOT ok french **
FAT en français?
MOT yeah
FAT ben pourquoi?
MOT well I thought we'd try again and see if the next one is a little less painful
FAT ok * tu vas me tu vas me mettre de la glace tu mets de la glace dans la tasse euh je sais pas ya des mm ya des euh *! En général on le met pas sur le sur le sol d'abord
CHI non eat it, eat it
MOT um why is daddy getting ice cream *?
CHI between he finish his dinner
MOT because he finished his dinner
FAT tu veux une tu veux une cuillèr plus grosse ?
CHI we don't have that
FAT hein?
CHI we don't have it
FAT oh we have on a on a des cuillèrs un peu plus grandes. Une cuillèr à soupe, ça c'est une cuillèr à café * Tu veux regarder dans le tiroir si ya des d'autres cuillèrs? *
MOT * do you wanna try that?
FAT va voir dans le tiroir si ya des des cuillèrs plus grosses plus grandes, nan?
CHI no
FAT on regarde?
CHI yeah
FAT ok. Hey regarde. Tu vois c'est c'est une cuillèr plus grande là
MOT what do you think is that a better spoon?
CHI yeah
FAT mm
MOT mm
CHI here
FAT idéal d'une façon idéale tu tu n'utiliserais pas tes doigts ce serait bien
CHI * there is ice cream
FAT tu veux que je te montre comment on fait ça *? Tu veux que je te montre comment on fait? Regarde, non attends attends CHI no I wanna do it!
FAT non je vais te montrer regarde, je je veux te montrer. Il faut
pas que tu utilises tes doigts * Et maintenant tu peux faire comme ça
MOT * can you get that bowl for me so I can have some ice cream too?
CHI ok
MOT ok thanks
CHI oh I see ** food on your plate
MOT well mommy did a pretty good job
FAT ouais mais bon les règles c'est les règles hein
MOT mommy always leaves a little food on her plate
FAT ouais je sais bien c'est c'est pour ça
MOT mommy always leaves a little meat on her plate. Mommy is great at finishing the veggies. Ok what food did mommy finish?
CHI things
MOT what?
FAT qu'est-ce qu'elle a mangé ?
CHI things
MOT things?
FAT ${ }^{* * *}$ sans les doigts sans les doigts utilise le bord
MOT ok um I'm gonna serve my own ice cream
CHI ok
MOT ok thanks
CHI I can lick my hand
MOT euh yeah I guess you can lick your hand I guess that's true Ok euh can you tell me a story *?
CHI why?
MOT because I think it's cute
FAT ok tu dis tu veux nous raconter une histoire en français alors ?

CHI can can I try some of the ice cream?
FAT * tu veux *?
MOT yeah if you eat your dinner
CHI can I try the potatoes if I don't like I can just have the ice cream?
MOT if you try everything on your plate, a little bit of potatoes a little bit of meat and a little bit of broccoli, and that involves swallowing it, like in your stomach, all the way. Okay looks like somebody wants ice cream
FAT that's not swallowing * *
CHI yes
FAT tu n'as pas avalé là
MOT it was an effort
CHI can you get me a bowl?
FAT * la viande
MOT euh * euh yep
FAT la viande, turkey
MOT try the turkey please
CHI ice cream
MOT euh broccoli
CHI I do not like it

FAT j'ai j'ai j'ai j'ai pas bien vu tu peux essayer encore une fois stp
?
CHI I want ice cream
FAT ${ }^{* * * *}$ can you try the broccoli ?

## FAT euh

MOT with the big spoon or the little spoon?
CHI euh s euh little
FAT est-ce que tu veux que j'utilise mes doigts ou ?
MOT no way too much
FAT haha t'étais t'étais excitée pour un moment hein ? Avec mes doigts ou avec ou avec le bord ?
CHI bowl
FAT avec le bord ? Voilà c'est tombé tout seul
CHI my little spoon
FAT la petite cui la petite cuillèr ?
CHI yeah
FAT yeah. * t'as pourquoi tu mets tout dans la bouche? Tu veux pas juste le faire avec la langue? Tu veux pas faire?
MOT I got her reaction to everything on her plate was recording but she was out of the frame so sad You know I feel it will happen again
FAT * elle est bonne la glace?
MOT what do you say when something is really tasty?
CHI merci
MOT merci
FAT alors tu dis merci?
MOT is it delicious?
FAT c'est délicieux *?
CHI delicious
MOT what do you say when something is really yucky
CHI berk (fr)
MOT berk
FAT beurk
MOT do you think it's disgusting?
FAT c'est pas bon ahhh
CHI pas bon
MOT ah pas bon
FAT tu veux faire la même chose avec les broccolis peut-être ?
CHI never gonna do that
MOT never. What what kind of thing did you have in mind?
FAT never ever ***
MOT well I think one day you will eat broccoli and you will like it, you might even order it in a restaurant. This ice cream is pretty good
FAT yeah i don't i don't taste the lactose here
MOT no seems fine
FAT mm mm mm
MOT yeah there will be no seconds for you because you didn't actually eat your food. You tried it so you get to try some ice
cream but that's all
CHI * more
MOT and FAT no
CHI ice cream
MOT *** I ate my food
CHI and I ate it too
MOT mm you tried it but you it's not in your stomach
CHI but can I try a little more?
FAT you
CHI ice cream
FAT tu veux essayer encore? Si t'essayes encore les broccolis et les patates tu pourrais essayer encore les la glace. Les broccolis * les broccolis ça c'était les patates et et et la viande la viande
CHI do not like it
FAT la dinde * turkey
MOT that's clear totally clear
FAT the turkey. Ah nan nan nan faut mettre dans la bouche * faut mettre dans la bouche
CHI I don't want to put in la bouche. I just want ice cream
MOT you need to put some of the turkey in your mouth
CHI no I just want ice cream
MOT you didn't you i think the turkey is pretty tasty
CHI give me ice cream give me ice cream!

2/3: CHI and this is your chair ok?
MOT ok
FAT mais pour le moment elle est euh pour le moment elle est en train de filmer ok?
CHI here
FAT ok on se rapproche ?
CHI yeah!
FAT ou tu veux venir sur mes genoux ?
CHI yeah want to read
FAT tu veux venir sur mes genoux ou tu veux juste lire le live? ?
CHI want to read
FAT ok on va lire ok. Euh c' elle raconte quoi l'histoire *? qu'estce qui qui
CHI my t my soupe
FAT ok soupe et après ça ?
CHI rice
FAT a avec du riz ok
CHI et sou et the rice
FAT ok
CHI there's there's rice and there's soup
FAT ok du riz et de la soupe et et après à la page suivante c'est quoi? Tu peux tourner la page stp?
CHI *** there's ${ }^{* * * *}$
FAT ***

CHI look. Look
FAT et là ya quoi là ? Qu'est-ce qui sur 1
CHI well theres' **
FAT ya des roses ?
CHI there's roses
MOT oh
FAT ok
CHI roses (eng) roses
MOT est-ce que tu peux chercher le page avec le crocodile ?
CHI yeah
MOT and FAT ok
FAT tu vas trouver les crocodiles?
CHI oh wait
FAT ok
CHI oh I can't find it
FAT c'est dans ce livre ou pas?
CHI here you go
FAT ou c'est un autre livere il faut ou ya les crocodiles?
MOT c'est dans cette livre
CHI the end
FAT la fin?
CHI ***
FAT ok tu tu tu veux voir mon livre là ou pas ?
CHI *
FAT tu veux voir mon livre?
CHI no
FAT qu'est-ce qu'est-ce qui a dans mon livre ?
CHI ohhhh
FAT ohoh
CHI ohoh (eng)
FAT qu'est-ce qui se passe ? Qu'est-ce que tu crois qui va se passer?
CHI a rat!
FAT ya un rat
CHI a rat means a rat means it's a mouse
FAT well euh c'est un peu différent le rat
CHI a rat a rat means it's a mouse!
FAT le le rat il est plus gros que la souris, la souris elle est petite le rat il est plus gros
CHI but but but this is where the ** there's a mouse
FAT oh ok c'est petit parce que c'est une souris?
CHI yeah
FAT ok
CHI so that's why
FAT et tu vois le chat aussi ou pas?
CHI the chat est est est est est is bigger
FAT le chat oui il est plus grand que la souris
CHI the bag the the the the cat is $b$ bigger than the elephants
FAT le le le le chat il est plus gros que l'éléphant?
CHI yeah ******

FAT * * l'éléphant il s'il fait quoi comme bruit l'éléphant?
CHI pfffffff "imitates the elephant"
FAT and MOT hahaha
CHI but but but but the hele elephant this one they have a elephant in this one FAT ya un éléphant dans celui-là ? CHI yeah!
FAT ah d'accord ok. Oh! C' c'est la soupe avec euh le poulet et puis le riz?
CHI yeah
FAT ok
CHI * need to find the elephant
FAT ouais ouais j'aimerai bien trouver l'éléphant
CHI ok
FAT ok il est où l'éléphant, c'est une baleine
CHI yeah I'll find the elephant
FAT tu vas tu veux trouver l'éléphant?
CHI yeah. Where is
FAT je sais pas où il est la l'éléphant
CHI ah it's ok I will
FAT ok. T'es sûre que c'est le c'est dans ce livre ? C'est pas dans un autre livre?
CHI oh
FAT ah ah attention
CHI I'll find the ele
FAT ok
CHI *** french
FAT haha on parle français
CHI oui oui this one ${ }^{* * * *}$
FAT en français?
CHI yeah
FAT oh
CHI oh look at it
FAT ça c'est quoi ça ?
CHI ah *** like this
FAT c'est quoi ça?
CHI butterfly
FAT oui mais en français en français c'est comment?
CHI ***** papillon!
FAT papillon! Oui très bien
CHI papillon
FAT et tu tu veux peindre un papillon comme ça ?
CHI *
FAT c'est quoi ça c'est les ailes? C'est les ailes du papillon?
CHI oui yeah
FAT tu aimes bien faire ehm tu aimes bien faire les ailes?
CHI yeah
FAT oh comment tu dis les ailes en anglais tu sais
CHI fly fly calerpitar
FAT nan où il tsais où il est où il est cater

CHI caterpillar
FAT et ça ça s'appelle une chenille en français
CHI yeah. pêchenille
FAT chenille
CHI chenille
FAT uhuh. oh et ça c'est quoi?
CHI bee
FAT oui et en français?
CHI abeille
FAT abeille très bien
CHI no no * these are my stories
FAT ha c'est tes histoires? Tous tes livres?
CHI yeah mine
FAT ok
CHI they're * my books
FAT qu'est qu'est-ce que tu veux qu'on fasse avec les livres *?
CHI mine
FAT c'est à toi ?
CHI yeah
FAT tu tu peux m'en donner un ?
CHI mine
FAT tu veux pas m'en donner un stp?
CHI mine
FAT et comment tu veux que je les lise si tu me le donnes pas ?
Tu veux me donner un livre ? Ok ok tu ça c'est ça avec les chiffres tu veux faire chiffres?
CHI aou
FAT tu vas où ?
CHI I'm gonna give the * with mummy
FAT ok tu vas donner un livre à maman?
MOT merci !
CHI *** it was why you say is french
MOT merci
CHI why *** say thank you in french
MOT ok
FAT meric ouais *
CHI oh so I say *
MOT je peux toujours dir merci en français
FAT tu veux parler en français *?
CHI ** I'm not gonna say merci be because **** because that's why I'm not gonna merci
MOT okay
FAT tu tu veux que je te donne un livre *?
CHI no
FAT tu tu veux que je te donne ce livre
CHI I'm going my *
FAT ok
CHI well whe whe
FAT où est-ce que tu veux mettre la chaise ?
CHI whe

FAT où est-ce que qu'est-ce que tu veux faire avec la chaise * ?
CHI we are at the beach
FAT ok on est à la plage ?
CHI yeah we're on the beach
FAT ok
CHI and and there's no ocean here
FAT ya pas d'océan?
CHI yeah no ocean
FAT ya ya pas d'eau ya pas de ya pas de mer ?
CHI there's no ocean
FAT ok ya pas de
CHI *****
FAT ya pas d'océan
CHI mum here I brought a chair for you. And daddy
FAT ça c'est c'est la chaise pour papa ça ?
CHI yeah this one is for you and this one is for mummy ok?
FAT ok
CHI this one will break if you sit on it
FAT yeah je crois aussi ouais.
CHI yeah
FAT Elle est un peu fragile cette chaise hein?
CHI and mummy will not break it and this one will not break ok?
FAT ok
CHI ok yeah $* * * * * * *$ sit
FAT tu veux que je m'asseois là ?
CHI yeah yeah this is your chair
FAT ok c'est ma chaise ok
CHI mum sat on this one sit on this one

3/3: MOT ok what are we doing now?
CHI I have to put the cupcake and mine now where's our cupcakes?
MOT where's our cupcakes?
CHI yeah
MOT well queenabelle has one and allabelle has one right? And I have one
CHI *cupcake * cupcake this is my cupcake
MOT ok
CHI ** my water
MOT you're drinking your water ok
CHI dylike cookie?
MOT yes I'd like a cupcake
CHI ok ok boo cupcake?
MOT oh thank you
CHI do allabelle want a cupcake?
MOT um yeah I think allabelle would like a cupcake
CHI ok boo! Allabelle allabelle allabelle allabelle is right there
MOT ok ok
CHI that's her, no that's not allabelle
MOT I thought that was allabelle

CHI that not allabelle
MOT oh who is it?
CHI it's chal it's allabelle chalina
MOT allabelle chalina
CHI and that's allabelle
MOT ok so I should give allabelle the cupcake?
CHI yeah
MOT ok
CHI boo. Give me the cupcake. In my bowl
MOT ok
CHI can I eat my cupcake?
MOT yeah you can eat your cupcake
CHI ok this is my water ok?
MOT ok? You gotta be a bit more careful cause these are glass
CHI ok
MOT yeah
CHI **** I have to cook ok?
MOT you have to cook?
CHI ** have to cook ok? Because *** this one mum
MOT what is that for?
CHI that
MOT um that is for the cabin
CHI oh?
MOT yeah
CHI and what's this for?
MOT uh that is also the cabin. So in this one this is gonna go under the coffee uh not the coffee tables like the side tables they're on the side of the couch because it doesn't have well it has draws but like really small draws and we need just a little bit more storage and this, um it looks like a hamper but this is gonna be where we keep all of your costumes at the cabin
CHI and my clothes too?
MOT uh yeah if you wanna put your clothes in there we can put your clothes there too
CHI I want I want to put my clothes there too
MOT ok
CHI want to put my clothes in here
MOT ok
CHI ok what's * the the the my clothes in here
MOT which clothes do you wanna put in there?
CHI and uh my clothes
MOT which clothes? Like dresses or pants? What do you think?
CHI dresses
MOT dresses?
CHI and pants
MOT and pants too?
CHI yeah
MOT ok
CHI this is for chalina
MOT this is for chalina?

CHI this perle is for chalina
MOT what is it?
CHI this this perle is for chalina
MOT that little part?
CHI yeah and
MOT what what is she gonna do with it?
CHI uh she's gonna s s stick it also because there's glue
MOT oh she's gonna stick it on with glue?
CHI this is glue
MOT that's glue ok
CHI yeah and that looks sticky and *** no hey no this ** and I'm gonna do
MOT ok I move the phone stand next to me
CHI ** phone
MOT yeah
CHI that's **** is plastic
MOT mmh? What are you doing?
CHI now we can bring it downstairs ok?
MOT oh you wanna bring that downstairs?
CHI yes the hamper
MOT ok ok
CHI the hamper?
MOT it looks like a hamper
CHI but it a hamper
MOT uh well it's not really a hamper, it's gonna be more like a chester like a trunk for gear and costumes
CHI and that one for my clothes and * this one is pour my dresses in here ok?
MOT yeah ok we can put your dresses in there
CHI ok
MOT so no costumes just dresses?
CHI yeah
MOT yeah? Ok
CHI this *** you can carry this
MOT yeah I can carry it. Is it too heavy for you? Ok
CHI ... this is a table ok?
MOT ok
CHI ok ****** uh * table this is the teacher's table that's for kids
this is for $* \mathrm{ok}$ ?
MOT mmh
CHI ok?
MOT ok
CHI here open this
MOT ok
CHI this, this * here ** we're gonna go fish oh here are they
MOT oh here they are! Oh we found them! Hourray!! Oh all of them! Thank you * you did know where they were. OK so should I put this back now?
CHI no

MOT no?
CHI those are for kids
MOT these are for kids. Well I'm just worried that we're not gonna have room on your table cause we have a lot of activities right now so I'm gonna put this activity away ok?
CHI it's a * I'll it's a * is there more room?
MOT yeah now there's a lot of room. Do you wanna go fishing?
CHI yeah *** go finishing
MOT ok
CHI oh we don't need these ok?
MOT we don't need those?
CHI you you ***
MOT ok
CHI and I'll
MOT what colour is this *?
CHI azun
MOT azure? Yeah are you learning your colours in Spanish?
What colour is this one?
CHI no
MOT no?
CHI don't know
MOT you don't know? Do you want me to tell you?
CHI yeah
MOT In English or Spanish?
CHI Eng uh Spanish
MOT how do you say it in English?
CHI azun
MOT how do you say this colour in English *?
CHI azur!
MOT no this is azur but this is more like turquoise or keel uh CHI ***
MOT in Spanish this is narenja
CHI narenta
MOT narenja
CHI I can't say it
MOT you can't say it? Well how about telling me what it is in French?
CHI ** mangolingo
MOT mangolingo?
CHI yeah
MOT how about orange (fr)
CHI oranze
MOT orange (fr)
CHI oranze
MOT how do you say it in English?
CHI ***
MOT of my goodness
CHI I can't say it
MOT you can't just say orange (eng)?
CHI yeah

MOT i know you know all your colours in English. That's very silly. Ok uh should we go fish?
CHI where's * a fish? I'm gonna put no no * has a bit wet
MOT oh jeez
CHI ***
MOT ok
CHI uh jelly where's the jellyfish?
MOT that was a jellyfish
CHI ok this is a jellyfish
MOT ok what is that one? That's not a jellyfish. It's a lobster CHI ok
MOT ok. Which one should I get?
CHI you should get get
MOT oh what did you get?
CHI you should get that one
MOT ok. Did you get an octopus?
CHI yeah
MOT yeah? Ok
CHI **** chair
MOT oh what is this one? shark
CHI ** is scary
MOT it's scary
CHI no it's not
MOT no it's not scary?
CHI yes
MOT ok
CHI mine!
MOT oh its ok
CHI oh!
MOT oh. Is it my turn?
CHI yeah
MOT ok
CHI no I'm gonna get this one!
MOT you're gonna get this one? ok
CHI ohhh
MOT ok I'm gonna get this one. Which one is this?
CHI stracker
MOT stracker?
CHI yeah
MOT * you know how to say this. What is it?
CHI baleine
MOT baleine
CHI baleine
MOT baleine
CHI I'm not a baby here *** baby
MOT so you are a baby or you're not a bay I'm confused
$\mathrm{CHI} * * * * *$ this is a ${ }^{* *}$ this is a ${ }^{* * * * *}$ and I'm the teacher.
MOT and now you're the teacher
CHI yep
MOT ok

## Appendix 2: Corpus (from CHILDES)

## Links to access bilingual children's transcripts from CHILDES

## Transcripts of child Je.

1/4: childes/Biling/GNP/jes/011027f
https://sla.talkbank.org/TBB/childes/Biling/GNP/jes/011027f.cha

2/4: childes/Biling/GNP/jes/011020e
https://sla.talkbank.org/TBB/childes/Biling/GNP/jes/011020e.cha

3/4: childes/Biling/GNP/jes/011105e
https://sla.talkbank.org/TBB/childes/Biling/GNP/jes/011105e.cha

4/4: childes/Biling/GNP/jes/011123e
https://sla.talkbank.org/TBB/childes/Biling/GNP/jes/011123e.cha

## Transcripts of child Jo.

1/3: childes/Biling/GNP/joe/020423f
https://sla.talkbank.org/TBB/childes/Biling/GNP/joe/020423f.cha

2/3: childes/Biling/GNP/joe/020406e
https://sla.talkbank.org/TBB/childes/Biling/GNP/joe/020406e.cha

3/3: childes/Biling/GNP/joe/020415e
https://sla.talkbank.org/TBB/childes/Biling/GNP/joe/020415e.cha

## Transcripts of child Le.

1/4: childes/Biling/GNP/lei/010218e
https://sla.talkbank.org/TBB/childes/Biling/GNP/lei/010218e.cha

2/4: childes/Biling/GNP/lei/020300f
https://sla.talkbank.org/TBB/childes/Biling/GNP/lei/020300f.cha

3/4: childes/Biling/GNP/lei/020307f
https://sla.talkbank.org/TBB/childes/Biling/GNP/lei/020307f.cha

4/4: childes/Biling/GNP/lei/020224b
https://sla.talkbank.org/TBB/childes/Biling/GNP/lei/020224b.cha

## Transcripts of child Ge.

1/2: childes/Biling/GNP/gen/030020e
https://sla.talkbank.org/TBB/childes/Biling/GNP/gen/030020e.cha

2/2: childes/Biling/GNP/gen/020629f
https://sla.talkbank.org/TBB/childes/Biling/GNP/gen/020629f.cha

## Transcripts of child $O$.

1/2: childes/Biling/GNP/oli/020500b
https://sla.talkbank.org/TBB/childes/Biling/GNP/oli/020500b.cha

2/2: childes/Biling/GNP/oli/021029f
https://sla.talkbank.org/TBB/childes/Biling/GNP/oli/021029f.cha

# Links to access bilingual children's transcripts from CHILDES 

## Transcripts of child D.

1/2: childes/Eng-UK/Belfast/David/040203
https://sla.talkbank.org/TBB/childes/EngUK/Belfast/David/040203.cha

2/2: childes/Eng-UK/Belfast/David/040028
https://sla.talkbank.org/TBB/childes/EngUK/Belfast/David/040028.cha

## Transcripts of child $C$.

1/2: childes/Eng-UK/Belfast/Conor/040605
https://sla.talkbank.org/TBB/childes/EngUK/Belfast/Conor/040605.cha

2/2: childes/Eng-UK/Belfast/Conor/040010
https://sla.talkbank.org/TBB/childes/Eng-
UK/Belfast/Conor/040010.cha

## Transcripts of child B.

1/2: childes/Eng-UK/Belfast/Barbara/031105
https://sla.talkbank.org/TBB/childes/Eng-
UK/Belfast/Barbara/031105.cha

2/2: childes/Eng-UK/Belfast/Barbara/040118
https://sla.talkbank.org/TBB/childes/Eng-
UK/Belfast/Barbara/040118.cha

## Transcripts of child $L$.

1/3: childes/Eng-UK/Lara/030325
https://sla.talkbank.org/TBB/childes/Eng-UK/Lara/030325.cha

2/3: childes/Eng-UK/Lara/020900
https://sla.talkbank.org/TBB/childes/Eng-UK/Lara/020900.cha

3/3: childes/Eng-UK/Lara/020600
https://sla.talkbank.org/TBB/childes/Eng-UK/Lara/020600.cha

## Transcripts of child R.

1/3: from 1 to 1019: childes/Eng-UK/Manchester/Ruth/021121
https://sla.talkbank.org/TBB/childes/EngUK/Manchester/Ruth/021121.cha

2/3: from 1020 to 2041: childes/Eng-UK/Manchester/Ruth/021121 https://sla.talkbank.org/TBB/childes/Eng_ UK/Manchester/Ruth/021121.cha

3/3: childes/Eng-UK/Manchester/Ruth/020909
https://sla.talkbank.org/TBB/childes/Eng-
UK/Manchester/Ruth/020909.cha

## Transcripts of child $A E$.

1/3: from 1 to 934: childes/Eng-UK/Manchester/Anne/020910 https://sla.talkbank.org/TBB/childes/EngUK/Manchester/Anne/020910.cha

2/3: from 935 to 1852: childes/Eng-UK/Manchester/Anne/020910 https://sla.talkbank.org/TBB/childes/Eng_ UK/Manchester/Anne/020910.cha

3/3: childes/Eng-UK/Manchester/Anne/020908
https://sla.talkbank.org/TBB/childes/Eng-
UK/Manchester/Anne/020908.cha

## Transcripts of child $G$.

1/3: from 1 to 876: childes/Eng-UK/Manchester/Gail/021112
https://sla.talkbank.org/TBB/childes/Eng_
UK/Manchester/Gail/021112.cha

2/3: from 877 to 1441: childes/Eng-UK/Manchester/Gail/021112
https://sla.talkbank.org/TBB/childes/Eng_ UK/Manchester/Gail/021112.cha

3/3: childes/Eng-UK/Manchester/Gail/020929
https://sla.talkbank.org/TBB/childes/Eng_
UK/Manchester/Gail/020929.cha

## Transcripts of child $N$.

1/3: from 1 to 908: childes/Eng-UK/Manchester/Nicole/030010
https://sla.talkbank.org/TBB/childes/Eng_
UK/Manchester/Nicole/030010.cha

2/3: from 909 to 1781: childes/Eng-UK/Manchester/Nicole/030010 https://sla.talkbank.org/TBB/childes/Eng_ UK/Manchester/Nicole/030010.cha

3/3: childes/Eng-UK/Manchester/Nicole/021001
https://sla.talkbank.org/TBB/childes/Eng-
UK/Manchester/Nicole/021001.cha

## Transcripts of child AF.

1/3: childes/French/York/Anne/030504
https://sla.talkbank.org/TBB/childes/French/York/Anne/030504.c ha

2/3: childes/French/York/Anne/030002
https://sla.talkbank.org/TBB/childes/French/York/Anne/030002.c ha

3/3: childes/French/York/Anne/021018
https://sla.talkbank.org/TBB/childes/French/York/Anne/021018.c ha

## Transcripts of child $L$.

1/3: childes/French/York/Lea/040321
https://sla.talkbank.org/TBB/childes/French/York/Lea/040321.cha

2/3: childes/French/York/Lea/030005
https://sla.talkbank.org/TBB/childes/French/York/Lea/030005.cha

3/3: childes/French/York/Lea/021021
https://sla.talkbank.org/TBB/childes/French/York/Lea/021021.cha

## Transcripts of child M.

1/3: childes/French/York/Max/030223
https://sla.talkbank.org/TBB/childes/French/York/Max/030223.cha

2/3: childes/French/York/Max/030014
https://sla.talkbank.org/TBB/childes/French/York/Max/030014.cha

3/3: childes/French/York/Max/020320
https://sla.talkbank.org/TBB/childes/French/York/Max/020320.cha

## Transcripts of child $P$.

1/3: childes/French/Leveille/030312
https://sla.talkbank.org/TBB/childes/French/Leveille/030312.cha

2/3: childes/French/Leveille/030006
https://sla.talkbank.org/TBB/childes/French/Leveille/030006.cha

3/3: childes/French/Leveille/021017
https://sla.talkbank.org/TBB/childes/French/Leveille/021017.cha

## Appendix 3: Procedure for the recordings

Hereafter is the protocol for the recordings that was sent to the parents of English monolingual children (the French version of the protocol was sent to the French monolingual parents).

- each child was recorded 3 times (the recordings went from 1 day up to 7 months between the recordings)
- only one of the parents was present for the French and English recordings, and both parents were present for the bilingual recording
- the recordings lasted 15 to 20 minutes. If they were longer than that, I selected only 20 minutes of them based on the transcripts from CHILDES for which only 20 minutes were selected
- the activities during the recordings were reading a book and talking about it, playing UNO, playing make-believe and constructions, talking about movies and shows, baking, drawing, playing puzzles, eating
- both child and adults were to be visible on the video, the video had to be recorded in a quiet room.

The letter below was sent to parents, to make sure the protocol would be respected :

Dear parents,
I thank you very much for your interest in participating in my study on bilingual children's language development when they are brought up in an environment which encourages the use of Code-Switching. These are the steps you need to follow in order so that the research carried out follow a coherent pattern:

1) There should be 3 recordings per child (5 years old or under): one with one parent, one with the other parent, and one with both parents at the same time.

It is always best, in the first two cases, that the other parent is not present in the room.
2) The recordings should be $15 / 20$ minutes long. If it goes over this time, I will select only 20 minutes of it.
3) Examples of "playtime" that can be used for these recordings are: make-believe, talking about the day or a special event that happened not long ago, mealtimes, reading and showing the pages of a book, painting or drawing, etc.

You know your child better than anyone, you know which situation and which subjects lead them to talking the most.
4) Make sure the recordings happen in a place with very little background noise. I don't recommend the park for example, or a room with too many children putting at risk the understandability of the recording.
5) The child and the parent(s) should be visible on the video since I also analyse body language.

## Appendix 4: Poster for the ISOLDE Summer <br> School (14-18 June 2021)

Bilingual children delayed in language development?


Illustration 51: Poster for the ISOLDE Summer School (14-18 June 2021)

## Overview

## I. CHAPTER 1: STATE OF THE ART ON BILINGUALISM AND CODE-SWITCHING

I.1. What is Code-Switching?
I.2. Motivations for Code-Switching
I.3. Balanced and unbalanced bilingualism
I.4. Phonological systems
I. 5 Possible differences in the use of systems between CS and codemixing
I.6. Different approaches to language acquisition and how CS is dealt with by them
I.7. Levelt's Model of Speech Productions
I.8. Essential criteria to be taken into account for the current study
I.9. Synthesis of Genesee et al.'s seminal study (1996)
II. CHAPTER 2: CORPUS-BASED ANALYSIS FROM BILINGUALS AND NON-BILINGUALS UNTIL THE AGE OF 5 YEARS OLD: A STUDY OF SEVERAL CRITERIA
II.1. Material
II.2. Language awareness
II.3. Language development
II.4. Errors
II.5. Intelligibility of children according to age
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## III. CHAPTER 3: BILINGUALISM AND CODE-SWITCHING (CS) AFTER THE CRITICAL PERIOD FOR LANGUAGE LEARNING (CPL)

III.1. Cognitive benefits of bilingualism and reaction of the brain to CS
III.2. Academic benefits of bilingualism
III.3. When parents and children do not speak the same language
III.4. Impact of bilingualism for individuals, companies and countries
III.5. How do bilingualism and CS help in the country's sociolinguistic context?

## IV- SUMMARY, ASSESSMENT AND CONCLUSIONS


[^0]:    ${ }^{1}$ Child Language Data Exchange System (https://childes.talkbank.org)

[^1]:    ${ }^{2}$ «Si les mots étaient chargés de représenter des concepts donnés d'avance, ils auraient chacun, d'une langue à l'autre, des correspondants exacts pour le sens ; or il n'en est pas ainsi» Saussure (1916/2005: 125)

[^2]:    ${ }^{3}$ When a certain number of " $x$ " appear in our study, we followed the standard transcription found in ELAN where " $x$ " is used when a word is not intelligible. So many " $x$ " represent so many syllables.

    We have also used a single " $x$ " in place of any information that would break anonymity of our subjects and their relatives.

[^3]:    ${ }^{4}$ I love putting nude polish on my nails, it's so classy.

[^4]:    ${ }^{5}$ The students are very effective

[^5]:    " [their] studies of nonce borrowing on the ground show that speakers also appeal to them when incorporating otherlanguage words spontaneously: they treat novel borrowings exactly like their established loanwords (by imbuing them with the grammar of the recipient language) and distinguish both from their CS, which retain the grammar of the donor language".

[^6]:    ${ }^{6}$ A phenomenon in which speakers will use all of their languages with minimum skills, therefore not having native-like proficiency in any of their languages.

[^7]:    ${ }^{7}$ «Le schéma montre la séquence en msec. qu'il y a "entre la prononciation des phonèmes /b/ et /p/. Le point 0 représente le relâchement inévitable mais perceptible entre les deux phonème» (Vouillamoz, 2000).
    ${ }^{8}$ «En français la durée est de -40 ms pour le pré-voisé, 0 ms pour le voisé (/b/), +40

[^8]:    10 "Döpke (2000), for example, found that Australian children learning English and German simultaneously used -VO word order much more in all verbal clauses in their German than native, monolingual speakers of German. German uses both -VO and $-O V$ word order: $-V O$ in main clauses and both $-V O$ and $-O V$ word order in subordinate clauses; English, in contrast, uses $-V O$ order in main and subordinate clauses" (Genesee \& Nicoladis, 2006).

[^9]:    "In the first stage [first words on to approximately $2 / 2,5$ years old] the child has one lexical system which includes words from both languages. ..., in this stage the language development of the bilingual child seems to be like the language development of the monolingual child. ... In the second stage [from 2/2,5 years old until 3,5 years old], the child distinguishes two different lexicons, but applies the same syntactic rules to both languages. In the third stage [from 3,5 years old on] the child speaks two languages differentiated both in lexicon and syntax..."

[^10]:    ${ }^{11}$ «Pierre pense qu'il pleuvra demain» (Raeber, 2012)
    12 « Marie pense que Pierre pense qu'il pleuvra demain » (Raeber, 2012)

[^11]:    ${ }^{13}$ Defined by the "level of parental education (usually maternal), or occupation (usually parental). [but also] by economic deprivation [...], or income-to-needs

[^12]:    " $[i] n$ a Minimalist approach to CS which adheres to the research agenda stated [above], lexical items may be drawn from the lexicon of either language to introduce the features into the lexical array, which must then be valued [...] in just the same way as monolingual features must be valued, with no special mechanisms permitted. In this lexicalist approach, noCS specific mechanism is required to mediate contradictory requirements of the systems in contact. The requirements are simply carried along with the lexical items of the respective languages".

[^13]:    ${ }^{14}$ «Il n'existe donc pas [...] de structures cognitives a priori ou innées: seul le fonctionnement de l'intelligence est héréditaire et il n'engendre des structures que par une organisation d'actions successives exercées sur des objets »

[^14]:    ${ }^{15}$ « Dans le domaine phonologique tout d'abord, sans doute influencé par Whitney (qui avait déjà beaucoup marqué Saussure), il en vient peu à peu à la notion de phonème par une démarche autonome. (Il ne connaît ni Saussure ni Baudouin de Courtenay, qui furent, en Europe, les initiateurs de la phonologie.) En étudiant les langues indiennes et la réaction de ses informateurs à l'audition des sons, il en vient en effet à la nécessité de séparer l'approche formelle des sons du langage (la phonétique) de son approche fonctionnelle (la phonologie) » (Calvet, 2016).

[^15]:    ${ }^{16}$ «[l]a polyglossie est une plaie sociale» (Epstein, 1915 : 210)

[^16]:    ${ }^{17}$ «Une assimilation sans accommodation nous emmène dans un monde imaginaire» (Complido, 2014).

[^17]:    18* The documents marked this way will be found in the annex.

[^18]:    ${ }^{19}$ Link for P.'s transcripts: https://sla.talkbank.org/TBB/childes/French/Leveille
    ${ }^{20}$ Link for M., Le., and AF.'s transcripts:
    https://sla.talkbank.org/TBB/childes/French/York
    ${ }^{21}$ Link for B., C., and D.'s transcripts: https://sla.talkbank.org/TBB/childes/Eng_UK/Belfast
    ${ }^{22}$ Link for La.'s transcripts: https://sla.talkbank.org/TBB/childes/EngUK/Lara/030325.cha
    ${ }^{23}$ Link for AE., G., N., and R.'s transcripts:
    https://sla.talkbank.org/TBB/childes/Eng-UK/Manchester
    ${ }^{24}$ Link for Ge., Jo., Le., Je., and O.'s transcripts.
    https://sla.talkbank.org/TBB/childes/Biling/GNP

[^19]:    25 "A nonprofit organization committed to clinical practice, education and research, providing expert, whole-person care to everyone who needs healing".

    26 "On constate ainsi tout d'abord que l'enfant utilise son prénom très tôt et que les pronoms constituent une acquisition plus tardive, qui ne remplace pas complètement l'usage du prénom, même à 30 mois (Rossi \& Vincent-Durroux, 2022: 3).
    ${ }^{27}$ «Les pronoms singuliers apparaissent en premier, le pluriel est plus tardif : un peu plus d'un quart des enfants produisent « they » et « them » à 30 mois » (Rossi \& Vincent-Durroux, 2022: 3).
    ${ }^{28}$ «Il est nécessaire de tenir compte du fait que les catégories grammaticales ont été définies en observant les langues écrites, fondées sur la représentation de mots isolés graphiquement. Or, la première réalité des langues est leur forme orale, caractérisée par un flux, et il s'avère indispensable d'observer les pronoms tels qu'ils se présentent à l'oral » (Gardelle \& Vincent-Durroux, 2022: 12).
    ${ }^{29}$ «La formalisation en catégories par l'analyse de la langue orale aurait pu ou pourrait donner lieu à des répartitions différentes» (Gardelle \& Vincent-Durroux,

[^20]:    ${ }^{30}$ «Non seulement elle comporte un nombre non négligeable de sous-catégories selon le rôle joué par les pronoms dans l'énoncé (pronoms relatifs, interrogatifs, déictiques), mais en outre, certaines de ces catégories posent problème» (Gardelle \& Vincent-Durroux (2022: 12).
    ${ }^{31}$ «L'absence d'homogénéité au sein de la catégorie des pronoms est également visible dans la sous-catégorie des pronoms relatifs de l'anglais : WHICH, WHO et THAT. Les pronoms relatifs en $W H$-, eux, peuvent intégrer le trait $+/$ - humain de leur antécédent et peuvent être précédés par des prépositions, comme le sont les groupes nominaux. Sur ces deux aspects, THAT se démarque (*the house in that I live) » (Gardelle \& Vincent-Durroux, 2022: 12).
    ${ }^{32}$ «Un critère sémantique est que les pronoms permettent 'd'assurer une certaine économie dans le discours, en évitant les répétitions et en fondant leur interprétation sur le contexte et la situation' (texte de cadrage qui a accompagné le corpus commun d'où sont extraites les données analysées dans ce volume)» (Gardelle \& Vincent-Durroux, 2022: 14).

[^21]:    ${ }^{33}$ «Les données diachroniques permettent par ailleurs d'isoler différentes souscatégories de pronoms, ainsi que les présente C. Delesse dans ce volume: les pronoms personnels, les possessifs, les réfléchis, les démonstratifs, les interrogatifs, les relatifs et les indéfinis.
    Toutefois, cela suffit-il pour constituer une liste fermée de pronoms ?» (Gardelle \& Vincent-Durroux, 2022: 14).
    ${ }^{34}$ A morpheme is the smallest unit of a word that has meaning, for example "uncertainly" has three morphemes: "un", "certain" and "-ly".

[^22]:    ${ }^{35}$ Speech and Language Therapy Information (SLTinfo) is a website led by academics which focuses on speech, language and communication needs.

[^23]:    ${ }^{36}$ «Cela ne semble pas de nature à invalider l'hypothèse d'une primarité du spatial, non pas au stade de la parole, mais au stade antérieur de la structuration des représentations. Or, c'est bien de cela qu'il s'agit ici : l'ontogenèse susceptible de fonder la primarité du spatial dans le mode d'indication des relations qui sous-tend l'emploi des prépositions n'est pas l'ontogenèse de cet emploi mais bien des représentations qui le précèdent » (Groussier, 1997 : 227)

[^24]:    ${ }^{38}$ In Illustration 20, the " $[t]$ hick bands represent the second quartile (median) VOT durations, top and bottom bands of the box represent first and third quartiles of the data, whiskers represent the lowest and highest data points still within 1.5 interquartile range (IQR) of the lower and higher quartile; data points outside of the whiskers can be considered outliers" (Piccinini \& Arvaniti, 2015: 130).

[^25]:    39 "Même si l'enfant bilingue fournit dans les faits un travail «double » et malgré le décalage possible entre langue forte et langue faible, l'acquisition bilingue n'implique pas de retard significatif dans le développement du langage" (Benazzo \& Morgenstern, 2017).

[^26]:    ${ }^{40}$ Eriksen \& Eriksen's goal (1974: 143) by developing the Flanker task was to "study the visual information processing". They state that they would "employ a display in which a target is embedded among a number of noise elements" and that "the target has been a letter embedded in a display containing other letters".

[^27]:    ${ }^{41}$ MCI: "condition in which someone has minor problems with cognition - their mental abilities such as memory or thinking" (Alzheimer's Society).

[^28]:    42 An additive bilingualism is when a speaker's first language continues to development while he is learning his second language.

    A subtractive bilingualism is when the learning of the second language comes at the expense of the first language, meaning that they will usually lose proficiency in their first language their skills in their second language improve.

[^29]:    ${ }^{43}$ The parent who spends the most time with the child.

[^30]:    ${ }^{44}$ «Selon l'avis de nombreux chercheurs, l'interruption prématurée de l'acquisition de la langue maternelle peut avoir des répercussions sur le développement cognitif de l'enfant, sans parler du fait que le rôle éducatif des parents est affaibli par l'utilisation d'une langue mal maîtrisée» (Abdelilah-Bauer, 2015).

[^31]:    ${ }^{45}$ Submersion vs. immersion: in a submersion school, the child does not know the language of his teachers and classmates, and vice versa, whereas in an immersion school, the child knows the teacher and his classmates' language, and vice versa.

    46 «Ce n'est qu'à la fin de cette période académique qu'il n'est plus possible de détecter de différences au niveau conceptuel linguistique entre un enfant monolingue et un autre enfant qui aurait appris l'Anglais tardivement» (AbdelilahBauer, 2015).

[^32]:    ${ }^{47}$ «Langue-économie» (Grin, 2002: 22)

[^33]:    ${ }^{48}$ A biliterate is a person who is able to write and read in two languages.

[^34]:    49 "Elective bilinguals are those who choose to learn an additional language, usually as a means of social and educational advancement" (May, 2016: 3).

    50 "Circumstantial bilinguals are those who are required to learn another language, most often because their first language (L1) is not the language of the wider society in which they currently live" (May, 2016: 3-4)

