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Code-switching: language of bilingual children and what it can reveal about multiple language use.

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Ce mémoire intitulé :

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Abstract and Key Words

Code-switching and borrowing are both highly common linguistic phenomena in multilingual communities. Whilst much research has been carried out on these phenomena, there are two aspects of them which have not been satisfactorily explored. Firstly, the exact distinction between code-switching and borrowing, and secondly, that of code-switching in children.

Many researchers state that the difference between code-switching and borrowing lies in phonology: borrowings from another language assimilate to the phonology of the language in which they have been inserted. Whilst this may be a necessary distinction of borrowing, it may not be sufficient to distinguish it from code-switching. This has led to many researchers to propose that a key difference between code-switching and borrowing is that the former is subject to a set of constraints, though these differ greatly between theories.

Code-switching behaviour of young bilingual children is ideal for testing the validity of these theories: many researchers argue that there is a developmental aspect to constraints acting upon children's code-switching, which provides valuable insight into the nature of bilingual language acquisition.

The aim of this thesis is therefore to answer two crucial questions. Firstly, if there does indeed exist a developmental aspect to constraints acting on children's code-switching, and, secondly, what bilingual children's code-switching can reveal about multiple language use, particularly with regards to bilingual language acquisition.

Keywords

bilingualism, language acquisition, code-switch, borrowing, constraint

Résumé et mots clés

Le code-switch et les emprunts sont tous les deux des phénomènes linguistiques très courants parmi les communautés multilingues. Malgré le fait qu'il y ait eu beaucoup de recherche à propos de ces phénomènes, il existe deux aspects qui n'ont pas été explorés de manière satisfaisante. Premièrement, la distinction exacte entre le code-switch et l'emprunt, et, deuxièmement, le code-switch parmi les enfants.

Plusieurs chercheurs proposent que la différence entre le code-switch et l'emprunt existe dans la phonologie : les emprunts d'une langue à une autre subissent des assimilations phonologiques selon la langue de cible. Si celle-ci est une distinction nécessaire des emprunts, cela ne veut pas dire qu'il est suffisant pour les distinguer du code-switch. Ceci amène plusieurs chercheurs à postuler que la différence cruciale entre le code-switch et l'emprunt est que ce premier est soumis à un ensemble de contraintes. Toutefois, la nature de ces contraintes varie beaucoup parmi les théories.

Le code-switch dans les locuteurs bilingues jeunes est un outil idéal pour tester la validité des théories proposées : plusieurs chercheurs proposent qu'il existe un aspect développemental de ces contraintes, qui informe de manière importante sur la nature de l'acquisition du langage bilingue.

La cible de ce travail est de répondre à deux questions cruciales. Tout d'abord, s'il existe bel et bien un aspect développemental des contraintes concernant le code-switch, et, deuxièmement, comment le code-switch des enfants peut informer sur l'usage de langues multiples, particulièrement concernant l'acquisition du langage bilingue.

Mots clés

le bilinguisme, l'acquisition du langage, le code-switch, l'emprunt, la contrainte

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List of abbreviations & terms

ML	-	Matrix Language
EL	-	Embedded Language
NP	-	Noun Phrase
VP	-	Verb Phrase
V	-	Verbal Head
L^q	-	L carrier with index q
Op	-	Null Operator
MLU	-	Mean Length of Utterance
MMU	-	Multi-morphemic Utterance
SM	-	System Morpheme
SMP	-	System Morpheme Principle
MOP	-	Morpheme Order Principle
IECS	-	Intracranial Electrical Cortical Stimulation
PET	-	Positron Emission Tomography
fMRI	-	functional Magnetic Resonance Imaging
ERP	-	Event Related Potentials
ART	-	Article
GER	-	Gerund

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1. Introduction

Code-switching and borrowing are both linguistic phenomena which are highly common in multilingual communities. Whilst much research has been carried out on these phenomena, there are two aspects of them which have not been satisfactorily explored. Firstly, the exact distinction between code-switching and borrowing, and secondly, that of code-switching in children.

Many researchers state that the difference between code-switching and borrowing lies in phonology (di Sciullo et al., 1986; Poplack, Sankoff & Miller, 1988): borrowings from another language assimilate to the phonology of the language in which they have been inserted. Whilst this may be a necessary distinction of borrowing, it may not be sufficient to distinguish it from code-switching. Indeed, many items which are the subjects of code-switching bear inflections belonging to the language into which they have been inserted. This has led many researchers to propose that a key difference between code-switching and borrowing is that the former is subject to a set of constraints. What these constraints may be differs greatly between theories. Certain linguists posit that the use of code-switching is guided by a specific set of constraints, which is unique to the language in question and forms part of the speaker's linguistic competence (Pfaff, 1979). Others, such as Myers-Scotton (1993), propose that code-switching is rule-governed, and therefore takes place in the S-Structure, as part of syntax. As such, under this model of code-switching, constraints for code-switching structures are seen as universal.

In order to reach a solid conclusion regarding the relationship and distinctions between code-switching and borrowing, it is necessary to explore these theories and test their applications to known instances and uses of code-switching. This thesis will further explore the validity of claims of unique sets of constraints governing code-switching in specific languages against a theory of a unified system of constraints governing code-switching at a

deeper level. In order to do so, this thesis will not engage in new empirical study, but will evaluate criteria assigned to this linguistic behaviour using secondary data from previous studies.

The second aspect of code-switching to be explored is that of code-switching in children. Code-switching in young bilingual speakers is an ideal tool for testing the validity of the theories proposed behind code-switching. Many of these theories posit that constraints are subject to developmental change. Meisel (1994) proposes a *grammatical deficiency hypothesis*, in which there exists a stage where children's utterances are not constrained by linguistic principles, because they are not yet complex enough for rules to apply¹. Similarly, many researchers propose that there is a *unitary language system hypothesis* (Swain, 1972; Leopold, 1978), which suggests that bilingual children's underlying representations of their two languages are not differentiated, and that they therefore use items from both languages indiscriminately and randomly. This concept is central to this thesis, as it is this opposition which is to be explored in later sections: are children's underlying representations differentiated or uniform? Whilst the *unitary language system hypothesis* held sway in earlier studies, more recent studies offer evidence to suggest that the reality may be more nuanced (§6).

Other researchers propose that language dominance plays an important role in bilingual children's code-switching (Fantini, 1978; Lindholm & Padilla, 1978), and that they use code-switching to fill in gaps in their knowledge of the grammar of their less dominant language, with the equivalent lexical item in their dominant language.

This thesis will explore the issues surrounding code-switching in bilingual children's language use for two crucial reasons. Firstly, if indeed there does exist a developmental

¹ Meisel, 1994: "bilingual children are sensitive to the adult rules of code combination in sentences only when they produce sentences of sufficient grammatical complexity for the rules to apply."

aspect to constraints regarding code-switching, exploring children's use of code-switching provides important information regarding language acquisition, and the acquisition of these constraints. Secondly, observation of bilingual children's use of code-switching seems to provide counterevidence of a deficiency in constraints in early childhood. Indeed, several studies have suggested that the emergence of structural constraints happens at an early stage (Genesee, Nicoladis & Paradis, 1995; Reyes, 2004; Paradis, Nicoladis & Genesee, 2000; Genesee, Boivin & Nicoladis, 1996). Whilst these studies show that children's use of code-switching is necessarily different from that of adults, they suggest that they are able to differentiate between their two languages from an early age, and therefore, that the underlying representation of these languages is more differentiated than proposed in many theories regarding the constraints involved in code-switching. Therefore, the key question of this thesis is whether, despite bilingual children's different behaviour, they respect the constraints of code-switching as observed in adult speakers.

In order to answer this research question, at the heart of this thesis, the following steps are necessary. Firstly, it is necessary to differentiate code-switching and borrowing in a meaningful way, in order to exclude from the discussion all instances of borrowing. Secondly, it is necessary to discuss the theories surrounding the constraints of code-switching in detail, with a particular focus on opposing theories regarding the universality of these constraints. The first section of the thesis will conclude in a discussion as to the different types of code-switching used by adult speakers, in order to provide a categorised framework of different types of code-switching in use, as well as to test the validity of the theories explored.

The use of constraints will further be assessed against bilingual children's use of code-switching, in order to ascertain whether there is a developmental aspect to these constraints. Relevant data for this evaluation is drawn from secondary data from previous

studies. The conclusions from these analyses will support discussion regarding important perspectives on theories of language acquisition.

2. The difference between code-switching and borrowing

The difference between code-switching and borrowing has long been a debate in the linguistic community, for many reasons. For a long time, code-switching was seen as random, indiscriminate use of two languages, largely due to a lack of proficiency, or even confusion between two grammars. Secondly, the difference between code-switching and borrowing is far from clear-cut: both are multilanguage phenomena, both involve the insertion of an item from one language into another within a conversational turn. The differences between them are nuanced, but studies into code-switching are crucial, as they inform greatly on the coexistence of multiple grammars in bilingual speakers.

Nevertheless, there are instances where this difference is clear-cut, and speakers can agree unanimously on what is a code-switch and what is a borrowing. This example from Toribio (2001) is a clear illustration of English-Spanish codeswitching:

Por la noche, los siete enanitos found her on the ground, seemingly dead.
At night, the seven dwarves found her on the ground, seemingly dead.

Here, it is clear that there are two codes involved: the contrast is particularly stark in this example, where the code changes in the middle of a clause, between a subject and verb. As for borrowing, there are equally cases where it is clear that a speaker is not engaging in codeswitching, but rather, in borrowing, such as in the following example, in English:

Helping people was his *raison d'être*.

Here, it is clear that *raison d'être* is not a word that originated in the English language, and that it has been borrowed from French. It is also clear that speakers agree that it is a borrowed word. But what exactly differentiates it from an instance of code-switching? It is the fact that it consists of one lexical item as opposed to an entire suite of them? Is it the degree to which it has been phonologically integrated into the target language? Is it the difference in mental representation of grammars of the speaker?

The theoretical implications for this are important, for there is still a strong debate pertaining to the mental representation of multiple grammars in bilingual speakers. This has given rise to a strong debate on the existence of structural constraints on code-switching, and whether code-switching exists within a framework of rules and principles. Studies on adult speaker's linguistic activity have been informative, but have left many questions without an entirely satisfactory answer: is there a social aspect to code-switching?; are there structural constraints acting on code-switching?; are these constraints universal?

In observing children's multi-language use, it is possible to speculate further as to the answers to these questions. If there are constraints in effect, these should be observable even from early language use. If so, are these observed generally, across many speakers? In observing children's use of language, the theoretical implications are vast. If these constraints are observable from a young age, this does much to inform on theories of language acquisition. If bilingual children do engage in code-switching, is it random and indiscriminate, suggesting that at least in early childhood, there is a singular representation of grammar in the mental lexicon?

These questions are crucial for informing further on code-switching and multilanguage use. Therefore, this thesis will explore the theoretical implications of children's code-switching by first establishing the difference between code-switching and

borrowing, followed by an analysis of possible structural, and social constraints. Finally, these constraints will be tested against data from studies observing young bilingual children's code-switching.

Both code-switching and borrowing are extremely prolific terms in any conversation centring around multilingual communities. Indeed, on first inspection, the two terms seem to describe identical phenomena. Both, for example, refer to a speaker of a given language inputting a lexical item which ostensibly belongs to another (certain theories describe the former as a *matrix language*, or ML, and the latter as an *embedded language*, or EL²). However, the two differ significantly, both in terms of their respective levels of linguistic integration into the target language, and in terms of speakers' attitudes towards them.

Borrowings, for example, are often the objects of distinct scrutiny of speakers of a given language. Whilst these characteristics will be discussed in §2, for this thesis, the importance lies in their linguistic differences. For the sake of the discussion of code-switching and its associated theories, constraints and uses (in both adult and young bilingual speakers), it is necessary first to attempt to define clearly the difference between code-switching and borrowing, so as to exclude borrowing from these analyses.

Whilst bilingual speakers often engage in both borrowing and code-switching, borrowing, by nature, is a phenomenon which is common in monolingual speakers also, as they, in order to be classed as a borrowing, generally must belong to the lexicon of a given linguistic community.

2.1 What is borrowing?

How, then, does borrowing differ from code-switching? The question is notoriously difficult to answer, not in the least because of the variety of conflicting theories and definitions which

² These terms fall under the remit of Myers-Scotton's *Matrix language frame model* (Myers-Scotton, 1993)

abound. One important difference is that borrowing constitutes one word. This difference on the surface seems to be simple, but it is not a satisfactory difference in and of itself, because whilst borrowing constitutes one word, and code-switching often constitutes longer utterances, this is not necessarily the case – code-switching may occur with just one word as well. Because borrowing is so unique to the lexical inventory of a given language community, two natural phenomena occur.

Firstly, this aspect of borrowing has given rise to a number of different types (§2), as well as different linguistic behaviours surrounding borrowings. In certain communities, whether a word is regarded as a borrowing may simply lie in how long it has been established in the target language, and therefore, whether it is recognised as a foreign word (i.e., it is a case of integration: it may be that the borrowed word has replaced a word in the matrix lexicon entirely, in which case it may no longer be recognised as a borrowed word). In others, particularly in multilingual communities, such as French-speaking communities in the province of Ontario, Canada, it may be a case of how linguistically assimilated into the languages words have become, or indeed, whether speakers broadly accept them as unmarked lexical items (Poplack, Sankoff & Miller, 1988: §2).

Integration is not an absolute parameter for borrowing, however. It is very possible that the pronunciation of a lexical item taken from another language may vary, yet its status as a borrowing or as a code-switched item does not change. There are numerous factors governing this, as code-switching is nuanced and innately socially motivated. It may depend on the availability of an alternative phrase in the target language, or the register or familiarity the speaker maintains with the interlocutor. Before continuing a discussion as to the exact nature of borrowing, therefore, it is necessary to highlight the various types of borrowings to be included.

2.2 Types of borrowing

It is important to note that whilst many types of borrowing exist, the distinctions between these types are not concrete, and often become a matter of individual analysis of each word in its context. Haugen (1950) identified three types of borrowings. This theory categorises borrowings according to two axes, one of importation and one of substitution. *Importation* refers to structures that have been taken from a source language and directly input into a target language, i.e., where no translation or morphemic integration has taken place.

Substitution refers to the degree to which structures have been modified in order to assimilate into the target language. The three types of borrowing are as follows:

Loan words: these constitute a one-to-one mapping of sense and form: that is to say, that there has been importation without substitution:

e.g. le shopping

Loan shifts: these refer broadly to foreign terms which have been translated into the target language with the same semantic value, i.e., that there has been substitution without importation:

e.g. der Wolkenkratzer (German)

ART cloud – scraper

‘skyscraper’

Loan blends: also known as hybrids, they refer to borrowings which mix elements of both target and source language. As such, there has been some degree of both importation and substitution, in which a word from the source language retains some of its semantic and morphological form, but assimilates to the form of the target language:

e.g. le baby-foot

These categories are very useful, because they highlight the depth of usage of borrowing, and begin to exemplify how they differ from code-switching. Whilst code-switching constitutes the use of two languages, or codes, within the same utterance (whether there exist constraints on this switching or not), borrowing exists as a mapping of form, meaning, or both, into a target language, which then in and of itself constitutes a lexical item in the inventory of that language. Nevertheless, these categories are broad and require further nuance.

Ayres-Bennett & Carruthers (2001) identify further categories regarding borrowings from English into French:

Straight borrowings, in which both meaning and form are input into the target language, similar to Haugen's *loan words*

e.g. le whisky

Pseudo-anglicisms, which refer to words which retain the English form, but correspond to a different usage. Here, whilst the word appears to be an anglicism, and uses lexical items that belong to English, its usage does not exist in English:

e.g. le tennisman

Translations, where the meaning and form from the source language have simply been translated into the target language

e.g. la science-fiction

Whilst these categories are helpful for describing the situation for borrowings between English and French, they do not necessarily account for a number of other contexts, nor do they account for dialectal differences.

2.3 Integration of borrowings

Much work on the distinction between code-switching and borrowing has centred on the degree to which lexical items from the source language have been integrated into the target language (Poplack, 1980; Bentahila & Davies, 1983; Poplack & Sankoff, 1984; Treffers-Daller, 2000), both phonologically and semantically. At least in early research, the degree of integration constituted a distinctive characteristic between code-switching a borrowing, and analyses reflected this accordingly.

2.4 Phonological integration

In almost any case of a transfer from one language to another, there cannot be a strict equivalency between the sounds that exist in the target and source languages. As researchers argue, both code-switching and borrowing manifest when two different language systems come into contact (Treffers-Daller, 1991; Myers-Scotton, 1992; Ayres-Bennett & Carruthers, 2001), and therefore, the nearest phones in the target language are employed.

For some, the process of phonological integration marks the difference between code-switching and borrowing. Poplack (1980) was an analysis of the speech of 20 Puerto Rican members of a bilingual community with varying degrees of bilingual language proficiency. On the observation that proficient bilingual speakers were capable of pronouncing ambiguous lexical items with both English and Spanish phonological patterns, this was analysed as a distinction between utterances containing an example of code-switching, and monolingual Spanish utterances.

In this sense, phonological integration is seen as a feature unique to borrowing. Code-switched items and structures do not undergo phonological assimilation, whereas borrowing

may involve a process of phonological bleaching, often to the point that the word is no longer recognisable as a loan word. It is important to note, however, that phonological assimilation is highly variable, and depends greatly on the individual speaker, where they are from, their dialect, and with whom they are speaking. As such, many borrowed words undergo no phonological assimilation, and code-switched items may, in certain contexts, with certain speakers, undergo some sort of assimilation.

This distinction is therefore disputed. For some, the distinction between code-switching and borrowing is arguably non-existent, in that they bear far more similarities than differences, and that, regardless of surface distinctions, they are not the results of distinct processes (Treffers-Daller, 1991; Myers-Scotton, 1992). Indeed, for Myers-Scotton (1992), within her proposed framework of constraints on code-switching (the *Matrix language frame model*), there is little distinction between the two³. She further argues that phonological integration is a problematic criterion for distinction for two reasons.

Firstly, whilst many borrowings display phonological integration, it is not a uniform process, and there may be socio-linguistic factors at work. She argues that there may be a process of ‘elite closure’ at work (Myers-Scotton, 1992), in which borrowing from a source language of greater prestige than the target language will be less likely to incur phonological integration.

Secondly, the process of phonological integration cannot inherently be uniform. As a process of equivalency, speakers may strive to map similar phones in the target language to those of the source language, but where the languages differ greatly, this is not possible.

³ “There is little reason to differentiate the two forms as *processes*, that is, either in terms of their derivations *or* the ML morphosyntactic processes they undergo for surface realisations.” (Myers-Scotton, 1992)

2.5 How can borrowing be excluded from these analyses?

For the present discussion, borrowing will be excluded from analysis. At the heart of the matter are structural constraints on code-switching, which will be the focus of discussion. Here code-switching is considered to be innately socially motivated, and it is a pragmatic tool for bilingual speakers for maintaining language boundaries, for conveying extralinguistic information, or for facilitating comprehension. Borrowings, on the other hand, are items which have been adopted into the target language, and which are part of the shared lexicon of a given speech community. As such, monolingual speakers frequently engage in the use of borrowings (often without intention), whereas code-switching is reserved for speakers with proficiency in multiple languages. Phonological assimilation often appears alongside these differences, as it is usually related to the proficiency of the speaker. It is not, however, a viable criterion for the distinction between borrowing and code-switching, as both phenomena vary widely between individual speakers regarding assimilation.

2.6 Code-switching vs. borrowing

If the extent to which an item has assimilated grammatically (that is to say, phonologically, morphologically, syntactically or morphosyntactically) is not a sufficient criterion to distinguish code-switching and borrowing, what parameters are? The debate has been alive and well for decades, and no one theory seems wholly acceptable. It is clear that assimilation, whilst not in and of itself a sufficient criterion, is nevertheless a useful tool in the indication of borrowings, hence the confusion. It is true that many borrowings are phonologically assimilated, though this is not uniform across different speech communities, or even in the speech of individual speakers.

An interesting comparison is that between single-word code-switches and borrowings. Poplack (2012) suggests that there is indeed a grammatical indication of borrowings, and specifically uses the case of borrowings as opposed to single-word code-switches.

Specifically, it is suggested that morphosyntactic assimilation is a strong indicator that an item is a borrowing from another language. Morphosyntactic integration refers to lexical items that are adopted into another language displaying characteristics that suggest that the lexical item in question has integrated into the morphology or syntax of that language. Examples of this include integrated items from one language adopting subject-verb agreement affixation or tense marking. In this sense, the verb *switcher* in French is classed as a borrowing, rather than an instance of code-switching, as it displays morphosyntactic integration when employed in speech..

It must be acknowledged that the distinction between code-switching and borrowing is not purely a question of grammar. Recent studies in both active language usage (Janurik, 2009) and historical lexicography (Pinnavaia, 2001) suggest that there is a strong link between social motivations for borrowings and predicting where they will occur. Janurik (2009) is a comprehensive analysis of English borrowings in Russian, and cites several factors which motivate them. These factors include not only the grammatical: lack of semantic equivalent; phonology; and even transliteration in languages in which alphabets differ, but also the social. It is important to acknowledge that, like code-switching, borrowings are linked to social cues. English loanwords are popular among younger Russian speakers due to the frequency with which advertising employs English marketing technology, affording these borrowings a prestige status. Similarly, Pinnavaia (2001) notes that many Italian borrowings that exist in the Oxford English Dictionary hail from the heyday of Italy's social dominance in Europe, affording these borrowings prestige status for English speakers. As such, it is important to acknowledge that whilst grammatical features are helpful indicators for the distinction between borrowings and examples of code-switching, the social aspect is crucial.

In studies on Ontarian French, Mougeon, Beniak & Valois (1985) recognise that

prevalence of borrowings is higher in communities with higher levels of language contact. As such, lexicons of two languages may converge in these areas, meaning that borrowings from one language (typically the majority language) will find their way into the lexicon of the other. Taking this stance, therefore, it is no longer a question of grammar, but rather one of usage. In communities where the use of one item replaces the use of another, that is to say, the borrowing becomes part of the lexicon of that language, it is a case of borrowing, regardless of the level of phonological, morphosyntactic or semantic assimilation. It is therefore a question of integration rather than assimilation, which is the key difference between borrowings and code-switches. Examples of code-switching are not integrated into the lexicon of another language, but rather instances of two codes within the same utterance.

2.7 What is code-switching?

On the face of it, this seems like a simple question with a simple answer. Code-switching, or code-mixing, is the use of items, or combinations of items, belonging to two (or more) languages within the same utterance, or conversation. This type of linguistic behaviour, like borrowing, is particularly prevalent in multi-language communities, and is common among bilingual speakers in multilanguage environments of a range of ages (§3). However, as to whether code-switching engenders a process which is distinct from that of borrowing, there seems to be at least two distinctions which overtly distinguish code-switching.

2.8 The social function of code-switching

Code-switching, as opposed to borrowing, appears to have an overtly social role (Poplack, Sankoff & Miller, 1988; Myers-Scotton, 1992; Reyes, 2004). Many researchers argue that code-switching's primary function is that of a tool for negotiation in interactions. Myers-Scotton (1988) dubs this the *Negotiation Principle*⁴, in which interlocutors in a given

⁴ This principle capitalises on the proposed social aspect of code-switching. In any given speech event, each interlocutor has a choice between an unmarked or marked variant. As such, speakers switch between the two

conversation may structure their speech and exploit a set of maxims which allow implications to be plainly understood. Indeed, this type of linguistic behaviour may be used to facilitate or verify comprehension (Reyes, 2004), even from a young age (Genesee, Boivin, Nicoladis, 1996), or as an index for understanding one's role and perception of self with a given interlocutor (Myers-Scotton, 1992). In this sense, codeswitching is viewed as a pragmatic tool in order to interact with interlocutors more efficiently. As such, bilingual participants in conversation engage in negotiation with one another, switching between marked (or unconventional) linguistic variants and unmarked (uncontroversial) language in order to understand how best to communicate with one another.

This tool is useful for a variety of social reasons, notably in order to signal identification with a particular linguistic or ethnic community. In Berlin, an area of Germany with a large Turkish community, a dialect of German, *Kiezdeutsch*, is frequently spoken among the Turkish and North-African communities, and speakers frequently engage in code-switching between Standard German and *Kiezdeutsch* in order to signal that they belong to a specific community. Likewise, many studies have touched on code-switching in African American communities in the USA (DeBose, 2010; Hill, 2011; Wheeler, 2008), in which students from dialectally diverse backgrounds engage in code-switching between dialects in schools.

Further, code-switching is used as a tool for the maintenance and manipulation of language boundaries, which is unique to code-switching. Musk (2010), analysing the use of Welsh and English in bilingual school environments, distinguishes both unmarked code-*mixing* and marked code-*switching*⁵, the latter of which is often used to metalinguistically

(also dubbed the matrix language and embedded language respectively), negotiating between variants in order to convey implications of speech events. In any given event, the unmarked choice is considered to be the norm.

⁵ Musk (2010) distinguishes between code-mixing, which is unmarked, and code-switching, which is marked. The former is *insertional*, in that items from code are inserted or embedded into the another. The latter is distinguished as the *alternation* between two codes, adding additional meaning.

distinguish between two languages, and therefore to maintain the language boundary between the two languages. Musk's goal in this study was to examine informal use of language in Welsh-English bilingual adolescents to determine whether the maintenance of boundaries was implicit or explicit, and whether speakers were consciously using language mixing as a pragmatic tool.

These functions are, by and large, not possible for borrowing. Whilst it is possible to use a borrowed word to signify a sociolinguistic function (the language of middle-class British English speakers is peppered with borrowings from French, for example), it is far more limited. Musk's (2010) theory requires the ability to produce entire utterances in alternation between two languages as a defining feature of code-switching. Borrowing, in this sense, is rarely used to create language boundaries, as it is in multilingual communities that engage in code-switching.

3. Theories of code-switching

3.1 Why is it not clear-cut?

Having established the distinctions between code-switching and borrowing, two things become clear. Firstly, though they remain distinct in terms of their phonological, morphosyntactic and semantic integration, as well as their functions in discourse, there is little consensus on what distinguishes code-switching and borrowing on other levels. Whilst some argue that the two phenomena engage different neurological processes (Pfaff, 1979; Poplack, 1980), for example, it may also be argued that they exist on either end of the same spectrum; that they engage the same processes (that is to say, they are not necessarily distinct on a neurolinguistic level), but that they are indeed different in terms of their grammatical and social functions (Treffers-Daller, 1991; Myers-Scotton, 1992). Indeed, the anatomical organisation of the brain of bilingual speakers is contentious among researchers: whilst many studies have reliably shown that certain areas of the brain are different in bilingual speakers,

displaying increased grey matter density in the left inferior parietal cortex (Kutas, Moreno & Wicha, 2009), studies involving a variety of methods (IECS, PET, fMRI, ERP) have provided mixed results.

Secondly, whilst a distinction may be drawn between the two, this is by no-means clear-cut, and there is a great deal of overlap both between code-switching and borrowing. This is not surprising, given that there are many variables surrounding the speech of members of multilingual communities. Speakers' language use is idiosyncratic, regardless of linguistic conventions within a given community; bilingual speakers' mastery of, or preference for, either of their two languages is not uniform, and many bilingual speakers have a dominant language; code-switching is not always used in the same ways, which can make it difficult to pinpoint its exact function in discourse.

This has led to a great deal of discussion regarding the processes at work in code-switching, particularly regarding the grammatical processes at work. This discussion has centred around the notion of *constraints*⁶, though, once again, there is little consensus on the matter. Certain researchers argue for an almost purely syntactic model (di Sciullo et al., 1986; Bentahila & Davies, 1992), whilst some argue that whilst code-switching is rule-generated, there is both a grammatical and socio-pragmatic axis (Myers-Scotton, 1992; Milroy & Muysken, 1995; Grosjean, 1997). Further, earlier theories proposed that code-switching is guided by specific sets of constraints, unique to the languages in question and relating to a given speakers' competence (Pfaff, 1979; Poplack, 1980), whilst others posit a unified model of constraints, universal to all languages (Myers-Scotton, 1992). Indeed, there are also researchers who provide counterexamples for constraints relating to code-switching (Clyne,

⁶ *Constraints* refers to the notion that speaker's use of code-switching is not random and indiscriminate, but rather subject to grammatical or social rules, or a combination of the two.

1987; Romaine, 1989). Given the depth of discussion pertaining to the notion of constraints, it is necessary to briefly summarise its motivations and provide examples.

3.2 The notion of constraints

The notion of constraints has arisen from several general observations of language mixing, though it has not always existed in the literature on code-switching. Earlier studies proposed that whilst there were contexts in which code-mixing is more likely, it was overall random (Labov, 1972; Lance, 1975). However, more recent studies have moved towards a view that code-switching is largely rule-governed. As Poplack (2001) acknowledges, whilst mixing may occur at any level of linguistic structure, incompatibilities often manifest where there are word-order differences, different grammatical categories or morphologies, among other contexts. The pervading view is that the mechanisms which allow non-deviant code-mixing in these contexts are governed by constraints.

It is important, however, to approach the notion of constraints critically. Clearly, code-switching is not random or indiscriminate – if there are contexts in which code-switching is more likely, there is, by definition, a set of contexts where it is permissible. However, the notion of constraints must be applied with caution: much study on code-switching has been carried out on languages which are typologically very similar, and this has spawned constraints which do not necessarily reflect all interfaces between languages. Moreover, it is crucial that a rule-governed approach does not eclipse the socio-pragmatic aspect of code-switching. Studies have clearly shown that multi-language use is subject to a range of social parameters as well: the extent to which a word is entrenched in the target language may decide how marked a choice it is; the register used in the current interaction; one speaker's familiarity with the other, and so on.

Rule-based constraints are nevertheless extremely helpful. They capture the syntactic nature of code-switching and the interface between two languages. It is clear, even from early

constraints, that there are restrictions on code-switching, whether they are language-specific or universal (§3). They capture this aspect of code-switching and highlight the areas in grammatical structure that are able to accommodate code-switching and those where it is unlikely.

It is therefore important to approach the notion of constraints as a nuanced aspect of code-switching, with both a grammatical and a social aspect.

3.3 The grammatical aspect

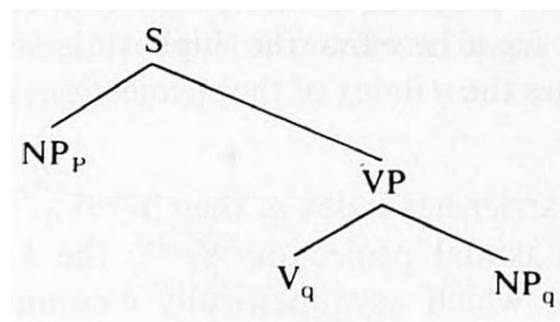
Among the theories surrounding code-switching, there has been the undisputed observation that it is, to some extent, grammatically (i.e. structurally) constrained. Some researchers argue that it is almost entirely grammatically constrained (Bentahila & Davies, 1992), while others argue that other functions interact with the grammatical constraints governing code-switching (§3).

The grammatical constraints governing code-switching have been clearly laid out in di Sciullo et al. (1986), who identified a *government constraint* on code-switching. Whilst this theory relies heavily on the implication that constituents of sentences in a given language exist within a specified structural relationship, it is essentially a theory which is grounded in terms of lexicon rather than phrase structure. That is to say, it is a theory which accounts for the fact that code-switching is constrained by structural relations between items which may or may not belong to the same lexicon. Di Sciullo et al. observe, for example, that switching may occur between subjects and verbs, but the same switching is less likely between verbs and their objects. In this sense, it is possible to surmise that elements in a certain type of relationship must necessarily belong to the same lexicon and switching in these contexts is not permissible.

The theory states that when two items belong to the same lexicon, they are co-indexed, belonging to the same language index, of which the matrix language is labelled q .

This capitalises on the structural dependencies that exist within a sentence, relying heavily on the notion of government. Broadly, an element in the structure must bear the same language index as the element which directly governs it (i.e., it must belong to the same lexicon).

If this is the case, however, how does the theory account for the asymmetry between subjects and verbs compared to that of verbs and their objects? As the below schema shows, the second NP is dominated by VP, which bears a different language index to the first NP, because it is not directly governed by NP.



Graphic 1. An illustration of the government constraint (di Sciullo et al., 1986)

Here, di Sciullo et al. refer to the notion of *L carrier*. According to this theory, only the maximal projection of a category is required to bear the same language index as its governor. As such, language indices are assigned, not to chains, as is the uncontroversial custom, but to individual lexical items. In this case, in the above schema, NP must bear the language index *q*, as assigned by the VP, because it is the maximal projection of N, i.e., it is the *L carrier* of that projection. As such, the constituents governed by VP are free to bear a different language index to the first NP_p, because it does not govern them. Where items bearing the same language index must belong to the same lexicon, this allows V_q to bear a different language index to NP_p, as there is no relationship of government between them.

The notion of *language index* indicates words which belong to a specific lexicon. Therefore, two words drawn from the same lexicon bear the same language index. This therefore accounts for the asymmetry in the relationship between subjects and verbs and that

of verbs and objects.

This is an example of how the theory specifically targets individual lexical items rather than chains or whole structures. The *language index* stipulation indicates that they may only be assigned to individual items. Plainly said, di Sciullo proposes that if one item governs another, and that they therefore have the same *language index*, code-switching between the two items is not permissible. This grammatical aspect of code-switching is broadly acknowledged, and corresponds to observations of several researchers (Pfaff, 1979; Sankoff & Poplack, 1981) that there are certain phrase boundaries and contexts in which code-switching is more likely, such as the boundary between determiner and noun.

This theory is not without compromise, however. In order for the theory to account for a broad range of code-switching examples, language indexation must take place at surface structure, and not in the deep structure, which is counterintuitive for a theory based on grammar, and is therefore an important difficulty for this theory. This is to account for certain relative structures, specifically, relativized direct object complements.

L'échantillon [che fanno e...]

The sample that [they] create is...

In this example taken from di Sciullo et al., it is clear why. The subject of the sentence, *l'échantillon*, is also the direct object of the verb *fare* (to create). As such, there is a null operator (Op^7) in the structure, a phonologically empty element which acts as the direct object of the verb *fare* in deep structure. However, whilst Op , and not the subject *l'échantillon* is in a relationship of c-command with the verb, it is not possible for it to

⁷ A null operator, a phonologically empty element, is introduced in generative syntax in order to account for certain relativized constructions. In those in which the direct object of a verb has been relativized to a sentence-initial position, Op is introduced in order to account for the lack of direct object, required syntactically by the verb. As such, an abridged structure of the above sentence (including language indices) is as follows:

L'échantillon^p [che Op fanno Θ_p e...]^q

receive a language index, which is specifically required in the theory. Here, then, language indication must occur at S-Structure to allow for the difference in lexicon.

The *language index* government constraint is extremely useful in describing code-switching in European languages, and the interface of two similar grammars. However, as Toribio (2001; 2017) acknowledges, when two starkly differing grammars interact, the contexts in which code-switching is permissible is a more difficult to determine.

There are certain scenarios in which there is little or no structural equivalency available, due to the differences between two languages. Between European languages, there are common boundaries for code-switching, including subject/predicate boundaries, and verb/object boundaries. Likewise, there are contexts which tend to lead to ungrammatical code-switching, such as between auxiliary and main verb, and negation markers and main verbs. Code-switching is idiosyncratic, however, and these boundaries may, at best, only be *tendencies*⁸.

This is an important distinction. Code-switching, theoretically, is permissible in the interface between any two languages, regardless of the proficiency of the speaker and the language combination. The government constraint hypothesis, and indeed, any hypothesis relating uniquely to grammar, is therefore insufficient and limited. Grammar must inform a successful theory – it must do so, in order to capture the broad structural tendencies observed throughout the study of code-switching – but it cannot depend solely on a syntactic reasoning. Certain interactions between languages may lead to utterances which seem to violate the grammar of both languages in question in order to allow the code-switch⁹, but they nevertheless occur. This is illustrated in the following counterexample of French-Arabic mixing (Toribio, 2017):

⁸ Toribio (2017) acknowledges that there is a systematic methodology problem relating to code-switching data: “controlled elicitation of code-switching judgements...may prompt reactions that relate more to language ideologies than to the baseline i-language data sought”.

⁹ Toribio (2017) dubs these *compromises*.

Cette	xubza	had	le	pain
FEM	FEM		MASC	MASC
<i>This</i>	<i>bread</i>	This		bread

Here, in order to facilitate a code-switch, the speaker appears to have violated the grammar of both French and Arabic, due to the fact that *pain* is masculine in French, and *xubza* is feminine in Arabic. In order to allow the switch, the speaker has had to use the incorrect demonstrative pronoun *cette*, despite bread being masculine in French.

Therefore, whilst theories that are underpinned by grammar, and in particular, syntax, are crucial for informing ideologies on code-switching constraints, it is crucial that constraints are not solely based on grammar, but rather acknowledge the rather complex *i-language* of individual speakers, and the socio-pragmatic motivations for multilanguage use.

3.4 The Social Aspect

Whilst strong evidence exists that there is an underlying grammatical structure to code-switching, with associated grammatical constraints, both earlier and more recent research have done much to show that engaging in code-switching is almost always socially motivated (Gumperz & Hernandez-Chavez, 1971; Poplack, 1981; Gumperz, 1982; Pfaff, 1979; Poplack, 2001). Bilingual communities of a variety of ages may engage in code-switching for a variety of social reasons, either to blur or maintain language boundaries (Musk, 2010), or to facilitate communication (Myers-Scotton, 1988). Indeed, Scotton (1983) cites that an overarching principle governing the use of code-switching is the *negotiation principle*, which “directs the speaker to choose the form of your conversational contribution such that it symbolises the set of rights and obligations which you wish to be in force between speaker and addressee for the current exchange”.

As such, speakers use code-switching as a means to convey extralinguistic information, about self-identification, to convey solidarity, or even to maintain a social

boundary between speaker and addressee.

This notion is helpful, insofar as it captures the innate social aspect of code-switching. Whilst code-switching is, by and large, structurally constrained, its primary function is social. This emphasis on the social nature of code-switching implies, as a natural corollary, that markedness is an innate aspect of multilanguage use. Only if a code choice is marked or unmarked relative to another choice can it take part in a linguistic negotiation. This aspect of markedness and negotiation is crucial, and must be explored in any theory relating to code-switching constraints.

This notion of negotiation is supported in studies involving bilingual adults and younger speakers. In Musk (2010), Welsh speakers of school age use code-switching to give emphasis to a phrase, or to reiterate, to maintain the language boundary.

Like with the purely grammatical theories for code-switching constraints, it is important to approach these social motivations for code-switching with caution. Having observed the structural tendencies for code-switching, it is clear that there are broad trends for contexts in which it is permissible, regardless of social motivations. This is not to say that code-switching does not happen in these contexts nonetheless: it is perfectly possible, and permissible within an individual speaker's language use, to code-switch in a variety of structural contexts. However, it is important to acknowledge both aspects of code-switching. Structural tendencies and social motivations must both play a role in a theory for code-switching constraints.

3.5 Unique constraints

It is therefore fairly unequivocal, faced with the syntactic evidence, that there exists some form of constraint in operation regarding the use of code-switching. However, it is still hotly debated whether these constraints affect languages universally, or whether individual sets of unique constraints apply to individual languages.

The broad trend throughout research regarding the relationship between constraints and code-switching is that earlier research proposed unique constraints, whilst latterly, there has been a movement towards universality.

3.6 *The equivalence constraint*

Generally speaking, the notion of unique constraints arises from observations regarding the interaction between two specific grammars (Pfaff, 1979; Sankoff & Poplack, 1981, Woodford, 1983). A prime example of this notion is that of the *equivalence constraint* (Sankoff & Poplack, 1981). This constraint states that “the order of sentence constituents immediately adjacent to and on both sides of the switch point must be grammatical with respect to both languages involved simultaneously.”¹⁰

Whilst this constraint is a general rule which applies to code-switching, the manner in which the constraint applies, and indeed, the extent to which it may apply, is governed by the specific grammars of the two languages in question. Whilst the constraint makes a general prediction, that is to say, that code-switching is more predictable when the grammars of the languages involved are more similar, in practice, it is a theory that has been developed whilst observing grammars that are very similar, such as French and Spanish, and suggests that languages must be structurally similar in order to permit code-switching. Indeed, Sankoff & Poplack state that code-switching may not be permissible between two languages with extremely different word orders because the *equivalence constraint* will not be able to apply. As we have seen, this is not always the case. In the above example from Toribio (2017), even when languages with two differing structures, such as French and Arabic interact, code-switching is observed.

Whilst Sankoff & Poplack acknowledge that this constraint precludes direct code-

¹⁰ “...the local co-grammaticality or equivalence of the two languages in the vicinity of the switch holds as long as the order of any two sentence elements, one before and one after the switch point, is not excluded in either language.” (Sankoff & Poplack, 1981).

switching in the interface between two languages with vastly differing structures, there are many counterexamples that suggest that this does not preclude code-switching entirely. As such, this theory is an example of a language-specific constraint, which applies well for European languages (such as the interface between Spanish and English), but not necessarily for other languages.

Toribio (2017) provides an example of French-Arabic code-switching:

C'est le fer qui donne... illi yi-ha:rib l'anémie

It is iron that gives... that fights anaemia

Here, the speaker begins in French, and realises they have made a mistake in using the word *donner* ('to give'), so switches to the Arabic word *ha:rib* ('to fight'). This requires repetition of the subordinating conjunction in Arabic, because the structure of Arabic will not allow its omission.

This is an example of the insufficiency of the equivalence constraint. It suggests that code-switching is not permissible where two languages' structures differ significantly. Between French and Arabic, the two languages' structures require repetition, rather than a simple insertion, in order to follow the grammar of Arabic. As such, it becomes clear that the constraint is lacking: a speaker may violate the constraint by repeating a structure, or by inserting a new structure into the switch site in order to allow the code-switch. However, the implications of the code-switch in this instance remain, and do not differ from an example in which a direct code-switch were possible.

In this way, language-specific constraints are limited, because they are formulated using data from a limited source, only focusing on a select interface between two specific grammars. This is not a problem if code-switching constraints are specific and unique to individual languages. This, however, is unsatisfactory – the observed structural tendencies in

code-switching suggest that constraints are universal, as these tendencies have been observed across a variety of languages.

3.7 The free-morpheme constraint

The free-morpheme constraint (Sankoff & Poplack, 1981) is another example of a general rule for code-switching which is concentrated on the interaction between two specific grammars.

“A switch may not occur between a bound morpheme and a lexical form¹¹ unless the latter has been phonologically integrated into the language of the bound morpheme.”

e.g. *runeando (Spanish)
run- GER
'running'

In the above example, the word is considered ungrammatical because it does not comply with the free-morpheme constraint. The morpheme 'run-' is bound, and may therefore only be switched into the structure if phonologically integrated.

This constraint is supported by Pfaff (1979), who studied code-switching in Spanish-English bilinguals (Mexican). Once again, this constraint is proposed to be a general one, that applies in all potential switching sites: however, it requires the presence of two compatible grammars, and therefore precludes switching in languages whose word orders, phonologies or morphologies may be more different than those of Spanish and English, as with the equivalence constraint.

Moreover, the constraint relies on the notion of phonological integration, which is an insufficient criterion for the categorisation of borrowings, and of multilanguage insertions. As

¹¹ Here, a bound morpheme refers to a minimal element of meaning (most often appearing as a part of a word) which is unable to appear as a free form, and must be attached to another morpheme in order to appear grammatically.

we have seen, switching is motivated by a variety of social factors, including register, familiarity with the interlocutor, and maintenance of language boundaries. The degree to which expressions and lexical items are phonologically assimilated depends on the linguistic community (Poplack, 1985; Myers-Scotton, 1988), and so it is prudent to exercise caution when using it as a parameter for permissible code-switching.

Further, these constraints broadly propose that code-switching happens at S-Structure, as proposed with the *government constraint* (di Sciullo et al., 1986). Therefore, a speaker must have a stable grammar in both languages, with no syntactic convergence. This notion, however, has been criticised by several observations. Studies observing young bilingual speakers (§6) have suggested that socially appropriate code-switching emerges in the speech of young bilinguals well before the formation of stable grammars for both of their languages. Once again, it is a constraint which is limited in that it focuses solely on structure, and does not account for the social, or nuanced aspects of code-switching.

3.8 Universal constraints

Latterly, a general agreement that there exist general constraints on code-switching has developed, due to several observations that do not align with prior notions. Firstly, the unique constraints previously proposed err towards languages with comparable grammars and word-orders. Some, however, argue that many conflicts in code-switching in languages with largely varied structures cannot be explained using constraints (Quay, 1992).

Further, many unique constraints are built on the notion that a speaker must have a stable grammar in both languages, with no syntactic convergence, in order to code-switch. Recent studies observing bilingual children have shown that they are capable of distinguishing languages, and engaging in socially appropriate code-switching from a young age, before the emergence of stable grammars (Genesee, Boivin & Nicoladis, 1996; Paradis, Nicoladis & Genesee, 2000).

These observations suggest that many of the unique constraints on code-switching proposed in the literature do not adequately account for observations of code-switching in contexts where speakers are switching between two languages with largely different structures, and in young bilingual children. These observations, therefore, help to inform the development of more general constraints.

3.9 The Matrix language frame model

In moving away from the equivalence model proposed in earlier research, researchers have sought other explanations for code-switching. One such example is the *matrix language frame model* (Myers-Scotton, 1992). This model differs from previous constraints for two reasons.

Firstly, it no longer focuses on surface features (such as the equivalence model, which requires co-ordinating surface word orders between two languages subject to code-switching), but rather proposes that constraints exist on an abstract level. Myers-Scotton proposes that constraints applying to code-switching exist on the level of the *mental lexicon*, which is a collection of *lemmas* rather than lexical items (word forms or lexemes). Myers-Scotton defines these as “bundles of semantic and syntactic information, but [which] are unspecified for phonological shape.” As such, this model reflects both the grammatical and socio-pragmatic aspects of code-switching. Here, *lemmas*, wherein reside the constraints, are selected based on pragmatic or socio-pragmatic information before insertion into the model, which subsequently processes the morphosyntactic characteristics of the item for sentence construction. At the base of the model the socio-pragmatic motivations for code-switching are represented.

Secondly, the *matrix language frame model* is much more general than earlier models,

because constraints exist generally at an abstract level, and *lemmas* are inserted into a system which applies for all languages. In the system, there are three principle constituents:

Matrix language islands: structures which are made up of morphemes belonging only to the *matrix language*¹²

Embedded language islands: structures which are made up of morphemes belonging only to the *embedded language*

Mixed matrix language and embedded language constituents: structures which either consist of a single embedded language lexeme within a structure of matrix language lexemes, or an embedded language island residing in a matrix language frame

As such, the matrix language projects the morphosyntactic frame of an utterance, including its syntax and prosodic structure. Naturally, this in turn means that the morphosyntax of mixed constituents is determined by the matrix language. Therefore, once lemmas have been selected for their pragmatic or socio-pragmatic information, they are inputted into the system and must take the form of one of these three constituents in order to construct a sentence. The model proposes further that the following two principles apply to mixed constituents:

Morpheme Order Principle: surface morpheme order must not violate that of the matrix language in mixed constituents

System Morpheme Principle: All “externally relevant” system morphemes come only from the matrix language in mixed constituents. A system morpheme is considered “externally” or “syntactically relevant” only if it takes part in agreement relationships external to its own head, such as verbal agreement with an NP subject.

¹² “The [matrix language] can be defined as the language which projects the morphosyntactic frame for the utterance in question.” (Myers-Scotton, 1992).

In this way, code-switching is authorised between any two languages regardless of differences in their sentence structure, because the model proposes that if an item of the embedded language does not conform to the surface morpheme order of the matrix language, it will either not be produced, or may be produced as an embedded language island. Therefore, unlike previous models, elements originating from a language with a sentence structure largely inconsistent with the target language are not necessarily rejected for switching.

It is furthermore highly consistent with recent research to propose that (structural) constraints on code-switching exist at an abstract level, in the mental lexicon. Observation of young bilingual children interacting in a variety of social contexts has suggested that they are able to appropriately code-switch and therefore differentiate between their two languages from a young age, before the development of a stable grammar in either or both of their languages (Genesee, Nicoladis, Paradis, 1995; Quay, 1992; Paradis, Nicoladis & Genesee, 2000). Therefore, it is suggested that structural constraints on code-switching emerge early, and that these constraints exist in the mental lexicon.

Given that the *matrix language frame model* is highly consistent with these observations, it is the model of constraints on code-switching that will be adopted for the analysis of bilingual children's code-switching (§§5-7) for comparison as to whether bilingual children obey the same constraints as bilingual adults regarding code-switching.

4. Different types of code-switching

Before beginning the discussion on observed cases of code-switching, it is necessary to first outline and specify the types of code-switching for discussion. As previously indicated, the *matrix language frame model* (Myers-Scotton, 1992) will form the model of constraints on

code-switching. As such, it is important to indicate that this model of code-switching targets largely intra-sentential code-switching, though it may be applied to others.

4.1 Types of code-switching

In terms of the structure of code-switching, there are broadly speaking three types of code-switching, in which speakers engage in switching at different boundaries in the utterance.

4.1.1 Inter-sentential code-switching

Inter-sentential code-switching occurs at the boundaries between sentences, or between clauses. In this type of code-switching, sentences consist of different structures, and there is often a prosodic boundary between the two. According to the *matrix language frame model*, the two sentences in this case would exhibit different matrix languages, and would be examples of two *matrix language* islands, as in the following example from Treffers-Daller (1992) between French and Dutch:

Nadine est née au mois d'avril en dan in de maand oktober heb ik een winkel heb ik een winkel opengedaan...
Nadine was born in April and then in October I opened a shop...

4.1.2 Intra-sentential code-switching

Intra-sentential code-switching occurs within a sentence, and may occur within one clause or within one lexical item. This corresponds to a mixed constituent in the *matrix language frame model*. This is illustrated in the following example in with Spanish and English (Poplack, 1980):

Leo un magazine
I read a magazine

4.1.3 Extra-sentential code-switching

Extra-sentential code-switching occurs on the periphery of clauses or sentences. In this switch, a tag or pragmateme from one language is inserted into an utterance of a different language. This type of code-switching corresponds to the second type of mixed constituent in the *matrix language frame model*, in which an embedded language island exists within a matrix language morphosyntactic frame. This is illustrated in the following Persian-English example (Hadei, Kumar and Jie, 2016):

It was a good performance, nae?
It was a good performance, wasn't it?

4.2 Social types of code-switching

It is important to distinguish structural types of code-switching from functions of code-switching. As many researchers agree, code-switching is almost always socially motivated (§3). It is therefore necessary to outline the varying functions of code-switching in order to distinguish them from the types of code-switching in §4. These functions may indeed overlap with the different types of code-switching previously mentioned, and may also take a different structural form.

4.3 Meta-linguistic commentary and reported speech

In bilingual communities, many speakers engage in code-switching in order to comment on speech in the language in which it was spoken. This may include instances of meta-linguistic commentary, in which speakers engage in code-switching in order to convey notions about one of the two languages spoken in the community. Similarly, in such communities, code-switching may occur where speech is reported, if one interlocutor is relaying a conversation to a speaker of one language, but the conversation took place in the other language of the community.

4.4 Expressions and proper names

In communities where speakers are fluent in two languages, code-switching is often used for efficiency in order to express certain notions which do not correspond to a single lexical item in one language. Likewise, such code-switching can occur where a proper name for a being or an organisation exists only in one language.

4.5 Exclusion from analyses

Such types of code-switching will be excluded from the analyses for two reasons. Firstly, young bilingual speakers do not yet master the socio-pragmatic conventions which guide these particular social functions for code-switching. Whilst studies have shown that young children are able to appropriately differentiate their two languages depending on the speaker with which they are interacting (Lindholm & Padilla, 1978; Genesee, Boivin & Nicoladis, 1996), they do not yet have the capacity to engage in meta-linguistic commentary, or other types of social code-switching which require extensive knowledge of social conventions.

Secondly, young children's code-switching is often limited to short utterances, and it is therefore much more prudent to focus on the structural constraints on code-switching as set out in the *matrix language frame model*, as opposed to the diverse social correlates associated with it.

5. Children's use of code-switching

How, then, does children's use of code-switching differ from that of adults? Whilst there has been a great deal of literature investigating adult's engagement in code-switching, there is rather less which observes children's use. Nevertheless, researchers have developed theories to investigate children's multilanguage use, and, as with adult code-switching, there is much debate.

One pervading notion on children's code-switching has been the *unitary language system hypothesis* (Swain, 1972; Leopold, 1978). This hypothesis proposes that bilingual children's underlying representations of their two languages are not differentiated, and that they therefore use items from both of their languages randomly and indiscriminately. Were this the case, bilingual children's code-switching would not yet be subject to the constraints of adult speakers' code-switching, giving rise to the notion of *developmental constraints* (§5). However, recent studies, particularly the work of Genesee, have suggested that not only do structural constraints on code-switching emerge from a young age, but that young bilingual children are able to differentiate their two language systems in appropriate social contexts, following Myers-Scotton's *matrix language frame model* (§6). It is the principal aim of this thesis to determine whether there is sufficient evidence for the early emergence of structural constraints, and whether, despite bilingual children's differing competence and linguistic behaviour, they also respect the constraints of code-switching.

Secondly, whilst there is consensus as to the fact that code-switching is almost always socially motivated, it has been proposed that young bilingual children lack the necessary social cues in order to master code-switching in the same manner as adults. This aspect is crucial to Myers-Scotton's model, since the constraints exist on an abstract level, in the form of *lemmas*, and are therefore selected on pragmatic or socio-pragmatic grounds. However, research has suggested that children become aware of the social aspects of code-switching from a young age (Musk, 2010; Reyes, 2004). It is therefore essential to explore these aspects of bilingual children's code-switching in order to ascertain whether they respect the same constraints as adults when engaging in code-switching.

5.1 The challenges of observation

It is important to acknowledge that it is not only on a linguistic level that children's code-switching differs from that of adults. It is also important to approach observation of young

bilingual children with no assumptions as to their language representations. As has been established, adult code-switching is subject to an array of structural constraints (Clyne, 1987; Myers-Scotton, 1993), which are governed not only by grammar, but also socio-pragmatically. If children are not as sensitive to the pragmatics of multi-language use, one could propose that these constraints either do not exist until later in development, as per the *unitary language system hypothesis*, or that there is a developmental aspect to these constraints, as young speakers become ever more aware of the grammar rules and social implications affecting code-switching (Lanza, 1992; Köppe, 1996; Deuchar & Quay, 1998). It is therefore crucial to lead observations of young children's language use in a way that adequately explores all possibilities for their linguistic representations.

A second challenge is that these observations cannot be carried out in the same way as observations of adult speakers, because the number of *multimorphemic utterances* (MMUs) will be much lower with child speakers than with adults. Many studies regarding the constraints that apply to code-switching focus on the points of syntactic structures into which certain elements may or may not be inserted. A simple fact is that young children tend not to use complex structures, but still engage in high rates of inter-utterance mixing. Therefore, whilst production of mixing is high, comprehension of these structures is still developing, and methods of observation pertaining to adult bilingual communities must be modified in order to truly observe young children's language use.

Finally, and crucially, as has been established, code-switching depends heavily on context. It is only in context that the form, functions, and limitations of code-switching may be observed, and this applies to adult and child speakers alike. Since code-switching is almost uniquely socially motivated, it is vital that researchers studying children's multilanguage use create environments which both encourage multilanguage use, and discourage language bias.

5.2 Differences in children's code switching

It is difficult to provide blanket statements regarding children's multilanguage use, because there are many variables at work. Children do not develop at a uniform rate, and so, whilst the vast majority of studies observe language use of a group of children within a defined age bracket, there is usually considerable variation between participants' proficiency and social development. Likewise, it is extremely rare that a bilingual child should be equally proficient in both languages (the same applies to many bilingual adult speakers), and so considerable variation within the observed group is often present, even if the participants are of a similar age, and are sourced from the same language community. It is also true that just because two children come from the same language community, there is no guarantee that they have had a similar linguistic upbringing – indeed, many parents self-identify as having raised their children with, for example, the *one-parent-one-language* rule¹³, but the actual situation is often contrary to this statement (Genesee, Nicoladis & Paradis, 1995).

A particular challenge in observation of children's language use is the fact that limitations of children's language proficiency remain unclear. This is largely due to the fact that bilingual children cannot engage in nuanced context-sensitive language use, as adult speakers can. As such, many studies relating to bilingual children's context-sensitive language use regards their interactions with their parents, or at the very limit, only with familiar interlocutors, usually members of the family. As Genesee, Boivin and Nicoladis (1996) acknowledge, such interactions may only be informative to a limited extent regarding children's underlying language representations: "it could be that bilingual children are able to use their languages differentially with familiar interlocutors because they have learned,

¹³ The *one-parent-one-language* rule refers to raising children in two-language households exclusively with one parent speaking one language and another parent a second language.

implicitly, to associate certain languages with particular individuals as a result of repeated exposure to them.”

As such, there is a question as to whether bilingual children are truly capable of language differentiation at a young age, and this is a question which is inextricably linked with the question as to whether young bilingual children’s language use is subject to constraints.

If young children are not truly capable of context-specific language differentiation (as opposed to simply learning which language individual familiar interlocutors tend towards), it follows logically that, at least in the early stages, word combinations are not constrained by general linguistic principles of code-switching. This has given rise to the notion of *developmental constraints* (Köppe, 1996), in which in the early emergence of code-mixing, combinations are not constrained at all, but are used randomly and indiscriminately. Following this, this notion proposes that constraints are subject to developmental change, and emerge incrementally as language proficiency and social intelligence develop.

5.3 The notion of developmental constraints

The notion of *developmental constraints* is an attractive one, particularly from an *empiricist* viewpoint. Were it the case that constraints on code-switching developed as the speaker’s proficiency develops, it would support an *empiricist* view, namely, that language acquisition is driven by input of stimuli throughout early development. Meisel (1994) argued for a *grammatical deficiency hypothesis*, in which, for a stage in early development, word combinations are not subject to general linguistic principles, stating that “bilingual children are sensitive to the adult rules of code combination in sentences only when they produce sentences of sufficient grammatical complexity for the rules to apply.”

Following this hypothesis, there are two logical conclusions. Firstly, if this hypothesis is true, constraints on code-switching exist hand-in-hand with language proficiency. That is to say, that until a certain level of proficiency is attained, grammatical code-switching is impossible.

The term *sufficient grammatical complexity* is ambiguous. Here, it may be likened to the *matrix language frame model*. Presumably, an utterance of sufficient grammatical complexity is one with a structure complex enough for another code to be logically inserted into it: that is to say, that there must exist a sufficiently complex ML island, able to accept the insertion of an EL island.

A second logical conclusion of this hypothesis would be that, if combinations are not constrained by linguistic principles, children's use of their two languages would be random, functionless, and ungrammatical. Here, differing evidence both support and refute this claim. The latter evidence will be discussed later (§§6-7). Certain studies have provided support for this proposal, focussing on word categories and children's rate of mixing them. Whilst these studies provide a great deal of information regarding children's developing linguistic knowledge, it should be mentioned that the vast majority of items that young children switch tend to be lexical (Meisel, 1994; Vihman, 1998; Paradis, Nicoladis & Genesee, 2000), and therefore these types of studies are rather limited from the outset.

5.4 Categorisation studies

One study focussing on the rates of mixing of items from different grammatical categories was Vihman (1998). The notion of these studies is that compared to adult speakers, young children do not mix categories with similar proportions. Broadly speaking, adults engage in code-switching in parts of grammar structures that are most apt to accept insertions from another language (as per the *matrix language frame model*), and these boundaries largely exist between lexical items. As such, adult bilingual speakers tend to code-switch with nouns and verbs. Early studies, however, make much of the fact that this behaviour is ostensibly not

exhibited in young children's code-mixing. To do this, studies label tokens dependent on their grammatical category, and measure the proportions of tokens belonging to each category that are involved in code-switching, either across a community, with a group of speakers, or across a timespan, with a small group, or an individual speaker. Indeed, these studies show that young children's use of code-switching evolves throughout early development. Such studies propose that the patterns observed can be attributed to the emergence of language differentiation, but, more importantly, the emergence of constraints on code-switching. Whilst in early development switching appears to be *ad hoc*, with ungrammatical word combinations, these studies suggest that as young bilingual speakers develop, their code-switching behaviour becomes more similar to that of adults.

The seminal study by Vihman (1998) observed the code-switching behaviour of one child, R, who was a young Estonian-English bilingual speaker. He heard mainly Estonian at his home, which was spoken by both of his parents, but spent weekday mornings at an English-language day-care. R's language use was recorded in a written diary from the age of 1;1 (his first adult-based word use), and subsequently, tape recordings were made each month between 1;7 and 2;10. From the beginning, Estonian was R's dominant language. At the beginning of the study, only 2 of his first 11 adult-based words were English, and by 1;10, of his recorded vocabulary of just under 500 words, only 27% were English-based.

It is clear from the study that R's language differentiation developed steadily throughout this observation, suggesting that by 2;0, the underlying representations in the mental lexicon for the two languages were more or less distinct:

TABLE 2. *English multiword utterances*

Age	<i>English context^a</i>		<i>Estonian context^b</i>		Total
	No.	%	No.	%	
1;8	0	—	4	12	4
1;9	2	20	8	8	10
1;10	17	45	21	9	38
1;11	15	56	12	8	27
2;0	14	82	3	2	17

^a Percentage of all English multiword utterances.

^b Percentage of all recorded multiword utterances in an Estonian context.

Figure 1. A table showing the numbers and proportions of English multiword utterances in R's speech between 1;8 and 2;0 (Vihman, 1998).

R's ability to appropriately use English utterances in English contexts, and to decrease use of English utterances in Estonian contexts improved steadily between 1;8 and 2;0. Not only did R's use of English utterances in Estonian contexts drop from 12% to 2% in the space of 4 months, but within this same time frame, R's use of English utterances in English contexts increased from 0 to 82%.

It seems apparent, then, that language differentiation is present from a young age. What can we surmise, however, about the presence or status of constraints on language use and code-mixing during the period prior to the development of language differentiation? Following the *grammatical deficiency hypothesis*, it would logically follow that prior to the stage of advanced language differentiation at 2;0, R's language use would not have been constrained to linguistic principles, and therefore, was not subject to code-switching constraints.

Vihman (1998) proposes that this is the case, and proposes this as an explanation for the difference in code-switching behaviour between R, and that observed in adult bilingual speakers. In this study, R's speech is analysed by reference to three grammatical categories:

nouns, verbs, and *functors*¹⁴.

As the data show, R's use of *functors* in mixed utterances was superior to that of nouns and verbs, which took up only 16% and 23% of R's tokens respectively. This is contrary to reports of adult code-switching, which largely suggest that adult bilinguals most often engage in code-switching in lexical and not function items (Pfaff, 1979; Poplack, 1980). This clearly shows that there are differences in the code-switching of adult and young bilingual speakers. Why is it that the distribution of *functors*, as opposed to nouns and verbs (that is to say, function as opposed to lexical items), is so different? One explanation could be that constraints on the two languages are still developing, and that therefore R is not able to follow the code-switching constraints of adults, as per the *grammatical deficiency hypothesis*.

This data is further informed by subsequent recordings of R's speech at a later stage. Whilst this data covers R's speech between 1;7 and 2;8, recordings were made until the age of 6;7. At this later stage, the proportions of categories which were code-switched was drastically different. By 6;7, nouns were code-switched far more than any other category, making up 44% of English words used in Estonian utterances and 55% of all Estonian words used in English utterances. These data suggest that there may be developmental constraints at work on young bilingual children's code-switching. Again, this assessment would certainly align with the *grammatical deficiency hypothesis*. If *functors* are switched more frequently than in the speech of adult bilingual speakers, it may be that it is because R's word combinations were not constrained by linguistic principles, because they were simply not complex enough.

Is there another possible explanation for this difference, however? Later studies (§6) suggest other motivations for differences in young children's code-switching behaviour. Such

¹⁴ “[Functors] include pronouns, conjunctions, adverbs, quantifier adjectives, deictics, the grammaticalized verb *have* (used in possessive and locative constructions), and three prepositions which also occur as verb particles.” (Vihman, 1998)

studies have suggested that code-switching is in fact a pragmatic mechanism used to facilitate communication and comprehension with interlocutors. It may be that R was engaging in a surprisingly large number of mixed utterances with *functors* because he was filling the gaps between his dominant and non-dominant language. In doing so, using English-language *functors* embedded in Estonian utterances would be a means to facilitate communication in instances in which R's knowledge of Estonian *functors* was not yet sufficiently developed. This would align with the observations that language differentiation was present from a young age. Whilst the data certainly suggests that code-switching constraints may have a developmental aspect in young bilingual speakers, it does not prove it outright.

Further, this data may be skewed by the breadth of the category of *functors*, which includes many items with little syntactic or semantic similarity (it is a category which includes, but is not limited to: adverbs; conjunctions; pronouns. As such, it includes elements with very differing syntactic or semantic properties). As Vihman acknowledges, Redlinger & Park (1980) report that nouns were most frequently substituted, but the results would indicate otherwise, were *functors* grouped together. Indeed, a later study, Nicoladis & Genesee (1998), using a similar definition of *functors*, found varying rates for lexical and grammatical mixing, dependent on the individual speakers.

Whilst the data collected from R's speech is clearly indicative of the development of speech and the emergence of language differentiation from a young age, it is unable to unilaterally demonstrate that developmental constraints exist on young children's code-switching. Clearly, studies observing more than one subject have yielded mixed results, and have suggested that there is a great deal of variability in young bilingual children's language development, language preferences, environment, and consequent engagement in code-switching. Categorisation studies, whilst informative, do not necessarily reflect grammatical categories as represented in the mental lexicon of the speaker, and they have received

criticism (Meisel, 1994; Nicoladis & Genesee, 2000) for their taxonomy of syntactic categories, which do not appear to be motivated by syntactic or semantic similarities, or by the relationship that certain functional items maintain with proposed structural constraints.

5.5 The Unitary language system hypothesis

The results of Vihman (1998) and Nicoladis and Genesee (1998), suggest that functional categories¹⁵ do not tend to emerge until around the age of 3;0, and the authors of these studies propose that prior to development of these categories, bilingual children are unable to differentiate between their two languages, and therefore confuse or mix their languages indiscriminately. It is true that some evidence of functional categories during prior development, such as inflectional morphology, but this is not productive until around the age of 3;0. Serratrice (1999) observes the language use of a bilingual Italian-English child from the age of 1;10 to 3;1 during free play sessions, and notes that functional categories do not become sufficiently productive until the lexicon has developed to an adequate size. Such observations have led to the development of the *unitary language system hypothesis* (Swain, 1972; Leopold, 1978; Volterra & Taeschner, 1978).

According to this hypothesis, prior to the development of functional categories, children's underlying representations of their two languages are unified – that is to say, that young children only have one underlying representation in the mental lexicon, until functional categories develop, and they are able to begin to differentiate their two languages, and two representations begin to diverge, allowing the child to code-switch more appropriately depending on context. As R's data show, there is a clear trend between age and language development regarding appropriate use of code-switching and target language dependent on context.

¹⁵ Words belonging to functional categories are those which are semantically void, and serve to denote grammatical relationships between elements of a sentence. These categories include: prepositions; determiners; conjunctions; complementisers.

However, there are certain logical conclusions to be drawn from the *unitary language system hypothesis* which must be tested. One such conclusion is that if children had only one underlying representation for their two languages, mixing would be bi-directional, as it would be more or less random, with items drawn from the same source. Several studies have shown that this is not necessarily the case, suggesting in fact that language dominance plays a role in code-switching, even from a young age, with code-switching often used unidirectionally (Fantini, 1978; Lindholm & Padilla, 1978; Genesee, Nicoladis & Paradis, 1995). If this is the case, the *unitary language system hypothesis* is not a viable explanation for children's code-switching behaviour (§5).

Secondly, whilst functional categories do not develop until circa 3;0, observation of bilingual children's code-switching behaviour at a younger age (1;10 – 2;2) has suggested that language differentiation is indeed present prior to the emergence of functional categories (Genesee, Nicoladis & Paradis, 1995). Once again, it is suggested that differentiation is motivated by a range of factors, including language dominance (§§4, 5). If differentiation is indeed present prior to the emergence of functional categories, there cannot be one single underlying representation. If children do indeed have a dual-language representation from a young age, then, the next question must be whether the same structural constraints apply to young children's code-switching as to adults.

5.6 The notion of language dominance

Several studies have suggested that language dominance plays a much greater part in children's code-switching than previously thought. Whilst it is clear that children do not use complex structures, and that their proficiency is limited, it is suggested in these studies that language dominance reflects proficiency. That is to say, that children tend to be more proficient in their dominant language. This may seem obvious, but it is a crucial aspect of the role of language dominance in code-switching. Observations have shown that children code-

switch more when they are asked to use their non-dominant language (Genesee, Nicoladis & Paradis, 1995), which reiterates the proposal that code-switching in young bilingual children is not random, as suggested in other studies (Swain, 1972; Leopold, 1978).

Lindholm & Padilla (1978) was a study focusing on samples of Spanish-English bilingual children between the ages of 2;10 – 6;2. Whilst the sample age was set at and well after the general age of emergence of functional categories, it showed clearly that language dominance plays a role in code-switching for bilingual children, and provides further evidence that children are capable of differentiating between their two language systems from a young age. This suggests that code-switching has important consequences for bilingual language acquisition (§7). The speech samples in this study were taken from five bilingual children, all born in the United States and second-generation Mexican Americans. In the study, the children interacted with two experimenters; one spoke only Spanish, and the other only English, and children believed that they were required to translate between the two.

TABLE 1. Breakdown of language mixes by Type^a

Type	Spanish utterance with English insertion	English utterance with Spanish insertion
Lexical		
Noun	71	12
Verb	3	3
Conjunction	5	2
Adjective	2	—
Phrasal	4	8
Total	85	25

[a] Based on a total of 5,177 utterances in both Spanish and English

Figure 2. A table showing the number of English and Spanish tokens employed in Spanish and English utterances respectively, and their types (Lindholm & Padilla, 1978).

Of the 5,177 utterances, only 2% bore an instance of code-switching, and the vast majority were nominal¹⁶. The data clearly show that the children in this study were capable of differentiating between Spanish and English, even from a young age. Further, English was the dominant language of all five children in this study, which is reflected in the data. Particularly with switching of nouns, only 12 instances of the insertion of a Spanish noun into an English utterance were recorded, compared with 71 instances of an English noun insertion into a Spanish utterance. These data suggest that code-switching is in fact closely linked to language dominance. If children engage in code-switching more when required to speak in their non-dominant language, it may be that code-switching is a tool that children use to fill gaps in knowledge with equivalent forms.

In light of these data, it seems clear that young children are capable of differentiating between their two language systems, and favour switching when speaking their non-dominant language. If this happens prior to the emergence of functional categories, this could explain the seemingly random nature of children's code-switching, differing from that of adults. Children's code-switching varies from that of adults simply because they are not yet proficient enough to code-switching only when pragmatic function requires it.

Given the nature of the code-switches in this study (nominal), it is important to address one question: how is it possible to exclude that these were in fact instances of borrowing? The instances of mixing were one-word, which is a necessary criterion for borrowings. However, it is possible to exclude the notion of borrowings from this study because of the necessary definition of borrowings stated in §2: how integrated into the matrix language is the item? That is to say, has this item replaced the use of another in the target language. Here, it is safe to say that these were instances of code-switches because they

¹⁶ These data further support the proposal that both adult and child bilingual speakers engage most frequently in code-switching on a lexical level.

involved tokens which had not been integrated into the other language, and therefore belonged to two distinct lexicons.

This explanation is attractive, because it provides evidence which has been supported in recent studies (§6). Further, it offers an explanation of the differences in children's code-switching, whilst supporting observations that children are indeed capable of differentiating between their two language systems prior to the emergence of functional categories, and the unidirectionality of children's code-switching.

5.7 Constraints in children's multi-language use

Having established that young bilingual children do indeed have a dual-representation of their two languages in the mental grammar, and that children also engage in frequent code-switching on the lexical level, like adult bilinguals, it is necessary to answer the question as to whether the differences observed in children's code-switching come down to differences in the structural constraints that apply to children's multi-language use.

Answering this question is complicated by the fact that young children do not use complex structures in their speech, and that children vary considerably in their individual development. Therefore, the answers to this question will be explored through the lens of three studies carried out observing young bilingual children, followed by a discussion of these observations and their applications to theories surrounding the presence of structural constraints in young bilingual children's speech.

6. Observable studies

The most appropriate means to assess the extent to which bilingual children obey the same constraints active in adult bilingual's speech is to analyse studies focusing on the speech of young bilingual children. As such, these studies must fill certain criteria. Firstly, the subjects should be observed in context. As established, code-switching is a highly contextualised

phenomenon. Even among children, it may be used to fill gaps in knowledge (Lindholm & Padilla, 1978; Genesee, Nicoladis & Paradis, 1995), to test understanding (Reyes, 2004), or to maintain language boundaries (Musk, 2010). Many studies on children's code-switching are not carried out in a variety of contexts, and may focus only on interactions with parents. It is therefore important that studies provide evidence of code-switching in interaction with a variety of interlocutors.

Secondly, the studies should analyse speech samples from subjects without referring to a *unitary language system* or functional categories. As shown, these parameters do not necessarily reflect accurately the facts of code-switching in bilingual children, and it is suggested that young children are in fact able to differentiate between their two languages from a young age. This is evidence that children do maintain a dual-aspect underlying representation of their two languages. Studies approaching young bilingual speakers without these notions are able to explore more fully the comparison between structural constraints in adults and children, because they approach both from a fundamentally similar viewpoint.

6.1 Genesee, Nicoladis & Paradis (1995)

Genesee, Nicoladis & Paradis (1995) was a study observing a group of five young French-English bilingual children between the ages of 1;10 – 2;2. This study is useful in analysis of constraints on code-switching because its subjects were well below the age at which functional categories usually develop. This study in particular focused on the role language dominance in relation to code-switching.

In this study, *mean length of utterance* (MLU) and *multi-morphemic utterance* (MMU) values were used to establish children's dominant language¹⁷, as shown:

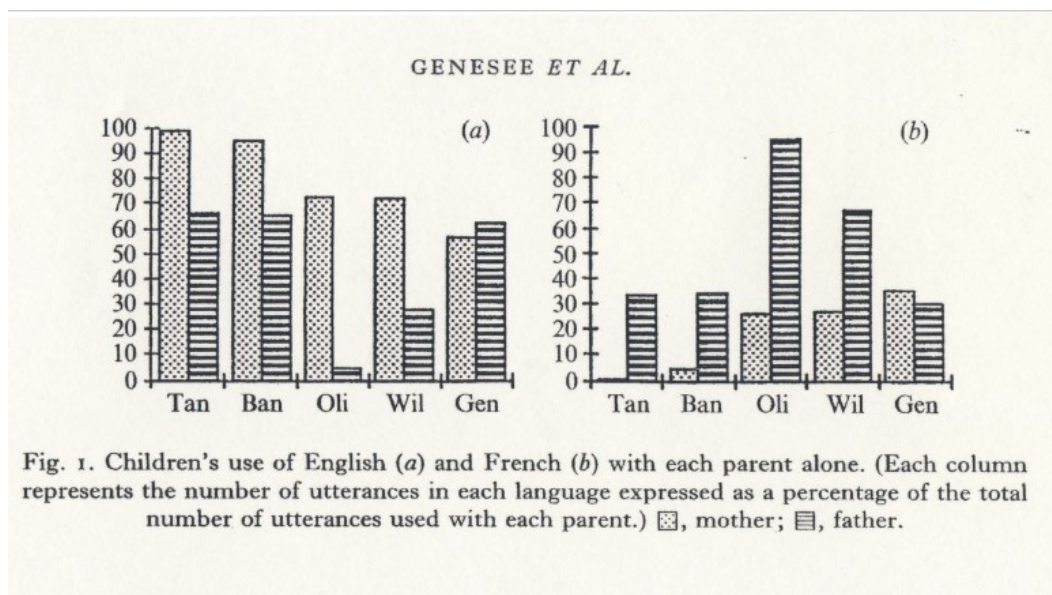
¹⁷ These values were considered to be more empirically viable compared to measures used in previous studies, such as measurements of pauses (De Houwer, 1990) or morphosyntactic complexity (Lanza, 1992).

Child	Age	Language	MLU	Upper bound	MMU %	Word type %	Discriminant scores ^a	Dominance
Tan	2;1.8	French	1.38 (76) ^b	4	10.33 (22)	21.98 (51)	71.43	English
		English	1.83 (357)	6	89.67 (191)	78.02 (181)		
Ban	1;10.25	French	1.66 (53)	3	22.03 (26)	26.80 (26)	73.81	English
		English	1.57 (226)	4	77.97 (92)	73.20 (71)		
Oli	1;10.5	French	2.02 (153)	7	68.46 (102)	59.12 (107)	-58.99	French
		English	1.67 (100)	4	31.54 (47)	40.88 (74)		
Wil	2;2.2	French	1.24 (156)	3	36.92 (24)	42.57 (43)	12.41	English?
		English	1.37 (130)	4	63.08 (41)	57.43 (58)		
Gen	1;11.0	French	1.96 (156)	5	50.30 (85)	48.55 (84)	4.14	Balanced
		English	2.08 (153)	5	49.70 (84)	51.45 (89)		

Figure 3. A table showing the MMUs, and determined language dominance of participants (Genesee, Nicoladis & Paradis, 1995).

For the majority of these children, it was determined that English was the mother tongue, due to a clear preference for MMUs in English over French. These scores were calculated in observation with subjects interacting with both parents, as it gave the most natural impression of language dominance, in a situation where the child was aware that both languages could be used. These differences are significant, because they give an indication of how each child might interact in the study. Those with English as a dominant language would be expected to engage in code-switching more frequently when in a French-speaking situation, and vice-versa.

Subsequently, children were observed interacting with a monolingual English-speaking stranger who was unable to understand French. In each case, the mother's mother tongue was English, and the father's French. The data for the interactions with their parents is as shown:



Graphic 2. An illustration of participants' use of English and French when interacting with their parents (Genesee, Nicoladis & Paradis, 1995).

As expected, when children spoke with each parent individually, they had a strong tendency to use their parent's language (96.43% of the time), even if this was their non-dominant language. This is not unexpected, but also does not contradict proposals from previous studies that children use different languages appropriately with interlocutors with whom they are familiar. Interestingly, however, when both parents are together, it would be expected, were children to have a *unitary* representation of their two languages, that they would switch between languages more indiscriminately. This, however, was not the case. Again, children used English predominantly with their mothers, and French with their fathers. This suggests that even young bilingual children are able to differentiate between languages and use them appropriately.

In interaction with a stranger, it was found that children used more English-only utterances, as the stranger was known to be only English-speaking. However, if children did not know an English word, they were observed attempting to continue conversation by speaking in French. Generally speaking, communication broke down in these scenarios, as children were constrained by proficiency. This observation is important, because it provides

solid evidence for children's motivations for code-switching: that is to say, that children engage in code-switching when prompted to do so by a lexical gap.

These observations have two ramifications. Firstly, even young children adopt code-switching for pragmatic purposes: in this case, as an attempt to render themselves clearer to another speaker. This behaviour is characteristic of adult bilingual speakers. Secondly, if children are able to adopt code-switching for pragmatic reasons before the emergence of functional categories, it follows logically that there is never a stage within which they engage in code-switching in a random fashion, and that there are no developmental constraints on children's code-switching. If this is the case, it suggests that children do indeed obey the same structural constraints on code-switching as adults, but may deviate from these constraints where their proficiency in one or both languages is not yet sufficient.

6.2 Genesee, Boivin & Nicoladis (1996)

A later study, Genesee, Boivin & Nicoladis (1996), explored this further by recording speech samples of another group of French-English bilingual children in the Montréal area of a similar age (c. 2;2) and MLU (1.56). The group consisted of four children, all raised in the Montréal area. Of the four children, two had a French-speaking father and an English-speaking mother, and two had the opposite situation. It is acknowledged, however, that the parents of all children but one occasionally engaged in multi-language conversations at home, whilst predominantly speaking to their child in their dominant language. The premise of the study was to observe young bilingual children, at the age at which language differentiation is largely contested, interacting with strangers, because interactions with parents may be less reliable in terms of providing evidence for language differentiation. If young children become accustomed to using a certain language with a certain parent, it may be a case of habit, rather than active, innate language differentiation motivating their language choice. As such, for the

two children whose dominant language was French, an English-speaking stranger was introduced, and for those whose dominant language was English, a French-speaking stranger.

Their interactions were recorded in play sessions in which the dominant language of the stranger was made apparent. Utterances were labelled based on whether there was *inter-utterance mixing* or *intra-utterance mixing*¹⁸, and percentages of English-only utterances, French-only utterances, and mixed utterances were recorded and analysed regarding interactions with both mother and father, and with the stranger in question.

Again, the results suggest that young bilingual children are able to code-switch differentially and appropriately in different contexts. Whilst children used mostly utterances consisting only of morphemes belonging to their parent's dominant language in interactions with their parents, they had a strong tendency to mix more with a stranger who spoke only their non-dominant language, suggesting that they use code-mixing as a pragmatic strategy in order to facilitate communication, and broaden their communicative capacities.

There are certain acknowledgements to be made pertaining to these results, however. Firstly, the very nature of the study assesses performance over competence, and so cannot overtly provide evidence that bilingual children are able to use code-switching pragmatically, as adults do. It is possible that the children engaged in mixing more when interacting with a stranger because of a lack of competence in their non-dominant language (something which, though proposed in early literature, has by and large been ruled out as a motivation for code-switching in adult speakers). It is possible that bilingual children engage in code-switching in these interactions to "fill the gaps" in their linguistics competence, to insert an item from the inventory of one language as the equivalent in the other language is not known.

Secondly, much of the children's utterances were unintelligible, due to the fact that

¹⁸ Inter-utterance mixing refers to cases in which utterances predominantly belonging to two different languages are used within the same conversation, but in different conversational turns. Intra-utterance mixing refers to utterances in which one or more morphemes from different languages are used within the same utterance.

they were only at the one-word stage of development (one child's unintelligible utterance rate reached 29%). The results of this study should therefore be taken as an indication, rather than consequential proof, and further studies of this nature would be extremely useful.

The results do, however, by and large suggest that bilingual children are, at an early stage, beginning to use code-switching as a strategy in interaction, which mimics the behaviour of bilingual adults (Gumperz, 1982; Poplack, 1985; Poplack, 1985; Tay, 1989; Bailey, 2000; Chung, 2006), and certainly, whether a case of lack of competence or not, that young bilingual children are able to differentiate between their two languages, suggesting important ramifications for theories on language acquisition (§7).

6.3 Paradis, Nicoladis & Genesee (2000)

Paradis, Nicoladis & Genesee (2000) was a study that specifically examines the extent to which bilingual children's code-switching obeys the same constraints as adults, by reference to the *matrix-language frame model*. In the study, results from 15 children between 2;0 and 3;6, gathered from previous studies, were collected and used to measure the extent to which bilingual children's speech obeys the principles of the model. The following table shows each participant's dominant language and ages at each period in which their speech was observed:

Table 1. *Children's across-Period dominance and ages at observation Periods I to IV*

Children	Dominance	Period I: 2;0	Period II: 2;6	Period III: 3;0	Period IV: 3;6
Mathieu	English	1;11	2;3	2;11	3;6
Nicholas	English	1;11	2;3	3;1	3;8
Olivier	French	1;11	2;3	2;10	3;6
Stefan	Bal/Eng ^a	2;0	2;7	3;1	3;5
Yann	Balanced	2;0	2;5	3;1	3;8
William	English	2;2	2;10	3;3	
Gene	Balanced	1;10	2;7	3;0	3;7
Elise	English	1;9			
Tanya	English	2;1			
Brigitte	English	1;11			
Jennifer	French	2;1			
Jessica	Balanced	1;11			
Jason	English	1;11			
Joelle	English		2;4		
Leila	English		2;3		

^a Bal/Eng = dominance changed over time

Figure 4. A table showing individual participants' language dominance and ages at observation points during the study (Paradis, Nicoladis & Genesee, 2000).

These participants were all French-English bilinguals from the Montréal area, with one French-speaking and one English-speaking parent. All data were collected in interaction with a parent as interlocutor. Because data were analysed by reference to the ML model, on a case-by-case basis, the matrix language was chosen based on certain criteria¹⁹, both sociolinguistic and psycholinguistic. The sociolinguistic factor was the expected language of discourse – in these interactions, it was taken to be the adult's language of discourse. The psycholinguistic factor was taken to be the child's dominant language, in this study, determined by the language from which the majority of morphemes uttered originated. The children's speech was then analysed against two principles of the model: the *system morpheme principle*; the *morpheme order principle*.

6.4 System Morpheme Principle

An important constraint of the *matrix language frame model* is the *system morpheme principle*. A system morpheme is a bound or free morpheme that belongs to a closed, or

¹⁹ In the study, the ML was determined based on psycholinguistic and sociolinguistic factors, where in the majority of cases, the ML was that of the adult speaker unless children used more of their dominant language in a session, contrary to the mother tongue of the adult speaker.

functional class, and may include such items as determiners, adverbs, negation elements, auxiliary verbs and nominal or verbal inflections. A subcategory of system morphemes is *late system morpheme*. A late system morpheme is a morpheme which is activated by functional relations exterior to their maximal syntactic projections, such as a regular verb inflection which verifies agreement with the subject of the CP. The principle states that late system morphemes must belong to the matrix language (ML) unless they appear as an embedded language (EL) island constituent. As such, combinations of the type early/late in an ML island, early or late in an EL island, and early in an ML + EL constituent are acceptable, with all other combinations violating the principle.

As an example, the following constituent, an ML + EL constituent, in which Swahili is the ML and English, the EL, is grammatical, because it respects the principle:

Unaweza kumpata amevaa nguo nyingine bright
you-can find-her she has worn clothes other bright

You could find her wearing other bright clothes

In the constituent, the lexical item *bright*, belonging to the EL, follows the word order of the ML in the NP *nguo nyingine bright*, meaning that the example is acceptable.

These combinations and all constituents including a system morpheme were analysed, yielding the following data:

Table 2. *Incorrect system morpheme mixes (SMP violations) for Periods I to IV*

	SMP Violations
Period I	4.2% (2/48)
Period II	31% (27/87)
Period III	20.9% (29/139)
Period IV	8.1% (7/86)

SM Incorrect = EL late system morpheme in ML + EL constituent.

Figure 5. A table showing the percentages of SMP violations at each observation point in the study (Paradis, Nicoladis & Genesee, 2000).

The results show relatively high percentages of violations, particularly in the second and third observation periods. Across all intervals, the rate of SMP violations was 18.1 percent. These data suggest that in fact, at least concerning the *system morpheme principle* constraint, there is a developmental aspect for bilingual speakers.

However, the authors acknowledge that this evidence may be misleading. A potential explanation for the relatively high number of violations is that children of this age violate this constraint because they do not have a chance in certain contexts. It is suggested that children are unable to obey this constraint in many circumstances because they have too many lexical gaps. It is proposed that where a child has not yet acquired the equivalent late system morpheme in one language, they must substitute it with an early system morpheme, causing a violation of the constraint. This is in line with previous observations of children's code-switching, in which it is apparent that code-switching is often motivated by some form of lexical gap. This is illustrated in ungrammatical constituents produced in possessor-possessed constructions (Paradis, Nicoladis & Genesee, 2000), in which children were frequently unable to respect the constraint, possibly due to the fact that they have not yet learned the possessive 'of' in English, and so cannot respect this word order when the ML is French:

Madame cookies?
Lady's cookies

Guitar monsieur
Mister's guitar

A second possibility is that late system morphemes are acquired at different rates in different languages (Genesee, Boivin & Nicoladis, 1996). This could result in skewed directional switching patterns between French and English, where French exhibits more system morphemes in these utterances.

It is important to acknowledge, also, that these violations of the constraint were most common in constructions that vary greatly between French and English, namely: possessor-possessed constructions; adjective-noun constructions and negations. In these instances, the gaps in children's linguistic knowledge are more evident, as they are structurally more complex constructions which the children have not yet developed. It is also important to acknowledge that these results do not include so-called "constraint-neutral" utterances, which could not be included due to performance errors.

It should also be acknowledged that whilst the percentage of SMP violations was significant, it was still relatively low (under 20%). This supports the notion of broad structural trends of code-switching, even from a young age. This may therefore be taken as further evidence that structural constraints exist on code-switching, and that young speakers are sensitive to them, even before the emergence of stable grammar.

6.5 Morpheme Order Principle

The *morpheme order principle* stipulates that in mixed ML + EL constituents, the order of morphemes must respect the order of morphemes in the ML. This is most apparent when switches happen between two languages with greatly differing word orders. The authors

identified three construction types which are the greatest predictors for this type of violation²⁰:

Possessor-possessed constructions:

the teddy-bear's house

la maison du nounours

the house of the teddy-bear

Adjective-noun constructions

big dog

grand chien

big dog

red dog

chien rouge

dog red

Negative markers

le lion (ne) voit pas l'éléphant

the lion see-(pres) not the elephant

the lion does not see the elephant

It is clear why these are the contexts in which this type of violation is most predictable: they are key structures in which the order of morphemes differs greatly between French and English. This constraint is helpful, because it offers a solution to the earlier-proposed

²⁰ All examples are taken from Paradis, Nicoladis & Genesee (2000)

equivalence constraint. It is, in some ways, a helpful reformulation of that very constraint: here, it is again proposed that a violation of grammatical principals ensues when the order of the source (or matrix) language is not respected, as with the *equivalence constraint*, but it differs from it in two crucial ways. Firstly, it refers to morphemes, which is far more specific than the notion of equivalence, which referred to similar structures. Secondly, it offers an explanation for observed tendencies in code-switching which motivated the *equivalence constraint*, without being as prescriptive. It does not preclude the interaction of two languages with starkly differing structures, because it refers to the order of morphemes rather than larger structures.

In the study, *morpheme order principle* violations were much rarer than *system morpheme principle* violations, at only 8.8% across all speakers, periods and construction types. Several important observations can be taken from this result. It is unsurprising that SMP violations were more prevalent than MOP violations, given earlier observations. It is suggested that SMP violations were more common because, despite speakers' awareness of the constraint, were unable to help violating the principle because of gaps in proficiency (the same gaps which constitute an important motivation for code-switching in young speakers). This is not the case for MOP violations, because structures used are not yet sufficiently complex to allow for these violations.

It is also important to mention that whilst contexts in which MOP violations were predictable were identified, the structures of French and English are still, in the context of all languages, relatively similar. These observations should therefore be taken as an indication rather than definitive evidence of children's code-switching behaviours. MOP violations may be far more prevalent in English-Chinese bilingual children, for example, in which not only morpheme orders, but the properties of morphemes, are vastly different.

These observations suggest two things, however. The relatively small number of

MOP violations relative to SMP violations may well stem from the same phenomenon. Whilst violations were nonetheless present, the difference in the data may be down to children's relative lack of proficiency in comparison to bilingual adults. SMP violations can be caused by lack of choice of morphemes due to lexical gaps, which, as has been observed, are an important aspect of children's code-switching. MOP violations likewise may be limited by these gaps, as utterances are not yet sufficiently complex. As such, the relative lack of violations may be due to the children's relative inability to create complex constructions in discourse, rather than a distinct ability to respect these constraints. It is notable, however, that violations of these principles lower than anticipated, and that violations tended to occur within a specific subset of structures, which suggests that young children are beginning to develop a sensitivity to these constraints.

7. Discussion

7.1 Application of observations

What do these observations mean in terms of application to theories? The results of recent studies certainly lead to several logical conclusions.

Firstly, it seems apparent that young bilingual children do not engage in code-switching randomly, or indiscriminately, as suggested by earlier studies (Swain, 1972; Leopold, 1978; Volterra & Taeschner, 1978). Evidence suggests that there is in fact an awareness of both languages from a young age (Genesee, Nicoladis & Paradis, 1995; Genesee, Boivin, Nicoladis, 1996). Not only do young children have an awareness of both languages, but studies have shown that young bilingual children are capable of differentiating between their two languages. These results are not consistent with the *unitary language system hypothesis*, and suggests that from the early stages of acquisition, bilingual speakers have a dual linguistic representation, as opposed to a unitary one.

Secondly, whilst it is clear that children are capable of language differentiation, they are also capable of employing code-switching to pragmatic ends. Studies recording young children's interactions with strangers support this claim (Lindholm & Padilla, 1978; Genesee, Boivin, Nicoladis, 1996). In these studies, children were able to understand the language of preference, or indeed only language, of an interlocutor who was a stranger to them, and appropriately use their language. In these scenarios, the most common cause of language mixing was a lack of an equivalent form in the main language of the interaction. Thus, children are able to engage in code-switching in an attempt to maintain conversation, and to make themselves clearer. Again, this pragmatic use of code-switching aligns children's multi-language use with that of adults, whose main motivations for code-switching are pragmatic (Myers-Scotton, 1988).

These observations suggest that bilingual children's code-switching, even from the earliest stages of acquisition, is much more similar to adult's code-switching than previously thought. They are able to use code-switching in real-time as an adaptive mechanism with non-familiar speakers, they are able to reduce code-switching in scenarios where the interlocutor is monolingual, and code-switching, for young children, is largely unidirectional, in favour of their dominant language.

In this case, code-switching for children is not random switching between lexical items belonging to a unitary system in the mental lexicon, but a tool for communication, similar to adults. It appears then that it is not lack of linguistic development in young children that conditions code-switching, but language dominance.

The observation of children's code-switching is also informative about the nature of code-switching itself. Clearly, it is subject to broad structural trends, but is innately socially motivated. Bilinguals, even from a young age, seem to be sensitive to its pragmatic uses, as they grasp from the early stages of language use the principles of negotiation, and facilitation

of comprehension. For this reason, the hypothesis of the *matrix language frame model* is useful: it is a theory grounded in grammar, but captures the socio-pragmatic nature of code-switching, allowing for its nuances. It remains to be seen, however, how well it may be applied to children's code-switching. The number of principle violations in the studies is not insignificant: it is therefore crucial to develop studies further to explore this. For now, however, two things are clear. Code-switching is subject to structural constraints, including children's code-switching. This is an important conclusion: not only does it show that children are not engaging in code-switching in a random, indiscriminate manner, but it suggests that these constraints are general, that they are innate, and that they develop alongside the proficiency of the young speaker.

7.2 Is there a developmental aspect?

Whilst data are not consistent with the *unitary language hypothesis*, that does not of itself rule out the possibility of a developmental aspect for children's code-switching, and the structural constraints acting upon it. It is clear that children undergo a great deal of linguistic development in a short space of time: their lexicons develop, and their MLU increases, among other correlates. It is also true that young children's code-switching behaviour is different to that of adults, despite their many similarities.

In a study on the extent to which young children obey the structural constraints outlined in the *matrix language frame model* (Paradis, Nicoladis & Genesee, 2000), children violated both the *morpheme order principle* (8.8% of the time) and the *system morpheme principle* (18.1% of the time). It is possible that these violations are due to the fact that structural constraints on code-switching develop during early childhood, and so children, whilst largely obeying constraints, engage in violations of these constraints as a symptom of a

lack of linguistic development. These observations strongly suggest that children, from a very early stage in development, have a notion of structural dependence.

7.3 Do bilingual children respect the constraints of code-switching?

The crucial question must be answered, then: do bilingual children respect the constraints of code-switching? Largely, they do. Despite the violations to the structural constraints on code-switching, the majority of the time, children obey the constraints of code-switching, and do not display any indiscriminate or illogical code-switching.

How can bilingual children's different code-switching behaviour be explained? It is possible that there is a developmental aspect to the constraints, and they do not develop fully until later in childhood. This is not the only explanation, however. It is possible that violations in structural constraints are the result of gaps in knowledge, which force young children to violate these constraints where an appropriate element is not known in the matrix language. It is also possible that these violations arise as a result of different rates of acquisition of certain morphemes in each language. Broadly, however, bilingual children's code-switching is remarkably similar to that of adults.

7.4 Code-switching: some final observations

In this thesis, much has been discussed about the constraints concerning code-switching, its functions and its motivations. Clearly, there are two fundamental aspects of code-switching: whilst its function is primarily social, and it largely relates to a question of usage, there are trends and structural tendencies surrounding code-switching, relating to its grammatical aspect.

In that case, what motivates code-switching? As has been mentioned, code-switching is used by speakers for a variety of reasons. It is used to manipulate the barriers between languages, as a negotiation tactic, in order to explore a variety of social implications in conversation, including (but not limited to) power, and authority. As we have seen, it is often

used in order to show identity with a particular linguistic or social group. Code-switching can therefore be used in order to facilitate understanding, and to break down barriers, but conversely, as a means of maintaining these barriers and creating social distance.

The social aspect, whilst constituting the main motivation for code-switching, is not its only criterion, however. There is clearly a grammatical aspect underlying its use. In this case, when is code-switching appropriate? As we have observed, there are clear boundaries where speakers have tendencies to code-switch: particularly prevalent are subject/verb boundaries and determiner/noun boundaries. Whilst certain theories rely on structural relationships between elements in a sentence, such as government, they are not sufficient. It is in the remit of more general theories, such as the *matrix language frame model*, to account for boundaries in which code-switching is more likely. By referring to strings of morphemes, rather than whole lexical items within a structure, it is able to account for a broader range of contexts in which code-switching is permissible. In particular, by referring to morphosyntactic agreement in its rules, it acknowledges the tendencies of speakers at surface level. It is common for speakers not to switch between elements that must agree with one another (i.e. not to contradict the *system morpheme principle*).

A further advantage of this theory is that it suggests that code-switching happens in deep structure rather than at the surface. This aligns with observations of young bilingual speakers. If code-switching happened on the surface, it would require the existence of two stable, autonomously developed grammars. Contrary to this, observations have shown that bilingual children are able to code-switch before the development of stable grammars, and, further, that these grammars develop in an interdependent way. As such, it seems more likely that code-switching, in grammar, takes place at boundaries in which the order of morphemes or the agreement of morphemes is not violated.

Once an appropriate place for code-switching is established in grammar, it becomes a

case of usage. Code-switching is not employed in every location where it is permissible, and there are therefore extralinguistic²¹ factors at work in order to motivate it.

7.5 Applications to theories of language acquisition

This evidence can also provide answers to many questions circulating about bilingual first language acquisition. Whilst code-switching in adults is considered to be a sophisticated, functional aspect of language use, there is more doubt concerning this feature of bilingual children's language. In general, there is a great deal of scepticism surrounding raising children bilingually. Many parents, in particular those who are raising children in a country which does not use their mother tongue, believe it best to raise their children monolingually, so that they might learn the language of their environment more quickly, that they should avoid becoming a social outcast because their language abilities are behind that of their peers. Bilingualism, naturally, has many advantages, both social and cognitive, but these pervading doubts still exist.

Many believe that young children's code-switching is a symptom of either language interference or confusion. Indeed, earlier linguists, such as Leopold (1978), believed that his own child was suffering from language confusion because of her language mixing. In light of the above discussion, it is possible to make claims with important ramifications for theories surrounding bilingual language acquisition. Whilst the studies discussed in §6 are small, and further investigation is required, it would seem apparent that the children in the studies were not confused between their two languages. Clearly, there was a marked ability for language differentiation, with the participants context-sensitively, and proactively, using their two languages with unfamiliar interlocutors as a means to increase communicative competence. If young children are able to engage in language differentiation, and, even more remarkably,

²¹ *Extralinguistic* refers to factors which are not part of language, but which nevertheless have a marked effect on language use, such as socio-pragmatic considerations (age, sex, the identity of the interlocutor).

use it pragmatically with unfamiliar interlocutors, it seems to provide solid evidence that during early language development, young children do not suffer from confusion between their two languages.

Language interference does not seem to have had an effect in these studies. Participants were able to show differentiation, without a clear interference effect involved. It is highly likely that a large amount of code-switching in these studies was motivated by performance factors: that is to say, that children might switch (generally speaking, from their less dominant to their dominant language) to fill gaps where a word in one language might fail them. However, whilst switching may have been a mechanism to fill gaps in performance in real-time conversation, the same was not observed in children's dominant language, suggesting that such interference is not present in the dominant language.

This question is closely linked to another, constantly surrounding the phenomenon of children's code-switching: namely, do bilingual children, in the early stages of development, go through an initial monolingual stage? Again, evidence that young children are able to differentiate between their two languages would seem to negate this. If children can context-sensitively differentiate between languages from a young age, and correctly code-switch, it means that the grammars of these languages have two underlying representations. According to the *unitary language system hypothesis*, one underlying representation exists, and they gradually become distinct throughout development. However, if young children code-switch correctly, it suggests that in fact children are acquiring the constraints of two grammars simultaneously. This is a hurdle that an empiricist view of language acquisition would need to overcome. A logical conclusion of an empiricist view would be that as children acquire two languages, they require stimuli in order to be able to begin to differentiate the two, as per the *unitary language system hypothesis*. The observed facts are a strong indication that in the mental lexicon, the grammars of both languages already exist.

Finally, it is often contested as to whether young bilingual children's languages develop interdependently or autonomously. In the former, the two languages, whilst distinct in terms of underlying representation in the mental lexicon, interact with one another and inform one another during development. In this case, languages would engage in cross-linguistic transfer, meaning that structures from one language may appear in the other. In the latter, in which languages develop autonomously, the two languages would exist independently of one another, and code-switching would therefore be the result of the interaction of two distinct systems which do not inform one another. If children do indeed use their dominant language to fill gaps in their other language, it would seem that the two develop in an interdependent way. Logically, this would mean that structures from one language may appear in the other.

8. Future directions

This area of research is fertile ground for further study. Many of these studies were conducted only with a small group of participants, and so further study involving larger groups would be extremely helpful for further analysis. This would also apply to studies analysing young children's speech by reference to the *matrix language frame model*. There is a natural methodological difficulty in the gathering of this data, however. Generally speaking, the most reliable data about permissible code-switching comes from judgements of grammaticality. This is of course very complicated with young speakers. Likewise, natural recordings are useful insofar as they provide evidence on real-time usage of code-switching, but they are not sufficient for the formation of general theories on the nature of multilanguage use – as has been established, code-switching is nuanced and idiosyncratic. As such, natural recordings may only inform theories on constraints to a limited capacity.

The nature of language contact is a further important avenue to explore. More

research must be carried out on the violations of *matrix language frame model* principles observed, in order to ascertain whether this different code-switching behaviour is due to a developmental aspect of structural constraints, or to other factors, such as lexical gaps or language contact. If these violations are due to different rates of acquisition of system morphemes and other items between two languages, further study with participants from different linguistic backgrounds (i.e., not only French-English bilinguals) would illuminate this phenomenon.

Further to this, it is important that further study be carried out on a wider, more diverse range of languages. Many constraints, particularly those that are language-specific, such as the *equivalence constraint*, are formulated on the observations of European languages, and languages that are typologically very similar (such as Spanish and English). Languages which are typologically similar, such as French and Spanish, or which, grammatically, are rather close, such as French and English, can only inform to a certain extent. It is therefore important to carry out similar studies with languages which are not typologically similar, such as English and Chinese. Young bilingual speakers of these two languages may exhibit different behaviours due to the stark differences between languages: for example, the amount of cross-linguistic transfer may be far more marked, as structures from one language are transferred into another. This would provide strong evidence that grammars in young bilingual children develop interdependently. Whilst they are able to account for structural interface between these types of languages, they are limited in the description of languages which are structurally very different.

Finally, whilst it is apparent that children largely do respect the structural constraints of code-switching, this thesis has put the phenomenon of borrowing to one side. Whilst it is far more difficult to establish an inventory of borrowings that children use, a categorised

framework for constraints on borrowing, similar to the *matrix language frame model*, would be a natural companion to code-switching studies.

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