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TESIS DOCTORAL:

An Analysis of Interlinguistic Influence between Chinese and English in Direct Object Realization in Chinese-English Bilingual Children

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Abstract

While null objects are possible and pervasive in the Chinese language, their occurrence in languages like English and Spanish is rather restricted. In the case of developing grammars, the omission of categories that characterizes the initial stages of acquisition also affects the object category, together with inflection, subjects, etc. The main goal of this dissertation is to investigate the nature and the directionality of interlinguistic influence between the two languages of a set of Chinese-English bilingual (C-E bilingual) children with a focus on bilingual children's early direct object (DO) realization in English and Chinese and to provide new empirical evidence for the postulation that the development of the two languages is interdependent. In order to do so, two comparative studies have been carried out. In the first study, the English production of C-E bilinguals is analyzed with regards to DOs and, in order to determine whether the possible overproduction of null DOs is due to influence from the other first language (L1) (i.e. Chinese) or is rather part of the developmental process, a double comparison is established with English monolinguals (E monolinguals) and with Spanish-English bilinguals (S-E bilinguals). In the second study, the Chinese production of C-E bilinguals is compared to that of Chinese monolinguals (C monolinguals) in the case of DO realization. The results show that, on the one hand, C-E bilinguals' performance in terms of DO realization in English is significantly different from that of both E monolinguals and S-E bilinguals and that the latter two groups behave similarly; on the other hand, C-E bilinguals' performance in terms of DO realization in Chinese is not less satisfactory and even more adult-like at a certain point of language development when compared to that of the C monolinguals. These findings support the conclusion that, although null DOs occur in the initial stages of child language acquisition regardless of whether the adult grammar allows them (Chinese) or not

(English and Spanish), in the case of C-E bilinguals' English development, interlinguistic influence from Chinese into English has a negative effect as reflected in null DOs being produced at a higher rate and until later. In contrast, in the case of DO realization in Chinese, no negative effect is found from English; instead, a possible positive effect is found on C-E bilinguals' spontaneous production

Key words: bilingual acquisition, interlinguistic influence, null object, Chinese-English bilingual
               children

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Introduction

Language is said to be an innate capacity all humans have prior to existence rather than a by-product of the linguistic input humans are exposed to from birth. This concept of language is captured in Pinker's (1994) language instinct and earlier in Chomsky's (1965) universal grammar (UG). This conceptualization of language establishes a common ground for monolinguals and bilinguals in that they both are equipped with the same innate capacity. However, input makes them different as monolinguals are first exposed to one language while bilinguals are exposed to two languages.

In the case of bilingual acquisition there is a general consensus that bilingual children establish two separate language systems at the very initial stages of language acquisition (Genesee 1989, Meisel 1989, De Houwer 1990, Genesee, Nicoladis and Paradis 1995, among others): the so-called Language Differentiation Hypothesis. However, regardless of this consensus, how the interaction between the two languages takes place along the developmental process remains a matter of debate: whether the development of one language may influence the development of the other (Interdependent Development Hypothesis) (Cummins 1979, 1991, Bernhardt and Kamil 1995, Gawlitzek-Maiwald and Tracy 1996, Döpke 2000, Hulk and Müller 2000, Paradis and Navarro 2003, Van Gelderen et al. 2004, Sorace 2004, Serratrice et al. 2004, Lleó and Rabow 2006, among others) or whether the development of each language is comparable to the development in the corresponding monolinguals (Autonomous Development Hypothesis) (Padilla and Liebman 1975, De Houwer 1990, Nicoladis 1994, Paradis and Genesee 1996, 1997, Meisel 2001, among others).

The goal of the present dissertation is to provide new empirical evidence for the postulation that the development of the two languages is interdependent and so that the

development of the bilingual system occurs in such a way that the two languages influence each other. In particular and within the context of the Interdependent Development Hypothesis, in the present dissertation I study how bilingual children with one of the L1s allowing null DOs (Cantonese Chinese[1], referred to as Chinese in the present study) and the other not allowing them (English) acquire and produce DOs in both languages. To be more specific, both the Chinese and the English production of a set of C-E bilinguals is studied in order to determine whether there is interlinguistic influence and, if there is, how it is materialized and which directionality it has. Interlinguistic influence could be reflected in the overproduction of null DOs in English due to the influence from Chinese or in the overproduction of overt DOs in Chinese due to the influence from English or in both situations happening together.

In the case of null DOs, interlinguistic influence should be distinguished from the omission stage that is part of the language acquisition developmental process. For this reason C-E bilinguals' performance in DO realization in English is compared to that of both E monolinguals and S-E bilinguals (Spanish[2] showing a similar DO realization mechanism to that in English). If, in the case of DO production in English, S-E bilinguals and E monolinguals show a comparable performance in terms of DO realization and both groups differ from that of C-E bilinguals', it will indicate that this difference does not result from either the omission stage in

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[1]Cantonese is one of the different varieties of the Chinese language. It is spoken in Guangdong Province and in the Cantonese-speaking overseas communities and it remains one of the official languages in Hong Kong and Macau. Although there are several differences in grammar between Cantonese Chinese and Mandarin Chinese, both languages behave alike with respect to the referential properties of empty categories (Lee 2000). In the present study, Cantonese Chinese and Mandarin Chinese are generally referred to as Chinese.

[2]In the present study, the Spanish variety under investigation is limited to peninsular Spanish.

early language acquisition or the fact of being bilingual (i.e. the so-called bilingual effect) but it is very likely that it is the due to the influence from Chinese into English.

The directionality of language influence in the case of C-E bilingual children could also go from English into Chinese (as seen in an overproduction of overt DOs in Chinese). In either case, directionality could be linked to dominance and so it could go from the dominant language to the non-dominant language. In order to tease apart directionality and dominance, Chinese-dominant (C-dominant) C-E bilinguals and English-dominant (E-dominant) C-E bilinguals are compared, both in their English and in their Chinese production.

In order to address the issues above with respect to the nature and directionality of interlinguistic influence as reflected in the DO category, the production of the C-E bilinguals is analyzed in a two-fold comparison concerning children's early DO realization: the first one focuses on naturalistic English data and the second on naturalistic Chinese data. The study of the English production involves data from twelve children: five C-E bilinguals, four of whom are considered to be C-dominant and the other one E-dominant, five E monolinguals and two S-E bilinguals. The study of the Chinese production involves data from eight children: the five C-E bilinguals that are the target population in the present dissertation and three C monolinguals. This selection is made in terms of the longitudinal data available in the CHILDES project (MacWhinney 2000).

The present dissertation is organized as follows. Chapter 1 addresses the notion of transitivity from the point of view of linguistic theory and focuses, on the one hand, on the nature of verbal arguments (section 1.1) and, on the other, on the nature of DOs in transitive verbs (section 1.2). A review of the different proposals accounting for the distribution of null and overt DOs cross-linguistically is also provided (section 1.3). Finally a comparative account of the three

languages involved in the present study (i.e. English, Chinese and Spanish) in terms of both similarities and differences is offered (section 1.4). Chapter 2 is concerned with empirical studies on both monolingual (section 2.1) and bilingual (section 2.2) children's acquisition of DOs. In chapter 3, the methodology of the present study is presented, which includes the research objectives and the hypotheses (section 3.1), a description of the participants (section 3.2), the procedure of data selection (section 3.1) and the data classification criteria (section 3.4). In chapter 4, I present the analysis of the DOs that appear in the spontaneous production of the participants, dealing first with the English data (section 4.1) and the Chinese data (section 4.2) and then providing a detailed analysis on the role played by language dominance in interlinguistic influence based on both the English and the Chinese data (section 4.3). The results obtained are then confronted with the initial hypotheses proposed (section 4.4). A final chapter presents the conclusions drawn from the present study in which I also propose some relevant questions for further research.

Chapter 1. The Nature of Objects

In this chapter, several issues concerning the nature of objects will be addressed in order to provide a theoretical background for the present study. First, the nature of verbal arguments is introduced, which deals with the number of core arguments required by a verb and its semantic basis (c.f. section 1.1). Section 1.2 focuses on bivalent verbs (i.e. verbs requiring two arguments) and explores the notion of transitivity. Section 1.3 provides a theoretical account on the distribution of null and overt objects cross-linguistically and section 1.4 narrows down the scope and addresses the distribution of null and overt DOs in the three languages involved in the present study (i.e. English, Chinese and Spanish).

1.1 The Nature of Verbal Arguments

Verb valence refers to the number of core arguments required by a verbal predicate. It is related, though not identical, to verb transitivity which only takes the object arguments of a verbal predicate into consideration. Verb valence, on the other hand, considers all the arguments that a verb takes, including both the subject and the object(s). The relation as well as the difference between verb valence and transitivity is made explicit in the following two proposals by Jacobsen (1985) and Lazard (1998). Jacobsen (1985) proposes that transitivity, owing its origin to predicate logic, can be defined in terms of the number of arguments necessary to make a predicate coherent so that a predicate requiring only one such noun argument is termed intransitive and a predicate requiring two or more, transitive. On the other hand, according to Lazard (1998), a verb that can have a direct (accusative) (ACC) object is considered transitive, whereas all others are deemed intransitive.

Transitive valence is in principle a notion with clear boundaries since the valence could be zero (i.e. avalent verbs, as in (1a)), one (i.e. monovalent verbs, as in (1b)), two (i.e. divalent verbs, as in (1c)), three (i.e. trivalent verbs, as in (1d)) or four (i.e. tetravalent verbs, as in (1e)). There are no intermediate forms and so there are no verbs that have, for instance, one and a half arguments. And so is transitivity: if a verb is transitive, it must have at least one O; on the other hand, if a verb is intransitive, it must have no object(s). There is no intermediate or mixed patterns as it refers to the necessity verbs have for arguments. The nature of these arguments (e.g. referential or non-referential; overt or null) is a separate issue, as it will be shown below.

(1) a. It rains.
b. He sleeps.
c. He kicks the ball.
d. He gives her a flower.
e. I bet you two dollars it will rain.

As shown in (1a), a weather-type verb has non-referential and non-individuated subjects (i.e. expletives), though *it* is functionally the subject in these cases. Such *it* is an expletive subject which adds no meaning but serves as a syntactic placeholder: it is non-referential and therefore does not count as an argument and no other subject can replace *it*, though syntactically *it* is still the subject of the verb. However, the fact that the verb *rain* takes no object indicates that it is an intransitive verb. In languages where the subject of the sentence is not necessarily overtly presented, such expletive subject is null. For example, in Spanish, the English sentence in (1a) would be as in (2):

(2) *e* llueve.
    rains
    "It rains."[3]

At the same time, the verb *llover* ("to rain") is still considered intransitive, although being avalent, since it takes no object. What could be inferred from this is that weather-type verbs are intransitive verbs regardless of the nature of their subjects, that is, whether they have an overt expletive subject or a null one.

Monovalent verbs, like *sleep* in sentence (1b), require only one participant to perform the action and do not have any effect on any other participant(s). Monovalent verbs thus take only one argument and are intransitive verbs. The single argument of a monovalent verb serves as the subject in the sentence and, as opposed to avalent verbs, the subject is referential.

Divalent, trivalent and tetravalent verbs (e.g. *kick* in (1c)), *give* in (1d) and *bet* in (1e)), which respectively require two, three and four arguments to fulfill the action denoted by the lexical semantics of the verb predicates, are transitive verbs. One argument serves as subject, which is the agent of the sentence, and the rest serve(s) as object(s).

Ontologically, as proposed by Kittilä (2002), events that involve two different participants, one of which instigates the event (namely, the agent, e.g. *the boy* in (3a)) whereas the other is targeted by it (namely, the patient, e.g. *the vase* in (3a)) are considered as transitive events, and transitive verbs must consequently describe such transitive events. A transitive clause is commonly believed to have at least two core arguments which function as S (typically the agent) and O (typically the patient) for its meaning to be complete. On the other hand, events that

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[3] In the present study examples that appear in a language other than English are given in the following format: line 1 for the actual example; line 2 for a word-for-word translation; line 3 for the corresponding translation into English.

only involve one participant (the S, typically the agent or experiencer) whose change of state results from internal causes are generally considered as intransitive events and then verbs that describe such events are intransitive, as shown in (3b).

    (3) a. The boy broke the vase.
        b. John cried.

Allocating functions S and O to the core argument(s) has then a semantic basis, that is, it is constrained by Thematic Theory[4] (Chomsky 1981). It is generally believed that a verb assigns thematic roles (theta roles) to its (referential) argument(s). This means that a specific verb requires a subject with a specific theta role and it may require either no objects when the verb only assigns one theta role, that of the S; or it may require one or more objects with its/their corresponding theta role(s). Since each argument can bear only one theta role and each theta role has to be borne by an argument, the theta roles assigned by a particular verb are directly related to its syntactic argument structure (i.e. the number and type of noun phrases required syntactically by a particular verb). The theta role of the argument(s) is associated with the lexical semantics of a particular verb, which forms a theta grid. The theta role of an argument expresses the role that this argument plays with respect to the action or state described by the verb. For example, the verb *break* in (3a) assigns two theta roles. This is determined by the verb's semantic property: in order to accomplish this event, there necessarily must be an external agent, namely, a "breaker" which brings about such an event. At the same time, something that undergoes this action whose state is changed afterwards, namely, a "broken thing" is also required. These two entities, according to the thematic relation that they are assigned, constitute

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[4] Early conceptions of theta roles are proposed by Gruber (1965) and by Fillmore (1968), as well as by Jackendoff (1983, 1990).

the theta grid for the verb *break* as <agent, patient>. On the other hand, to *cry* is an event that comes about due to the inherent properties of the only argument (i.e. *John* in (3b)); no external agent can bring about this event. Therefore, only one entity is required in this activity: a "crier", and thus the verb *cry* assigns one theta role and its theta grid is <experiencer>. These theta roles are the basis of the formal mechanism for argument implementation of the verbs *break* and *cry* in (3). This analysis is captured in the so-called Theta Criterion as the defining property of Thematic Theory (Chomsky 1981). The Theta Criterion requires that each argument bears one and only one theta role, and that each theta role is assigned to one and only one argument. Failure to correctly match the argument(s) and its/their theta role(s) will result in ungrammaticality. In (3a), *the boy* undertakes the theta role of the agent and functions as S while *the vase* undertakes the theta role of the patient and functions as O. In (3b), *John* is assigned the theta role of the experiencer and functions as S.

Theta roles describe the thematic relation between a verb and its argument(s) at the syntax-semantics interface. They denote syntactic structures that reflect the positions in the argument structure of the verb they are associated with. They are about the number of arguments (i.e. the valence) and type of arguments (i.e. their thematic role and syntactic function) that a verb requires.

In the next section, I concentrate on bivalent verbs, that is, verbs requiring two arguments and, in particular, on transitive constructions as the focus of the present dissertation.

1.2 The Notion of Transitivity

Transitivity is assumed to be a universal property and, therefore, manifested in all languages. As a linguistic phenomenon, it has been defined in a number of ways. The traditional

view on transitivity suggests that the effects of an action pass over from agent to patient (Lyons 1968: 350 and Tsunoda 1994: 4671, among others). This view is very similar to the modern definition of sematic transitivity which is illustrated in the following two quotes.

> "In accordance with the etymology of the term, semantic transitivity evokes the idea of something passing (transit) from one participant to the other, from the agent to the object. We are led to think that a sentence meaning, for instance "the gardener killed the rabbit" is typically transitive, since it implies some intention in the agent which is realized in the action, whose effect is to modify the state of the object: from the will in the gardener's mind something is passed into the outer world, a thing which is manifested in the fact that the rabbit is dead" (Lazard 1998: 236).

> "Event transitivity encodes a model of directed, unilateral 'energy transfer' from Agent to Patient. The Agent is the source of energy transfer, whereas the Patient is the participant targeted by it; the Patient is either created, manipulated or changed in the process" (Davidse 1996: 98).

The definitions by Lazard (1998) and Davidse (1996) are purely semantic in the sense that they are not concerned with the (morpho)syntactic structure of clauses when accounting for transitive events. Only semantic criteria as, for instance, volitionality of the agent, affectedness of the patient, etc. are relevant. As a consequence, the kind of event described above can be expressed (morpho)syntactically in many different ways, all of which must be regarded as transitive due to the semantic nature of the definitions at issue. Under this view, ACC constructions (4a) and ergative (ERG) constructions (4b), as well as active structures (4a) and passive structures (4c) will all be regarded as transitive constructions despite their clear structural differences since they all describe a similar event.

> (4) a. The burglar broke the window.
>   b. The window broke.
>   c. The window was broken.

In sentence (4a), *the burglar* is the agent while *the window* is the patient. The burglar's intention, which is "to break the window", is taken to action. As a result, the state of the window, which is the patient/theme, is changed: it was fine before and it ended up being broken afterwards. On the other hand, the state of the window is also modified in sentences (4b) and (4c) and this is caused by some external agent's intention since the window cannot break itself. However, this external agent is not mentioned in these two sentences, that is, it is null or implicit. According to the pure semantic definition on transitivity, all the three sentences in (4) are transitive constructions since they indicate the volitionality of the agent (i.e. to break the window) and the affectedness of the patient (i.e. the window was broken) despite of the fact that, for instance, the syntactic pattern of sentence (4a) is SVO and that of sentences (4b) and (4c) is SV.

Thus the pure semantic definition of transitivity does not separate structurally different constructions from each other. Therefore, all constructions that can be used to describe semantically transitive events must be viewed as equally transitive. However, if the focus is on syntactic transitivity, which is the question under investigation in the present study, only the SVO construction (i.e. (4a)) is considered to be transitive from such a perspective; while the SV construction is considered intransitive in nature and, therefore, verbs in (4b) and (4c) are used intransitively (and referred to as ERG and passive constructions respectively). However, semantic transitivity provides a remarkable insight into syntactic transitivity since semantics underlies some aspects of syntactic transitivity. In fact, the semantic properties of particular verbs, or classes of verbs, are linked to the syntactic phenomena associated with those verbs.

Now let us take a look at the following examples.

(5) a. The boy broke the vase.
   b. The vase broke.

While the verb *break* in (5a) is bivalent, it is monovalent in (5b). On the other hand, while the verb is transitive in (5a), it is intransitive in (5b). This change of verb valence and transitivity is the result of the change in the syntactic function associated to *vase*. As I argue above, a verb assigns theta roles to its argument(s) which is/are associated with the lexical semantics of this particular verb. When the syntactic function of the argument changes (from object to subject) the theta role changes to (theme is assigned to S and not to O, as in (5b)). To illustrate this, two different lexical entries can be postulated for the verb *break*, as in (6), which show two different syntax-thematic roles mappings.

(6) a. *break$_1$*, to cause to separate into pieces suddenly or violently.
   b. *break$_2$*, to become separated into pieces or fragments.

According to the first lexical entry (6a), the verb *break* assigns two theta roles: the agent (i.e. the "breaker") and the patient (i.e. the "broken thing"). According to the theta criterion, these two theta roles must be assigned to two different arguments, one undertaking the role of the agent, and the other, the role of the patient. Therefore, the verb *break* is bivalent and thus requires two core arguments, one of which functions as S and the other, as O (as in (5a)). Thus the verb is syntactically transitive.

According to the second lexical entry (6b), the verb *break* assigns only one theta role, that of the patient, which is affected by the action and changes its state. As a result, only one argument is required which undertakes this theta role. So the verb *break* in this case is monovalent and the only argument functions as S in the sentence (as in (5b)). Thus the verb is syntactically intransitive.

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These types of verbs are ambivalent and are called labile verbs (Chikobava 1942, among others) which refers to the fact that they may be used transitively or intransitively with the target of the action serving as S in the intransitive sentence.

Now let us take a look at another group of examples.

(7) a. John has eaten.
    b. John has eaten a meal.

The two different structures of the verb *eat* in (7) can be explained through a lexical approach similar to that in (6). Under this approach, *eat* can be described through two lexical entries, as in (8).

(8) a. *Eat$_1$,* unergative, "eat a meal", incorporates an object component.
    b. *Eat$_2$,* transitive, "ingest food in some manner", incorporates a manner component that forces the presence of an object.

<div align="right">(Pérez-Leroux et al. 2006: 2)</div>

An overt object used with the transitive *eat* is supposed to be syntactically present (as described in (8b) and presented in sentence (7b)). However, the view that there is no object in sentence (7a) is syntactically problematic. First of all, the description of *eat* in (8) offers two options: there is an object (8b) or there is no object (8a). Nevertheless, even though the object is not phonetically presented in sentence (7a), a projected null object is needed, as shown in (9) as the syntactic representation of (7a).

(9) John has eaten *e*.

Fodor and Fodor (1980) point out that some verbs are associated with a meaning postulate, which is denoted by the lexical semantics of the verb. This is referred to as rules of inference by the two authors. This is to say, the null argument in (7a) and (8a) is still involved in

the compositional interpretation of the sentence because the meaning postulate specifies that unergative *eat* entails the existence of something that is eaten. This is expressed through the incorporation of the object component into the lexical entry of the verb, which leads to the paradoxical view that the unergative interpretation (8a) does involve an object, but this argument has been left implicit. This proposal is supported by the fact that we do not simply interpret sentence (7a) as expressing that John has been engaged in the physical activity of eating (as in 8b), but rather we interpret the sentence in (7a) as in (7b), that is, as *eat*₁ in (8a).

One is forced to posit a lexical rule so that the entry in (8b) can be turned into (8a) given that the manner component disappears and the object is incorporated in the verb. A more plausible explanation for the null object in (8a) could be that a lexical rule ensures that the entry in (8a) systematically implies (8b). This essentially means (i) that the transitive verb subsumes its potential unergativity; and (ii) that transitivity for a particular verb must thus be learned before unergativity.

A pure lexical approach also fails in other respect. Sentence (10a) is ambiguous in the sense that, on the one hand, it can be understood by a natural reading that *the spy* had some food after (s)he memorized *the document*, as shown in (10b) (where *e* stands for an empty category, an empty object in this case). On the other hand, the sloppy reading will be that *the spy* ate *the document* after memorizing it, as shown in (10c).

(10) a. Which document did the spy memorize before eating?

<div align="right">(Pérez-Leroux et al. 2006: 3)</div>

     b. Which document did the spy memorize before eating *e*?
     c. [Which document]ᵢ did the spy memorize *e*ᵢ before eating *e*ᵢ?

The latter interpretation is a parasitic gap interpretation (Chomsky 1981) which refers to the fact that one gap (i.e. the second *e* in (10c)) appears to be dependent on another gap (i.e. the

first *e* in (10c)). This means that one gap can appear only by virtue of the appearance of the other gap, hence the former is said to be "parasitic" (Pérez-Leroux, Pirvulescu and Roberge 2008) on the latter. The parasitic interpretation as shown in (10c) requires the existence of a gap that relies heavily on an available empty object for the verb *eat*. Therefore, apart from the two entries mentioned in (8), a third possibility for *eat* needs to be provided, as in (11).

(11) *Eat₃*, transitive with null object, "ingest specified food".
                                         (Pérez-Leroux, Pirvulescu and Roberge 2008: 380)

Nevertheless, this third option is not idiosyncratic and most likely not lexical in nature, but rather a pervasive possibility that is available cross-linguistically and that is related to movement theory and the null traces the moved element leaves behind in languages like English. This is what happens in (10a), with one *e* under the natural interpretation in (10b) and with two *e* under the sloppy interpretation in (10c).

A simpler, more accurate approach would provide a single entry for the verb *eat* and derive the three uses of the discussed verb (as in 8a, 8b and 11 above) from the nature of the object used. Pérez-Leroux, Pirvulescu and Roberge (2008) propose that the simplest acquisition path would be to assume that transitive verbs are always transitive whether an object is overt or null except the cases of labile verbs, as shown in (6) and exemplified in (5). The difference between (5) and (7) lies in the syntactic re-arrangement that takes place in (5) but not in (7); that is, in (5b) no gap appears after *break* because the former object in (5a) is now the S; while in (7) a gap appears which could be lexically filled up (i.e. an overt object such as *meal*) or not (i.e. a null object). Therefore, transitivity is best considered as a (universal) grammatical property instead of a lexical property and this is the view the present dissertation adopts: the focus in then placed on the contrast in (7) and not on the contrast in (5), as presented next.

Transitivity is regarded as a syntactic constant that forces the merging of a complement and a verb. It is assumed that a V root must merge with an XP complement, so the basic transitive structure would be as shown in (12a).

(12) a. [VP V XP]
    b. [VP V DP]
    c. [VP V null N]

When the selected object is overt, (12a) is instantiated as (12b). When transitive verbs take no overt object, as in (12c), a bare N rather than a determiner phrase (DP) is merged to V. According to Hale and Keyser (2002), it can be assumed that the bare N merged with the V root enters into a semantic hyponymy relation with the V root. This means that the semantic indication of the bare N is included in that of the V root.

As a bare N, this object is non-individuated but referential (i.e. its class denotation allows it to make inference based on pragmatic situations), which eliminates the need for multiple lexical entries for transitive verbs taking null objects (as lexical entries for the verb *eat* shown in (8a), (8b) and (11)). The selectional relation that operates between V and N at the operation Merge ensures hyponymic identification (semantic-selection (s-selection)). This N can, in fact, be considered as a null cognate object (Dobrovie-Sorin 1998). The V root thus s-selects the N. Since this is the basic option available to all verbs, as represented in (12a), it can be taken to be the minimal instantiation of transitivity. That is, (12a) captures the nature and the availability of the object in transitive verbs: overt as in (12b) or null as in (12c).

Null objects appear cross-linguistically as the examples in (13) show for the three languages under consideration, English, Spanish and Chinese.

(13) a. We eat *e* at four o'clock.

     b. Comemos *e* a las cuatro.
         eat   at   four
       "We eat at four."
     c. Ngo5dei6 sei3dim2 sik6 *e*.
         we   four   eat
       "We eat at four."

However, the availability of null objects cross-linguistically is far from being a straightforward matter, as the next section will show. In particular, while null objects are possible in English, Spanish and Chinese, their distribution is not the same: in English and Spanish null objects are very much restricted and so these languages are referred to as [-null object] languages; in Chinese null objects are pervasive which makes this language a [+null object] language. The following section will provide theoretical accounts on the different distribution of null objects across languages.

1.3 Theoretical Accounts on the Distribution of Null Objects

So far different studies have captured the distribution of overt and null objects and their different manifestations across languages. These studies consider different languages and, as it will be shown, put forward several (theoretical) hypotheses. Two main approaches have been adopted and these have to do (i) with the null category under investigation and/or (ii) with the issue which is thought to capture the different distributions of overt and null objects across languages. In particular, in some cases, only objects are investigated while in others both subjects and objects are taken into consideration since overtness affects both categories; some of the studies focus on recoverability, that is, on the licensing of the null category while others focus on the nature of pronouns in different languages. The review that follows is organized in

terms of the first distinction (i.e. whether only objects or both subjects and objects are investigated), with a focus on the issue that is said to be responsible for the distribution of overt and null objects across languages.

1.3.1 Null Objects

Cummins and Roberge (2005) study the distribution and interpretation of null objects in French and argue that they are interface issues. They propose that the availability and interpretation of null objects follow from the interaction among syntax, semantics and pragmatics. They assume that null objects are syntactically present, though not being phonetically realized, a view that I have adopted in the present study as mentioned in section 1.2. and illustrated in (12). The lexical semantics of the verb then contribute to the actual or potential semantic interpretation of the null object which is thought to be merged to the V root. In other words, it can be said that the relation between a verb and its null object is one of classificatory licensing whereby "the verb identifies the null object complement to some sufficient extent" (Hale and Keyser 2002: 92). Cummins and Roberge (2005) further point out that while the semantic licensing makes it possible for the verb to identify its complements, in the case that the null object has a specific reference, the referent of the complement must be determined independently. This is the point at which pragmatics can start to play a role, as the example in (14) illustrates.

> (14) Tu as lu les pages? Tu m'as dit que tu avais lu *e*.
>   you have read the pages? you me have told that you had read
>   "Have you read the pages? You have told me that you had read them."
>
> (Cummins and Roberge 2005:53)

The empty category (*e*) in the answer is the object element that is syntactically active in the sentence. The lexical semantics of the verb *lire* ("to read") indicate that its object argument should be publications, written or printed words or sentences, or something alike. The identification of the referent of the null object then relies on pragmatic means. From the discourse context, it is very likely that one will assume that the null object refers to *les pages* ("the pages") present in the previous question. This co-reference is strongly preferred though not defeasible.

This strong pragmatic preference is formally captured in the Principle of Informativeness (I-principle) proposed by Levinson (2000). In particular, and using Levinson's (2000: 114) formulation, a distinction is made between the speaker's maxim and the recipient's corollary. On the one hand, the speaker's maxim is referred to as the maxim of minimization, that is, to say as little as necessary. In other words, the speaker will produce the minimal linguistic information sufficient to achieve his/her communicational ends. On the other hand, the recipient's corollary is referred to as the enrichment rule. It focuses on how the recipient will tend to amplify the informational content of the speaker's utterance and to assume the stereotypical relation obtained between referents and events as well as the most specific interpretation by avoiding interpretations that multiply referents.

The I-principle accounts for the default assumption of co-reference between reduced DPs (i.e. pronouns or null arguments) and full DPs. This default assumption has also been captured by other linguistic schools such as the Relevance Theory (RT), as addressed by Groefsema (1995).

RT is first proposed by Sperber and Wilson (1986) who argue that the linguistic content of an utterance underdetermines its propositional content, i.e. a semantically complete conceptual

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representation. Sperber and Wilson (1986) point out that linguistic coding and decoding is involved in communication, but that the linguistic meaning of an utterance falls short of encoding what the speaker wants to communicate: the addressee can only take the output of the linguistic decoding process as a piece of evidence about the communicator's intention. The output of the linguistic decoding process is taken to be an incomplete logical form (i.e. an incomplete conceptual representation) which the addressee has to enrich into the fully propositional form which the communicator intended to convey. This process of enriching the incomplete logical form is a pragmatic process; the points at which the logical form is incomplete have to be assigned values from the discourse context, and this assignment is done in accordance with RT. That is: "every act of ostensive communication communicates the presumption of its own optimal relevance" (Sperber and Wilson 1986: 158). An utterance is optimally relevant when it enables the addressee to derive an adequate number of contextual effects for no unjustifiable processing effort. Contextual effects can be divided into three types: strengthening (i.e. where new information causes an already existing assumption to be held at higher strength), contradiction (i.e. where new information causes the addressee to abandon a previously held assumption), and contextual implications (i.e. implications derived from the proposition expressed by an utterance together with assumptions in the context, where the implication could not be derived from either the proposition expressed by the utterance alone, or from assumptions in the context alone).

In order to derive contextual effects, a context has to be found against which the information is to be processed. RT proposes that an utterance communicates the presumption of its own optimal relevance. Because of this, the addressee can assume that the relevance of the

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utterance is given and, therefore, needs not be assessed. The task of the addressee is rather to select a context which bears out this guarantee of the relevance of the utterance.

When the addressee starts to process some new item of information, there is an initial context consisting of the assumption left over from the immediately preceding deductive process. This initial context can be extended in different directions during the interpretation process. One way of extending the context is to add assumptions used or derived in previous deductive processes. A second way is to add assumptions stored under the encyclopedic entries of concepts already present in the context or in the assumption being processed, or constructed from assumption schemas held in memory. A third way of extending the context is to add to it information about the immediately observable environment. Sperber and Wilson (1986) further propose that contexts are ordered according to accessibility and that extending the context is a cyclic process, i.e. only some extended contexts are accessible from the immediate context, but these extending contexts make further extensions accessible, etc. However, extending the context involves processing cost, which means that an addressee cannot freely access all kinds of different extensions, because this would diminish the overall relevance of the assumption being processed.

What makes an assumption immediately accessible so that it can be added to the context in one step? As mentioned above, there are in general three ways of extending the context. In the case of information from the immediately observable environment, Kempson (1988) proposes that such information can be added to the context if it is suitably picked out (i.e. made more salient than other information), for example, by pointing. In the case of assumptions and assumption schemas retrieved from memory, Sperber and Wilson (1986) propose that these are accessed via conceptual addresses. That is, concepts consist of conceptual addresses which give

access to different sorts of information, including encyclopedic information, which consists of the assumptions that a person has about the extension and/or denotation of the concept. When a conceptual address is processed, the assumptions stored under it become accessible. However, one may well have a large number of assumptions stored under a conceptual address which differ as to how much they will contribute to the relevance of a particular utterance. What then determines which particular accessible assumptions are actually accessed (i.e. added to the context)? The example in (15) is quite illustrative in this respect.

(15) a. Peter: Would you drive a Mercedes?
      b. Mary: I wouldn't drive ANY expensive car.

                                                              (Sperber and Wilson 1986: 194)

The conceptual address for *Mercedes* gives access to a range of assumptions one may have about Mercedes cars, such as that they are made in Germany, that they are reliable, that Peter's friend Ann used to own one, that they are expensive, etc. In turn, *expensive car* gives access to assumptions about expensive cars, such as that expensive cars are also expensive to insure, that they are status symbols, that a BMW is an expensive car, that a Mercedes is an expensive car, etc. However, not all these assumptions will contribute to the relevance of Mary's utterance in (15b) to the same extent. For example, the assumption that Peter's friend Ann used to own a Mercedes, along with Mary's utterance in (15b) does not give rise to any contextual effects. On the other hand, to derive the conclusion that Mary would not drive a Mercedes, one needs to assume that a Mercedes is an expensive car. The reason why this assumption, rather than others, is selected is that, unlike other assumptions, the assumption that a Mercedes is an expensive car does not just become accessible via *Mercedes*, but also via *expensive car*. Based on this account, Groefsema (1995) proposes the hypothesis that an assumption (or an assumption

schema) is immediately accessible if it is accessible from more than one conceptual address currently accessed (i.e. conceptual addresses already present in the context, and in the logical form of the utterance being processed).

This notion of immediate accessibility of assumptions plays an important role in establishing when arguments can be null. Groefsema (1995) argues that a verb can only be used with a null object argument if the interpretation of the argument is constrained in one of the following two ways: (i) an argument can be null if the verb puts a selection restriction on the argument such that it gives the addressee an interpretation in accordance with RT. For instance, the verbs *drink* and *eat* put selection restrictions on their internal arguments such that the "thing" involved is of the type "liquid" and "food" respectively. This information may be sufficient (without further enrichment) to yield an interpretation according to RT as, for example, in (16).

(16) When my tongue was paralyzed I couldn't eat *e* or drink *e*.

(Fillmore 1986: 96)

Because the activities of eating and drinking are mentioned in the context of the speaker's tongue being paralyzed, assumptions about what is involved in eating and drinking as physical activities become immediately accessible. This would also be the case in (17), although not for exactly the same reasons.

(17) We have already eaten *e*.

(Groefsema 1995: 153)

In this case, it may not be enough to recover that the people referred to by *we* have already been engaged in the physical activity of eating something of the type "food", as it is commonly known that people perform this activity regularly, so that it may not give rise to any

contextual effects. In order for the utterance to achieve relevance, the addressee has to assume that a significant instance of eating food is referred to. Since *eat* and *food* make immediately accessible assumptions about meals being the main occasions of eating food for most people, *meal* is an immediately accessible enrichment of the null argument (Groefsema 1995).

Another way of constraining the argument which, as proposed by Groefsema (1995), would license a null object argument is that (ii) the rest of the utterance makes (an) assumption(s) immediately accessible which give(s) the addressee an interpretation in accordance with RT. For instance, compare the three sentences in (18).

(18) a. Paul gave *e* to Amnesty International.
     b. *Paul gave to Ann.
     c. I always give books on birthdays.

<div align="right">(Groefsema 1995: 153)</div>

The verb *give* does not put a selection restriction on the type or instance of the "thing" given. In (18a), *give* and *Amnesty International* make the assumption that people give money to Amnesty International immediately accessible, from which it can be concluded that *Paul* gave money to *Amnesty International*. In (18b), however, *Paul*, *gave* and *Ann* do not make any assumptions concerning what kind of thing may be at stake immediately accessible, so that a relevant interpretation of sentence (18b) cannot be achieved, thus its ungrammaticality or inappropriateness. In (18c), *give* together with *birthdays* make the assumption that people give presents to other people on their birthdays immediately accessible, which offers the addressee the interpretation that the addresser always gives books to people as presents on their birthdays.

Groefsema (1995) further argues that when neither a selection restriction nor an immediate accessible assumption constrains the interpretation of the argument, this argument

cannot be null even though it may be part of the discourse context. This is due to the fact that, according to RT, a communicator tries to be optimally relevant, which means that he/she intends the utterance to provide the addressee with adequate contextual effects for as little processing effort as possible. This results in that the communicator must choose the utterance which he/she thinks is optionally relevant. When the intended interpretation of an argument is not constrained in either of the two ways mentioned above, the addressee cannot be sure which argument he/she is meant to recover, which may lead to an increase in processing effort, or failure to find an interpretation which bears out the presumption of optimal relevance. This means that such an utterance is not going to be the most optimally relevant one that the speaker can choose, which will, in turn, block its appearance in the very first place.

Groefsema's proposal (1995) indicates that null object arguments must be constrained either by selection restriction (i.e. the lexical semantics of the verb as well as the semantic implication of the discourse context) or by (an) immediately accessible assumption(s) (i.e. the semantic implication of discourse context and/or common sense and/or common knowledge shared within a certain group). This idea is in general in line with Pérez-Leroux, Cuza and Thomas's (2011) framed under the generative approach to the study of language.

Pérez-Leroux, Cuza and Thomas (2011) study the null object phenomenon in French and English and argue that null objects can be defined as a property displayed by some languages whereby a direct object can (or must) be left null in some environments (i.e. in certain discourse contexts). They point out that some languages can readily be classified as [+ null object] languages, while others are not usually considered to be [+ null object], such as French and English. However, null objects do occur in these two languages although they are syntactically,

semantically and pragmatically restricted (as in Groefsema 1995, and Cummins and Roberge 2005).

As mention in section 1.2, the basic transitive structure for both French and English will look like that in (19).

(19) [$_{VP}$ XP$_S$ [$_{v'}$ [$_v$ V] XP$_O$]]

This structure is created by Merge operations (Chomsky 1995). First, the internal argument XP (XP$_O$, object) and the verb are merged and create a VP. The subject (XP$_S$) merges in the Specifier (SPEC) position of the VP projection. In interpretative terms, the complement position is the locus of semantic identification of the object (XP$_O$): the object is s-selected by the particular verb used (Pérez-Leroux, Cuza and Thomas 2011).

A natural consequence of s-selection by V is that a (non-specific referential) null object merged with a given verb will automatically be interpreted as "prototypical" for that V. Syntactically, such a null object can be analyzed as a null bare N akin to a null cognate object (Hale and Keyser 2002, Cummins and Roberge 2005). As a bare N, this object is non-specific/non-individuated. Such type of null object is available in both English and French, as shown in (20).

(20) a. I really like to read *e* but John spends all his free time baking *e*.

b. Ce serait   mieux de finir *e* avant d'aller manger *e*.
   it would be   better to finish   before to go   eat
   "It would be better to finish up before we go to eat."

                                                                    (Pérez-Leroux, Cuza and Thomas 2011:282)

Sentence (20a) will normally be interpreted as I like to read publications such as books, newspapers, magazines, etc.; and, likewise, as *John* spends all his free time *baking* bakeable

goods such as bread, cakes, etc. *Publications* and *bakeable goods* do not have any specific

referents: they are generic and they refer to all the things that belong to their corresponding

categories. Similarly, sentence (20b) will normally be interpreted as it would be better for us to

finish our work such as a task, a project, etc. before we go to eat a meal. *Work* and *meal* do not

refer to any specific tasks or kind of food and do not have any specific referents either.

Pérez-Leroux, Cuza and Thomas (2011) further point out that referential, individuated

null objects exist in French but not in English, as shown in (21).

(21) Nikel m'a   dit de prendre une boîte bleue$_i$ dans le vestiaire. J'ai   prise *e*$_i$.
      Nikel me has told to take   one box   blue   from the locker   I have taken
      "Nikel told me to take a blue box from the locker. I took it."

(Larjavaara 2000: 77)

Although in sentence (21), the object argument of the verb *prendre* ("to take") is not

overtly realized (as indicated by the empty category), the sentence has an equivalent, as shown in

(22), in which an ACC clitic appears filling out the object position.

(22) Nikel m'a   dit de prendre une boîte bleue$_i$ dans le vestiaire. Je l$_i$'ai   prise.
      Nikel me has told to take   one box   blue   from the locker   I it have taken
      "Nikel told me to take a blue box from the locker. I took it."

(Pérez-Leroux, Cuza and Thomas 2011:282)

Sentence (21) is grammatical though it might sound unusual and would doubtless be

rejected by most speakers; on the other hand, sentence (22) is more usual and more commonly

accepted. Cummins and Roberge (2005) point out that the null object in sentence (21) is

"delinked" from the clitic. However, these null objects appears in the same contexts as those that

include a clitic (e.g. (21) and (22)), and their interpretation is the same as that of a clitic: these

null objects are definite and referential; they refer to a DP just like a clitic does.

Pérez-Leroux, Cuza and Thomas (2011) point out that this type of null object (i.e. a null object that is definite and referential) is widely attested in French though no study has demonstrated exactly to what extent. However, it is believed that its presence in French is related to the ACC clitic system. Since there is no such a system in English, this type of null object is, therefore, not available in English.

So far, the use of null objects is considered to be semantically and/or pragmatically restricted in languages such as English and French. However, as mentioned by Pérez-Leroux, Cuza and Thomas (2011), there is another group of languages in which null objects are pervasive and relatively unrestricted. These languages are classified as [+ null object] and Chinese is an example, as illustrated in (23).

(23) a. Ma1ma1 maai5zo2 jat1di1 ping4gwo2$_i$, Zoeng1saam1 sik6zo2 *e*$_i$.
      Mom   bought   some   apples   Zoeng11saam1   ate
    "Mom bought some apples. Zoengsaam ate them."

    b. Ngo5 sik6zo2 *e* laa3.
       I   ate
     "I have eaten."

In (23a), the null object is referential and specific. It refers to the *ping4gwo2* ("apples") that *ma1ma1 maai4zo2* ("mom bought"). On the other hand, in (23b) the null object is referential but generic: it refers to a meal in general. Both types of null objects are very common in Chinese.

This is to say, the restrictions studied by Cummin and Roberge in French, by Groefsema in English and by Pérez-Leroux, Cuza and Thomas in French and English do not apply to [+ null object] languages like Chinese since all these previous works studied [- null object] languages. The question then lies in what makes [+ null object] languages different from [- null object] languages. In other words, what makes the distribution of null objects different cross-linguistically? In order to answer this question, in the following subsection, I am going to take a

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broader perspective and investigate null categories (i.e. both null subjects and null objects) across languages because the availability of null categories need not be contingent on their functional role as subjects or objects.

1.3.2 Null Categories: Subjects and Objects

It is generally believed that languages allow null categories to the extent that their verbal agreement paradigm contains the phi-features that are necessary for the local recovery of the content of null arguments (Taraldsen 1978, Rizzi 1982, 1986 and Koeneman 2000, among many others). According to Taraldsen (1978), the possibility of null arguments in a language often correlates with the existence of a rich inflectional morphology, in particular, a rich agreement system. Based upon this theory and as it is also been assumed by Chomsky (1981), languages like Italian and Spanish allow a pronoun in subject position of a tensed clause to be null because there is a rich subject-verb agreement system in these languages. This agreement marking overtly present in verbal inflection is rich enough to determine or recover the content (i.e. reference) of a null subject, and thus identifies this null subject. On the other hand, in languages like English and French, agreement marking on verbs is (morphologically or phonologically) too meager to identify the content of null subjects; therefore, such pronouns need to be overt. While Taraldsen's (1978) theory holds for languages like English, French, Spanish and Italian, when taking languages like Chinese into consideration, this theory runs into difficulty since even though no rich verbal agreement morphology appears, null subjects are possible. In the case of the object, the so-called "Taraldsen's generalization" would predict that null object pronouns are illicit in all five languages given the lack of verbal agreement with the object that the five languages show. Nevertheless, the situation is precisely the reverse: null objects are allowed in

the five languages (although to a different extent). There is, therefore, a clear asymmetry between subjects and objects in this respect in languages like English, Spanish, Italian or French; and a clear symmetry in languages like Chinese. Chinese, in fact, allows null arguments (both subjects and objects) even more freely than those languages with a rich agreement system (like Spanish).

Huang (1982, 1984) explains the appearance of null arguments in both languages with a rich verbal agreement paradigm and languages without such a paradigm at all by distinguishing between sentence-oriented languages and discourse-oriented languages. He points out that discourse-oriented languages, such as Chinese, have a rule of "topic-chaining", by which the discourse topic is grammatically linked to a null sentence topic (*e*), which in turn identifies a null argument. This null argument is a variable left from the movement of the empty topic, as illustrated in (24).

(24) a. [*Discourse Topic*$_i$ [$_{CP}$ e_i lai4zo2]].
    came
  "He came."
  b. [*Discourse Topic*$_i$ [$_{CP}$ Zoeng1saam1 m4 sik1 e_i]].
    Zoengsaam   no know
  "Zoengsaam doesn't know him."

In (24), supposing that the discourse topic is *keui5* ("he"), such topic is linked to a null sentence topic (*e*) and serves as the referent for the null argument *e* in both (24a) and (24b). So the value of the null argument *e* in (24) can be recovered through the discourse topic *keui5* ("he"). The null argument can appear in either subject position (24a) or object position (24b).

Huang further observes that null objects in Chinese may not be bound by any matrix argument (thus the ungrammaticality of (25a)) because identification has to be bound by the closest constituent-commanding (c-commanding) nominal, though their reference may be bound

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by some DPs whose reference is fixed in discourse. In other words, the referent of a null object must be the discourse topic, namely, "someone or something that a given discourse is about" (Huang 1984: 541).

> (25) a. *Zoeng1saam$_i$ waa6 Lei5sei3 m4 sik1 e_i.
>   Zoengsaam   say   Leisei   not know
>   "*Zoengsaam$_i$ says Leisei doesn't know him$_i$."
>
> b. Gwo2go3 jan4$_i$, Zoeng1saam1 waa6 Lei5sei3 m4 sik1 e_i.
>   that   man Zoengsaam   say   Leisei   not know
>   "That man$_i$, Zoengsaam said Leisei didn't know him$_i$."
>
> c. [*Discourse Topic*$_i$ [$_{CP}$ Zoeng1saam1 waa6 [$_{CP}$ Lei5sei3 m4 sik1e_i]]].
>   Zoengsaam   say   Leisei   not know
>   "Zoengsaam said Leisei didn't know him$_i$."

According to Huang (1984), the null object in (25a) is a variable as it is governed by the verb *sik1* ("to know"), and cannot be co-indexed with the matrix subject *Zoengsaam* since it is not the closest c-commanding nominal. This is in line with Principle C of binding theory (Chomsky 1981), which states that a variable, like other referential expressions, cannot be bound by a c-commanding nominal occurring in an argument position, that is, it cannot be A-bound. Huang further argues that when a topic DP appears in addition to a matrix subject, an embedded null object is most naturally interpreted as bound by that topic, as shown in (25b). Huang claims that the sentence in (25c) can be structurally assimilated to that of (25b), and that the only difference between the two sentences is that the topic is overtly expressed in the former but not in the latter while it can still be inferred in the discourse. Sentence (25c) may be represented as (25b), with an empty topic binding the embedded null object, corresponding to (25b) with a lexical topic. Huang then claims that there is simply nothing missing in object position in (25b) and (25c). The embedded object has been topicalized and appears in sentence initial position. This is made possible by the discourse-oriented feature in Chinese.

Tsao (1979) argues that discourse-oriented languages have a rule of Topic DP Deletion, which operates across discourse to delete the topic of a sentence under identity with a topic in a preceding sentence. The result of such a deleting process is formally a topic chain (TC), which is a property that makes Chinese a "cool" language, using Huang's (1984) terminology. Tsao (1990) considers a TC to be a discourse unit in which a topic extended its domain to a sequence of several sentences. Each sentence in this sequence functions as an independent comment of the chain topic. The chain topic and all the comment sentences under its domain form an autonomous unit with its own properties. Li and Thompson (1981) also define a TC as a chain of clauses "in which a referent is referred to in the first clause, and then there follow several more clauses talking about the same referent but not overtly mentioning that referent", as illustrated in (26).

(26) [TC[CP1 Zoeng1saam1 maai5zo2 [TOP**jat1di1 ping4gwo2$_i$**]]. [CP2 Keui5 sik6zo2 e_i]. [CP3 Keui5 wa6 e_i hou2 hou2sik6]].
      Zoengsaam   bought   some   apples   //   he   ate   //   he   said   very delicious
   "Zoengsaam bought some apples$_i$. He ate them$_i$. He said they$_i$ are very delicious."

In (26), *jat1di1 ping4gwo2* ("some apples") in the first sentence forms the head of the TC and it extends its domain into the following clauses, in which it serves as the referent and the topic of the subsequent null arguments: object of the verb *sik6* ("to eat") in the second sentence and subject of the null copula verb in the subordinate clause in the third sentence. The three members of the TC are marked in bold type in (26). Consequently, the value of the null DPs (both in subject position, as in the third sentence of the TC, and object position, as in the second clause of the TC) can be recovered within the same TC.

Shi (1989, 1992) further develops Tsao's theory and argues that TC should be considered as a basic unit in Chinese and that it has all the syntactic functions normally assumed for CPs

(i.e. sentences). That is, TCs can, for instance, be subjects, as in (27a), or verbal complements, as in (27b).

(27) a. $[_{TC}[_{CP}[_{TOP}$ **Gam3 jau5meng2ge3 jin2jyun4**$_i$] mou5 din6si6toi4 coi2fong2 e_i], $[_{CP}$ jau6 mou5jan4 jing6ceot1 e_i]] zan1 kei4gwaai3.
So   famous   actor $_i$ no TV station interview   again nobody recognize   really strange
"It is really strange that no TV station has interviewed such a famous actor$_i$ and no one has recognized him$_i$ either."

  b. Ngo5 teng1 gong2 $[_{TC}[_{CP}$ Lei5sei3 maai5zo2 $[_{TOP}$ **yat1zek3 gau2**$_i$]], $[_{CP}e_i$ zi2 sik6 ngau4juk6], $[_{CP}$ keoi5taai3taai2 m4 zung1ji3 e_i]]
I   heard   Leisei bought   one   dog   only eat beef   his wife   no like
"I heard that Leisei has bought a dog$_i$, that it$_i$ only eats beef, and that his wife does not like it$_i$."

In (27a), the TC involves two CPs. The first one includes the overt topic head of the chain *gam3 jau5meng2ge3 jin2jyun4* ("such a famous actor") as well as a null object of the verb *coi2fong2* ("to interview"). This null object as well as the null object of the verb *jing6ceot1* ("to recognize") in the second CP are null topics whose referent is the head of the chain. The TC then serves as the subject of the matrix sentence. On the contrary, in English, the clause "no TV station has interviewed such a famous actor and no one has recognized him either" is the subject of the matrix sentence and it is embedded as a constituent. The objects in such clause are overtly realized.

In (27b), the TC involves three CPs. The first one includes the overt topic head of the chain (*jat1zek3 gau2* "a dog") which is the object of the sentence. This topic serves as the referent of the null subject in the second CP and the null object in the third CP both within the same TC. The TC then functions as the object of the matrix sentence.

Based upon the previous studies of TCs in Chinese, Li (2004) recently proposes that a topic in a TC cannot only serve as the antecedent and be referred to anaphorically by the zero DP(s) in the following clause(s), but also serve as the postcedent, appear in any subsequent sentence(s) within the same TC and be cataphorically referred to by the zero DP(s) in the

previous sentence(s). This implies that a topic does not have to occur overtly in the first link of the TC, as shown below in (28).

(28) a. [$_{TC}$[$_{CP}$ e_i Co5zo2 jat1zan6], [$_{CP}$ e_i jam2zo2 bui1 seoi2], [$_{CP}$ [$_{TOP}$ **Zoeng1saam1$_i$**] hoi1ci2 gong2je5]].
           Sat   a while   drank   glass water   Zoengsaam   began   talk
    "After he$_i$ sat for a while and drank a glass of water, Zoengsaam$_i$ began to talk."

  b. [$_{TC}$[$_{CP}$ e_i Nam2dou3 li1dou6], [$_{CP}$ [$_{TOP}$**Zoeng1saam1$_i$**] soeng2 faan1 uk1kei2], [$_{CP}$ e_i zoeng1 zan1soeng3 gong2bei2 Lei5sei3 teng1]].
      Think to   here   Zoengsaam   want return home   hold   truth   tell to Leisei hear
    "When he$_i$ thought of this, Zoengsaam$_i$ even wanted to return home and told Leisei the truth."

The TCs in (28a) and (28b) involve three CPs respectively. In (28a) the subjects in the first two clauses are null and their referent *Zoengsaam* appears in the last CP of the TC. In (28b), the subjects in the first and the third clauses are null and their referent *Zoengsaam* appears in the second clause. This means that, regardless of which clause the head of the TC appears in, and providing that the clauses are under the domain of the TC, the value of the null arguments in such clauses can be recovered by the topic either through anaphoric or cataphoric relations. This is made possible by the discourse-oriented feature in Chinese: null objects (either as anaphors or cataphors) are discourse-bound.

Another property of discourse-oriented languages is topic-prominence (Li and Thompson 1976), which refers to the fact that structures are organized in terms of topicality rather than syntactic function and so the central element is the topic (the discourse notion) rather than the subject (the syntactic notion). This means that while in "subject-prominent" languages (that Huang referred to as sentence-oriented languages, as I pointed out above), such as English and Spanish, structures are organized in terms of syntax (subject-verb-object), in "topic-prominence" (or discourse-oriented) languages like Chinese, sentences are structured in terms of topic (i.e. the person/thing that is predicated) and comment (i.e. the information provided about the topic). Furthermore, the sentences of the form topic-comment abound and must count as basic forms in

that they cannot be plausibly derived from other, more basic forms in such languages. This basic form is determined by the relationship between old information (topic or theme) and new information (comment).

One might plausibly assume that the basic nature of a topic-comment sentence in such languages is what gives rise to the possibility of allowing independent sentences each of which contains a null topic with an overt antecedent or postcedent which is the topic of the matrix discourse. That is, in a TC, an overt topic (in whichever position and in whichever CP within the TC) is needed and the topic of the rest of the CPs can be null and refer to the overt one, as shown in (29a) where the overt topic appears in the second CP in the TC. Furthermore, a TC can serve as either the subject (as suggested in (29b)) or as any other verbal complement in a matrix sentence.

(29) a. [$_{TC}$ …[$_{CP}$ e_i]… [$_{CP}$ [$_{TOP_i}$]]… [$_{CP}$ e_i]…]
      b. [$_{CP}$ [$_{TC}$ … [$_{CP}$ e_i]… [$_{CP}$ [$_{TOP_i}$]]…[$_{CP}$ e_i]…]   ]

To sum up, in Chinese the nature of DP arguments as null or overt is linked to its topic-prominence property, which is attributed to the discourse-oriented feature in such language. This makes TC formation a defining property of the Chinese language and the locus of the availability (and frequency) of null objects (and subjects): the referential content of the null object is recovered within the same TC.

Jaeggli and Safir (1989) also agree on the idea that a null argument can occur only when its referential value can be recovered, that is, when the null element can be identified, which is in line with Taraldsen's (1978), Rizzi's (1982, 1986) and Huang's (1984, 1989) views. Jaeggli and Safir's study (1989) mainly focuses on null subjects. They propose that there are two conditions for null arguments to occur in a language and both of them have to hold. These two conditions

are the following: identification of the null arguments and uniformity of the morphological paradigm.

With regards to the first condition, they propose three mechanisms for the identification of null arguments: (i) local Agreement (Agr), including a tense feature; (ii) a c-commanding nominal; and (iii) a Topic. The use of local Agr to identify the reference of a null argument follows Taraldsen's (1978) theory, linking null arguments to a rich agreement system. For instance, the morphologically rich agreement paradigm in Spanish verbs makes null subjects legitimate in such language. The use of a Topic to identify null subjects follows from Huang's (1984, 1989) proposal. That is, null arguments is Chinese are bound by discourse topics.

A third method for identifying null arguments is through a c-commanding nominal. Because a c-commanding DP can also be an identifier, in languages such as Chinese, a null pronominal may be found in embedded subject position, as in (30a), but not in object position, as in (30b). This distinction is found because the empty embedded subject can be identified by the matrix subject (30a) and it functions grammatically like a pronominal rather than a variable. However, the empty object cannot be identified by the matrix subject because identification has to be by the closest nominal element, thus the ungrammaticality of (30b).

(30) a. Zoeng1saam1$_i$, keoi5$_i$ waa6 e_i mou5 gin3gwo3 Lei5sei3.
      Zoengsaam   he   say   no   saw   Leisei
      "Zoengsaam$_i$, he$_i$ said that he$_i$ didn't see Leisei."

   b. *Zoeng1saam1$_i$, keoi5$_i$ waa6 Lei5sei3 mou5 gin3gwo3 e_i.
      Zoengsaam   he   say   Leisei   no   saw
      "Zoengsaam$_i$, he$_i$ said that Leisei didn't see him$_i$."

In addition to a recoverable referential value, Jaeggli and Safir (1989) also propose a second necessary condition, namely a morphological uniform paradigm for the legitimation of null subjects. They propose the formulation of the Null Subject Parameter (NSP) in (31) as a

principle of Universal Grammar (UG) that distinguishes [+ null subject] and [- null subject] languages.

(31) Null subjects are permitted in all and only languages with morphologically uniform inflectional paradigms (Jaeggli and Safir 1989: 29).

The NSP as defined in (31) provides a plausible explanation for why both languages with a rich subject-verb agreement system (e.g. Spanish) and languages with no agreement at all (e.g. Chinese) allow null subjects; while languages with a poor subject-verb agreement system (e.g. English) do not allow null subjects. According to Jaeggli and Safir (1989), a morphological paradigm is uniform if all verbal paradigms have either only underived inflectional forms or only derived inflectional forms. For example, the Spanish inflectional paradigm consists entirely of morphologically derived inflectional forms, hence null subjects are allowed; in Chinese, all verbal paradigms have only underived forms, hence null subjects are also allowed. English, however, is morphologically mixed. That is, a few verbs, such as *be* and *have*, show some derived inflectional forms, whereas the majority of verbs shown overt inflectional markers only for the third person singular present tense form. Therefore, such "mixed" system makes null subjects unlicensed.

To summarize, failure to satisfy either of the two necessary and sufficient conditions, namely a recoverable referential value for the thematic null subject (in any of its three possible mechanisms) and a morphologically uniform paradigm, will result in the prohibition of null subjects in a language.

These two conditions as proposed by Jaeggli and Safir (1989) also provide some insight into the legitimation of null objects. First of all, since none of the three languages (English, Chinese and Spanish) exhibits verb-object agreement, a morphologically uniform paradigm is

observed in all the three languages and so null objects are predicted to be possible in the three languages. However, when it comes to the other condition, a recoverable referential value, problems merge. First, since there is no agreement between a verb and its object in none of the three languages, the object cannot be recovered through a local Agr as it does not provide any information about the object. Second, since a DP in the object position can only be a variable but not an identifier, it cannot be c-commanded by the closest nominal element. The third mechanism to identify a null argument is through a topic. According to Huang (1984, 1989), English and Spanish are sentence-oriented languages while Chinese is a discourse-oriented language. This means that in English and Spanish, the topic in a sentence cannot be chained to other sentences, thus, it cannot serve as the referent for null arguments in other sentences, as shown in (32).

(32) a. *John$_j$ said that Bill$_k$ saw e_i.

b. *Juan$_j$ dijo que José$_k$ había visto e_i.
　Juan　said that José　had　seen
　"Juan$_j$ said that José$_k$ had seen him$_i$/it$_i$."

In (32), it can be noted that *Bill* and *José* saw something or someone that is not presented in the respective sentences. However, since the value of this something or someone cannot be recovered from other sentences due to the sentence-oriented feature in English and Spanish, it cannot be identified. This lack of identification is what renders (32a) and (32b) ungrammatical.

On the other hand, in Chinese the discourse topic is grammatically linked to a null sentence topic, which in turn identifies a null argument. This null argument is a variable left from the movement of the empty topic and it can be in subject position, as shown in (24a) above, as well as in object position, as shown in (24b) and (33). Moreover, since the empty object *e* in (33)

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can only be identified by the discourse topic but not by the matrix subject (i.e. *Zoengsaam*) as previously explained in (30b), or the c-commanding DP (i.e. *Leisei*) due to a semantic reason (i.e. the sentence does not refer to the action that *Leisei* sees himself), no ambiguity occurs.

(33) *Discourse Topic*$_i$ [$_{CP}$ Zoeng1saam1$_i$ waa6 [$_{CP}$ Lei5sei3$_k$ gin3gwo3 e_i]].
                          Zoengsaam   say   Leisei saw
        "Zoengsaam$_j$ said that Leisei$_k$ saw him$_{i/*j/*k.}$"

So by applying the two conditions proposed by Jaeggli and Safir (1989) we can actually account (i) for the availability of null objects in English, Spanish and Chinese and (ii) for the widespread use of null objects in Chinese as opposed to English and Spanish.

While the focus so far has been placed on the relevance of agreement and the recoverability of null arguments, others authors explain the null argument phenomenon by considering the nature of pronouns.

Rizzi (1994) accounts for the distribution of null arguments by formulating the Empty Category Principle (ECP). The ECP not only takes into account the root clause domain and the subject/object asymmetry of null arguments in languages like English, but also considers the additional fact that null subjects are never found in sentences with fronted wh-phrases. Rizzi (1994) sees similarities between languages like German and Chinese in terms of the availability of discourse identification of empty categories, since both languages allow null topics that can be identified from discourse (Huang 1984). Rizzi's (1994: 162) formulation, as shown in (34), depends crucially on how operator-bound empty categories, in particular, null constants, are identified.

(34) Empty categories [-p] must be chain-connected to an antecedent, if they can. ([-p] empty categories include DP traces, variables and null constants bound by null operators)

A wh-trace bound by a question operator, as shown in (35a), is a variable, as its reference can range over the values permitted for the wh-phrase (in this case, the set of people who *John* will see). A null constant, as shown in (35b), differs from a wh-trace in that it does not range over a set of values but rather is fixed to an antecedent. Therefore, the null operator (i.e. OP) in constructions as in (35b) is not quantificational in the same sense as a wh-operator.

(35) a. Who$_i$ will John see t_i?
    b. John is easy [OP$_i$ [to please t_i]].

Rizzi (1994) analyzes the null topic phenomenon in German using the ECP. Sentence (36a) contains a null object, and will be analyzed as in (37a); on the other hand, sentence (36b) contains a null subject, and has (37b) as its corresponding structure.

(36) a. *e* habe ich gestern gekauft.
        have   I yesterday bought
      "I bought it yesterday."

    b. *e* habe es gestern gekauft.
        have it yesterday bought
      "I bought it yesterday."

(Rizzi 2004:85)

As shown in (36a), the object empty category is a null constant bound by the null operator in the SPEC of CP position. Since German, like Chinese, can have null topics identified from discourse, the structure is well-formed. The null constant is chained to the null operator, observing the ECP for the identification of the null category. The null operator itself needs not be so chained, since there is no potential antecedent. It picks up its reference from discourse. This is represented in (37a).

Sentence (36b), with the null subject, has the structure given in (37b). The subject empty category is a null constant in CP binding the null subject in IP (inflectional phrase) since it is

linked to a subject and is construed with agreement. The chain is thus an A chain and the subject trace in the SPEC of IP is a DP trace. Occupying the SPEC of CP makes it impossible for the null constant to have a clause-internal antecedent. The null constant in this case is therefore exempt from the antecedent requirement. The configuration thus satisfies the ECP. The null constant, like the null operator, can pick up reference from discourse.

(37) a. [$_{CP}$ e_i [$_{IP}$ habe ich gestern gekauft t_i]].
   b. [$_{CP}$ e_i [$_{IP}$ t_i habe es gestern gekauft]].

While null operators (37a) and null constants (37b) in the SPEC of CP can both be discourse-identified in German, the two types of empty categories should be distinguished: the null object bound by a null operator can only have third person reference, indicative of the properties of topic-variable chains (Rizzi 1994); on the other hand, the null subject is not limited in person as it is not bound by a null operator but coindexed with a null constant.

(38) *Wann hat *e* angerufen?
      When has   telephoned
      "When did he telephone?"

(Rizzi 2004:85)

Besides accounting for the possibility of both null subject and null object in German, and the semantic differences between them, Rizzi's (1994) analysis can also explain why sentences involving fronted elements, such as the one in (38), are ill formed if the subject is null. In a representation like (37b), if the SPEC of CP is occupied by fronted elements, the empty category in the SPEC of IP will have a potential antecedent. The empty category, however, cannot be identified by the fronted wh-element, which is a quantificational operator in an A' position (non-argumental position). This results in a violation of the ECP.

Although child grammar will be discussed in subsequent chapters, a note on the presence of null subjects in child English is at place here since it follows naturally from the same line of reasoning. Not being a discourse-oriented language, English cannot have null topics that pick up reference from discourse. In other words, while in principle nothing would bar null operators from occurring in the SPEC of CP in English, these elements will not be discourse-linked. In a typical clause structure, the empty category in the SPEC of IP will therefore fail to be discourse-identified. Null subjects are, therefore, prohibited in adult English except in specific registers. However, Rizzi (1994) considers the possibility of another option for children. He assumes that children may not realize that the root clause is a CP. If no material is in the CP, children may truncate the tree by peeling off from the top, so only the IP is left. In this case, the empty category in the SPEC of IP will satisfy the ECP, since it has no potential antecedent. This empty category will be a null constant.

According to Rizzi's (1994) analysis, sentences with fronted wh-elements in child English are not expected to have null subjects, for the same reason why the corresponding sentences in adult German do not allow null subjects. In sentences with fronted wh-phrases, truncation will not be possible. An empty category in the SPEC of IP position will have a potential antecedent in the SPEC of CP, which nonetheless cannot identify it, violating the ECP. The absence of null objects in English also follows from the logic of this treatment: null objects can only be licensed by null topics, which are not available in English. Null objects are, therefore, prohibited in a general term.

However, Rizzi's (1994) account above cannot explain why null objects cannot occur in embedded clauses in German, as exemplified in (39).

(39) *Hans glaubt *e* habe ich schon gesehen.
   Hans believe have I already seen
   "Hans believes that I have already seen it."

                        (Rizzi 2004:85)

Rizzi (1994: 169) further postulates another principle, namely, the Minimality Principle, to cover the absence of null objects in non-root environments in German, as shown in (40).

(40) "A null element can be discourse-identified only if it is not c-commanded sentence-internally by a potential identifier."

By this principle, empty elements in embedded object positions cannot acquire reference through null topics in the SPEC of embedded CPs, since null operators in those positions will clearly have potential c-commanding antecedents. These null topics cannot then be identified from discourse, and the sentences will be ill-formed. The principle in effect limits discourse identification to the root clause null topic.

However, it should be noted that Rizzi's (1994) generalizations do not apply in the case of discourse-oriented languages like Chinese. First of all, the assumption that variables bound by null topics are limited to third person does not hold for adult Chinese. In a simple Chinese sentence, the null subject and the null object are both analyzed as variables in the framework of Huang (1984), as previously addressed and as shown in (41b), and there is no restriction to third person reference for them, as illustrated in (41a). In other words, no subject/object asymmetry in the referential range of empty categories exists in Chinese.

(41) a. A: Nei5 gwaa3 m4 gwaa3zyu6 ngo5?
     You miss not miss   me
    "Do you miss me?"
   B: *e* gwaa3zyu6 *e*.
     Miss
    "Yes, I miss you."

  b. [$_{TOP1}$ [$_{TOP2}$ [e_1 V e_2]]]

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c. Zoeng1saam1 waa6 *e* hou2 gwaa3 *e* a33.
 Zoengsaam   say   very   miss
 "Zoengsaam said that I/you/he/she miss me/you/him/her."

Secondly, the prohibition against discourse identification in embedded contexts does not hold for adult Chinese either, as null subjects and null objects in embedded clauses can be discourse identified in the language. The example in (41c) shows that the embedded subjects and objects are free to take on first, second or third reference, and they are constrained only by Binding Theory restrictions (Chomsky 1981).

Thirdly, if discourse identification is always achieved via the null topic in the SPEC of the matrix CP, as proposed by Rizzi (1994), empty categories would not be expected to be found in Chinese providing that the SPEC of CP is already occupied by other elements, for instance, wh-phrases or sentence final particles. This restriction clearly does not govern adult Chinese, as evidenced by the sentences in (42).

(42) a. kam4yat6 *e*   heoi3zo2 bin1do6 aa3?
      Yesterday   went   where
     "Where did you/he/he go yesterday?"

b. kam4yat6 *e*   heoi3zo2 tai2 hei3 aa4?
      Yesterday   went   see movie
     "Did you/he/she go to watch a movie yesterday?"

The null subject in (42a) co-occurs with a wh-phrase, and that in (42b) with a yes-no question particle. It is clear that in Chinese, neither a wh phrase in the SPEC of CP nor a yes-no question particle occupying that position blocks discourse identification of the null subject. In other words, both interrogative elements and null subjects can occupy the SPEC of CP position.

The analysis above indicates that Rizzi's (1994) ECP might only apply to sentence-oriented languages, or that the principle should be understood as applying only as a default option.

As an alternative to Rizzi's (1994) hypothesis, Wang et al. (1992) propose that there is more than a single parameter that controls the use of null arguments. One such parameter, which can be called the Discourse-Oriented Parameter (DOP) (Huang 1984), allows languages with discourse-oriented properties to have both null subjects and null objects. These null arguments can be of one of two types. Most are variables identified by a discourse topic, while others can be null arguments bound by a c-commanding DP (i.e. null subjects in embedded subject position).

Wang et al. (1992) then argue that null arguments in languages such as Italian and Spanish are due to a separate parameter, namely, the Null Pronoun Parameter. This parameter permits null arguments when licensed by certain case-assigning maximal categories (Rizzi 1986). These arguments are empty categories of the type *pro*, identified by the person, number, and/or gender features of the licensing category. Wang et al. further point out that although subject-verb agreement is insufficient to license or identify null subjects in adult English, null subjects in child English can be explained by such parameter. The subject-object asymmetry in child English is related to the cross-linguistic observation that object agreement is much less common than subject agreement; that is, *pro* null objects are found in far fewer languages than *pro* null subjects. Children will universally posit an inflection category with the potential of being a licenser for empty subjects but not for empty objects. Hence, universally children will begin with a null subject hypothesis. Changing the parameter setting to disallow null subjects will thus only take place after morphological agreement has been analyzed.

Sano and Hyams's (1994) study, primarily based on English data, considers null arguments in child language from a perspective similar to Wang et al.'s (1992). They attribute null arguments in child language to the availability of root infinitive (RI) structures in early language and the development of inflection. They characterize the null argument as PRO, which

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could capture several distributional regularities in child language. They point out that if children's main clauses can be non-tensed, the subject position of these clauses will be ungoverned, and PRO will be licensed, hence the possibility of null subjects in root clauses. This explains the subject-object asymmetry of null arguments: the object position is always governed, and thus prohibits PRO. The absence of null subjects in embedded finite clauses follows from the fact that the subject of embedded finite clauses is always governed. Sano and Hyams (1994) further point out that the gradual disappearance of null arguments in the language development of children who speak languages like English and the continued presence of such null arguments in the language development of children acquiring languages like Italian or Japanese can be explained by means of the Inflection-feature (I-feature) parameter, as shown in (43), which captures the relationship between language acquisition and cross-linguistic variation.

(43) I feature(s) are specified (and must be checked off by verb raising by or at LF)
    +: English, French, German, Italian…
    -: Japanese…

<div align="right">(Sano and Hyams 1994: 546)</div>

Sano and Hyams (1994) assume that in [+ I feature] languages, for instance, English, the I features such as tense and agreement must be checked off at least at LF (Logical Form, that is, the point in the derivation where sentences are interpreted). On the other hand, [- I feature] languages, for instance, Japanese, are unspecified for I features like agreement in view of the lack of morphological markers. In child language, the initial state is to assume the language to be [-I feature] so that children start off by assuming that I is unspecified, and, therefore, the verb does not have to raise to I to check off its features. As a result, the SPEC of IP is ungoverned and PRO is possible. This is the explanation given to what happens in the early grammar of English-speaking children. When these children acquire the inflectional system, they will become aware

of the fact that I in English should be specified. Once I is specified, the verb will move to I at LF, and null subjects will no longer be possible as the SPEC of IP will be governed by a raised V. Children acquiring languages like Japanese will not need to raise V to I in their language development, because the I in adult Japanese is unspecified. Thus null subjects continue to be present in these languages. Sano and Hyams (1994) argue that their observation of child English shows that in sentences with modals, finite forms of the copular verb, or third person singular present tense marker -*s*, only a small percentage of null subjects are found. Sano and Hyams (1994) thus accurately predict that the acquisition of finiteness will mean the end of the null subject period for the English-speaking child, and offer a revealing account for the subject-object asymmetry of null arguments.

While many other researchers consider the null argument phenomenon from a grammatical perspective that transcends the null argument as such, Neeleman and Szendrői (2007) explain it from a functional perspective by considering the nature of pronouns. They claim that the nature of pronouns plays a role in allowing null arguments. They propose two new generalizations governing the cross-linguistic distribution of the so-called radical pro drop which refers to the type of null arguments found in Chinese, that is, pronouns can be phonetically null in both subject and object positions. Their generalizations are the following: (i) languages with both null subjects and null objects must have an agglutinating pronominal paradigm for at least one nominal feature; and (ii) languages with pronouns that are either invariant in form or fusional for case cannot have null pronouns freely (although they may have agreement-based null arguments). Their proposal provides a new perspective to the issue under investigation in that the legitimation of null arguments is determined by the morphological characteristics of the pronominal paradigm (and not of the verbal one). They use a sample of nineteen languages to

examine their generalization. According to them, since the pronominal paradigm is fusional in all Germanic languages, none of these languages allows null arguments. Neeleman and Szendrői (2007) take Swedish, Dutch and Afrikaans as examples. The Swedish pronominal paradigm, as shown in Table 1, is clearly fusional: no separate pronominal stems or case suffixes can be identified.

Table 1. Swedish Pronouns

	Nominative	**ACC**
1 SG	Jag	Mig
2 SG	Du	Dig
3 SG M	Han	Honom
3 SG F	Hon	Henne
1 PL	Vi	Oss
2 PL	Ni	Er
3 PL	De	Dem

(Neeleman and Szendrői 2007:691)

As expected, Swedish does not allow null pronominal arguments, as shown in (44a) for subjects, and in (44b) for objects.

(44) a. *I går   tok   *e* sin hatt.
        Yesterday   took   his hat
        "Yesterday, he took his own hat."
    b. *Jag har *e* inte gett   lov   att komma.
        I   have   not given permission to come
        "I didn't give her permission to come."

(Neeleman and Szendrői 2007: 691)

Even though it is fusional, some patterns can be observed in the Swedish paradigm. For instance, third person singular forms share the string *h-vowel-n* (*h-V-n*), while first and second person singular forms display the same *-ig/-in* alternation in the ACC. However, this is not sufficient to establish an agglutinating paradigm. It seems insignificant to identify *h*-V-*n* as a third person singular morpheme, as that would require listing of several otherwise unmotivated

case suffixes. It seems equally insignificant to analyze *-ig* and *-in* as case ending, since they do not generalize across the pronominal paradigm or indeed to any other nominal.

Neeleman and Szendrői (2007) point out that such patterns are reminiscent of the "family resemblances" discussed by Bybee and Slobin (1982) and Pinker and Prince (1988, 1994, 1996) in connection with English irregular verbs. These authors argue that sub-regularities among irregular verb forms are real, but should not be handled by symbol manipulation (that is, grammatical rules), but in terms of associative memory. Similarly, family resemblances among fusional pronouns should not be analyzed as part of the grammar, and hence do not affect the generalization of null arguments.

The Dutch pronominal paradigm is given in Table 2. As in the case of Swedish, it is uncontroversially fusional, though it also contains a few invariant forms.

Table 2. Dutch Pronouns

	Nominative	**ACC**
1 SG	Ik	mij
2 SG	Jij	jou
3 SG M	Hij	hem
3 SG F	Zij	Haar
3 SG Neuter	Het	
1 PL	Wij	Ons
2 PL	Jullie	
3 PL	Zij	Hun

(Neeleman and Szendrői 2007: 692)

Like Swedish, Dutch lacks the so-called pro drop. Arguments can be null only if they are topics. Otherwise, subjects and objects must be overt, as shown in (45).

(45) a. *Hem ken *e* niet.
　　　　 Him know not
　　　　 "I don't know him."

b. *Ik ken *e* niet.
    I know   not
    "I don't know him."

(Neeleman and Szendrői 2007: 673)

The pattern found in Swedish and Dutch extends to other Germanic languages. This is of some theoretical importance, because these languages vary considerably with respect to verbal agreement. The mainland Scandinavian languages and English have no or very poor agreement; Dutch, Frisian and Flemish have what one might call a "middle-class" paradigm; German and Icelandic have rich morphology. Despite this variation, none of these languages allows the so-called radical pro drop.

While Afrikaans singular pronouns must be classified as fusional, the plural ones have systematically invariant forms; they are not inflected for case, number or gender, as shown in Table 3.

Table 3. Afrikaans Pronouns

	Nominative	ACC
1 SG	Ek	My
2 SG	Jy	Jou
3 SG M	Hy	hom
3 SG F	Sy	Haar
3 SG Neuter	Dit	
1 PL	Ons	
2 PL	Julle	
3 PL	Hulle	

(Neeleman and Szendrői 2007: 693)

Since neither fusional nor invariant paradigms allow null arguments according to Neeleman and Szendrői's (2007) generalizations, Afrikaans cannot have the so-called radical pro drop, which is indeed the case, as shown in (46).

(46) a. *Ons is egter   vol vertroue dat *e* sal slaag.
      we are however full confidence that   will succeed
      "We are full of confidence, however, that we will succeed."

b. *Ons sal hulle nie toelaat om oor *e* te loop nie.
  We will them not allow   for over to walk not
  "We will not allow them to walk over us."

<div align="right">(Neeleman and Szendrői 2007: 693)</div>

Neeleman and Szendrői (2007) then turn to languages that have the so-called classical pro

drop, which refers to null subject arguments found in languages like Italian, Pashto and Greek.

They point out that Italian allows context-sensitive null arguments in the subject position of

finite clauses, as in (47a). However, it does not allow referential objects to be null, which is

illustrate in (47b).

(47) a. *e* amano Gianni.
      Love   Gianni
    "They love Gianni."

b. *Per quanto riguarda Gianni, penso che Maria ami *e*.
   for how much regards   Gianni   think   that Maria loves
   "As for Gianni, I think Maria loves him."

<div align="right">(Neeleman and Szendrői 2007: 693)</div>

Italian only allows null pronouns that agree with a verb because its pronominal paradigm

does not consist of agglutinating forms. Nominative and ACC forms are either fusional forms or

invariant as shown in Table 4. Therefore, these forms cannot undergo the so-called radical pro

drop.

Table 4. Italian Pronouns

	Nominative	ACC
1 SG	Io	Me
2 SG	Tu	Te
3 SG M	Lui	
3 SG F	Lei	
1 PL	Noi	
2 PL	Voi	
3 PL	Loro	

<div align="right">(Neeleman and Szendrői 2007: 694)</div>

As for those languages that allow both null subjects and null objects, Neeleman and Szendrői (2007) take Korean and Burmese as examples. Since the pronominal system in both languages works in a similar way, only examples in Korean will be referred to in the present dissertation, as shown in (48).

(48) a. *e* etten swul-ul cohaha-sey-yo?
            What   kind of liqueur   like
          "What kind of liqueur do you like?"

      b. Yongho-ka *e* kumwul-lo cap-ass-eyo.
          Yongho   net with   caught
        "Yongho caught it with a net."

<div align="right">(Neeleman and Szendrői 2007: 699)</div>

Korean has an agglutinating pronominal paradigm. Pronouns in Korean carry the same case particles that regular nouns do. The pronominal stems are introduced by the spell-out rules illustrated in (49); the case endings are introduced by the rules shown in (50)[5].

(49) [DP+p, -a, 1, SG]: /na/, …   [DP+p, -a, 1, PL]: /wuli/, …
     [DP+p, -a, 2, SG]: /ne/, …   [DP+p, -a, 2, PL]: /ne-huy/, …
     [DP+p, -a, 3, SG]: /ku/, …   [DP+p, -a, 3, PL]: /ku tul/

<div align="right">(Neeleman and Szendrői 2007: 699)</div>

(50) [K NOM]: /ka/   [K ACC]: /(1)ul/
     [K GEN]: /uy/   [K DAT]: /ey/, /eykey/, …

<div align="right">(Neeleman and Szendrői 2007: 700)</div>

Application of these rules gives rise to inflected pronouns like the one in (51).

(51) Ku-tul-ka
     he-PL-NOM
     "They"

<div align="right">(Neeleman and Szendrői 2007: 700)</div>

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[5] There are many more pronominal stems in Korean, but since these all inflect regularly for case, only some representative examples are given here.

Ku tul is the stem of the third person plural pronoun while *ka* indicates the nominative case of the pronoun. Therefore, *ku-tul-ka* forms the third person plural nominative pronoun, i.e. they.

Neeleman and Szendrői (2007) point out that though a sample of nineteen languages might not be enough to firmly establish typological universals, it is suggestive that they have been unable to find any so-call radical pro drop languages that violate their generalizations.

The accounts offered in the previous sections are summarized in the next one with a focus on the three languages under consideration and for the category under investigation in this dissertation, i.e. objects.

1.4 Summary: Distribution of Overt and Null DOs in English, Chinese and Spanish

In the present dissertation, the languages under investigation are English and Chinese. But since S-E bilingual children are also involved in the study, Spanish will also be referred to in this overview.

Although English and Spanish are considered as [- null object] languages and Chinese as a [+ null object] language, null DOs can be found in these three languages, as shown in (52).

(52) a. I've eaten *e*.

    b. He comido *e*.
      have eaten
     "I've eaten."

    c. Ngo5 sik6 zo2 *e* laa3.
      I   eaten
     "I've eaten."

The verb *eat* in all the three sentences in (52) takes a legitimate null DO respectively which is generic and non-individuated. However, null pronouns in DO position in English and

Spanish are subject to a number of restrictions when compared to Chinese (c.f. section 1.3). In other words, the distribution of null DOs in English and Spanish is different from that in Chinese. The examples in (53) and (54), which are structurally and semantically comparable, show both possible and non-possible contexts for the appearance of null DOs in English and Spanish respectively.

> (53) a. I see him. / John said I saw him.
> b. *I see e_i. / *John said I saw e_i.
> c. *I prefer not to see e_i. / *I prefer seeing e_i.
> d. I see e.
> e. We will eat e at four.

> (54) a. Lo veo. / Juan dijo que lo   vi.
> Him see // Juan said that him saw
> "I see him."/ "Juan said that I saw him."
> b. *Veo e_i./*Juan dijo que vi e_i.
> see   // Juan said that saw
> "I see him." / "Juan said that I saw him."
> c. *Prefiero ver e_i./ *Prefiero que no vea e_i.
> prefer   see   // prefer   that no him see
> "I prefer to see him." / "I prefer that he doesn't see him."
> d. Ya   veo e.
> already see
> "Now I see."
> e. Comeremos e a las cuatro.
>   See   at four
> "We will eat at four."

As shown in (53d) and (53e) for English and in (54d) and (54e) for Spanish, an empty pronoun e may appear as object in English and Spanish. However, when the DO is null, it may indicate a change in the meaning of the sentence, as in (53d) and (54d), whose interpretation is not "I see something", but "I understand something" instead. Another possibility for null DOs in these two languages is that the referent of such DOs is generic, as in (53e) and (54e). Outside the scope of these restrictions, DOs must be overtly realized, as in (53a) and (54a). Regardless of whether they appear in a main clause or in a subordinate clause ((53b) and (54b)), and regardless

of whether the subordinate clause is tensed or non-tensed ((53c) and (54c)), null DOs will result

in the ungrammaticality of the sentence.

However, all the possibilities for null and overt DOs in (53) and (54) above are in fact

grammatical in Chinese, as shown in (55).

(55) a. Ngo5 gin3dou2 keoi5. / Zoeng1saam1 waa6 ngo5 gin3gou3 keoi5.
       I   saw   him // Zoengsaam   say   I   saw   him
    "I saw him."/ "Zhangsan said that I saw him."
  b. Ngo5 gin3gou3 e_i. / Zoeng1saam1 waa6 ngo5 gin3dou2 e_i.
       I   saw   // Zoengsaam   say   I   saw
    "I saw him."/ "Zhangsan said that I saw him."
  c. Ngo5 ning4jyun6 m4 gin3 e_i.
       I   prefer   no   see
    "I prefer not seeing/to see him."
  d. Ngo5dei6 sei3dim2 sik6 e.
       we   at four   eat
    "We'll eat at four."

In (55), all the sentences are acceptable. That is, DOs in Chinese could be overt, as in

(55a) or null, as in (55b, c, d); null DOs do not indicate any change of the meaning of the

sentence, as shown in (55a) and (55b), which have the same meaning, regardless of whether the

DO is overt (55a) or null (55b); the referent of the null DO in Chinese can be

referential/individuated, as in (55b, c) or generic, as in (55d); null DOs can appear either in a

main clause or in a subordinate clause (55b).

The distribution of null DOs in Chinese (as shown in (55)) forms a sharp contrast with

that in English (as shown in (53)) and Spanish (as shown in (54)). English and Spanish require

DOs to be mainly overt while Chinese exhibits maximal freedom in the use of null DOs. In fact

in Chinese DOs are usually and more naturally not overtly expressed, and understanding a

sentence requires the consideration of the grammatical context, inference, knowledge of the

word, etc. on the part of the reader or hearer.

The facts presented above show how the distribution of null DOs varies cross-linguistically. In order to explain these differences, different parameters have been proposed in order to capture the fact that these are different language types (Wang et al. 1992): Chinese is a discourse-oriented language and thus is controlled by DOP (Huang 1984); English and Spanish are sentence-oriented languages and null objects in these two languages are controlled by other parameters (i.e. Taraldsen's (1978) generalization, Rizzi's (1994) ECP).

According to Cummins and Roberge (2005) (c.f. subsection 1.3.1), the distribution and interpretation of null objects are interface issues, which refers to the fact that they involve semantic, syntactic and pragmatic factors. First of all, both overt and null objects are syntactically active. Semantic licensing makes it possible for the verb to identify its complements, and this is the point at which the type of language plays a role: the licensing of null objects is mainly based on informativeness (Groefsema 1995, Levinson 2000, Pérez-Leroux, Pirvulescu and Roberge 2008) in sentence-oriented languages while this is not necessarily the case in discourse oriented languages in which topicality is the main factor.

When a null object is non-individuated, a natural consequence of s-selection by V is that such a null object merged with a given verb will automatically be interpreted as "prototypical" for that V (e.g. Groefsema 1995, Pérez-Leroux, Pirvulescu and Roberge 2008 (c.f. subsection 1.3.1). This is available in all languages, regardless of the language type. When a null object is referential, the referent of the complement must be determined independently. For discourse-oriented languages like Chinese, such null objects can be identified by the topic in a TC by considering the pragmatic factor (Cummins and Roberge 2005), by following the I-principle proposed by Levinson (2000) or by the RT as discussed by Groefsema (1995) (c.f. subsection 1.3.1). TCs make referential null objects available in Chinese. Nevertheless, such null objects are

illegal in sentence-oriented languages like English and Spanish since TCs are not available in these languages. Furthermore, in a sentence in English and Spanish in which the null object is referential, the semantics of the sentence itself does not make any assumptions concerning what kind of information may be at stake immediately accessible, so that a relevant interpretation of sentence cannot be achieved in these two languages, which is the reason why referential null objects cannot be identified under the RT (Groefsema 1995) and therefore they are illegitimate.

The distribution of null objects in languages is also considered from the perspective of recoverability (Li and Thompson 1976, Taraldsen 1978, Rizzi 1982, 1986, Huang 1982, 1984, Jaeggli and Safir 1989, c.f. subsection 1.3.2). That is, null objects have to be licensed and identified though the way to license and identify such null objects may vary across languages.

Taraldsen (1978) and Rizzi (1982, 1986) attribute the recoverability of null arguments to the verbal agreement paradigm in languages. The rich subject-verb agreement system in Spanish allows a pronoun in subject position of a tensed clause to be null: this agreement marking present in verbal inflection is rich enough to determine or recover the content (i.e. reference) of a null subject, and thus identifies a null subject. On the other hand, the lack of such a verbal agreement paradigm in English makes null subjects illegitimate. Furthermore, since neither English nor Spanish possess any verb-object agreement markings, null objects are not licensed in either language. Taraldsen's (1978) and Rizzi's (1982, 1986) theories hold for both English and Spanish as sentence-oriented languages. However, their theories do not apply to discourse-oriented languages like Chinese since even though no rich verbal agreement morphology appears, null objects are possible.

Huang (1982, 1984) argues that discourse-oriented languages like Chinese have a TC rule (c.f. subsection 1.3.2) which refers to the fact that in a discourse-oriented language, the discourse

topic is grammatically linked to a null sentence topic under the control of the same TC. A null object, which is a variable left from the movement of the empty topic, is therefore bound by the sentence topic.

Jaeggli and Safir (1989) propose that identification of the null arguments can be realized through a local agreement, a c-commanding (constituent commanding) nominal or a topic, and through a morphologically uniform paradigm. These are two necessary and sufficient conditions for the appearance of null objects (c.f. subsection 1.3.2). When applying these two conditions to the study of null DOs in English, Chinese and Spanish, first of all, a morphologically uniform paradigm is observed in these three languages since none of them exhibits verb-object agreement. Nevertheless, since there is no agreement between a verb and its object in all the three languages, the object cannot be recovered through a local agreement (Agr) as it does not provide any information about the object. In addition, since a DP in the object position can only be a variable but not an identifier, it cannot be c-commanded by the closest nominal element and thus null objects in these three languages cannot be recovered by a c-commanding nominal. The third mechanism to identify a null argument which is through a topic is what makes Chinese different from English and Spanish. On the one hand, being sentence-oriented languages, the topic in a sentence in English and Spanish cannot be chained to other sentences, and thus it cannot serve as the referent of null arguments in other sentences. On the other hand, in Chinese the topic of a TC serves as the referent of the null arguments in the sentences governed by the same TC, and thus null objects in a Chinese sentence can be identified.

Apart from investigating the different distribution of null objects in Chinese, English and Spanish based on the relevance of agreement and the recoverability of null arguments, this phenomenon can also be studied by considering the nature of pronouns in these three languages,

following Neeleman and Szendrői's (2007) proposal (c.f. subsection 1.3.2). Their two generalizations limit the distribution of null arguments (subject and object) to languages with an agglutinating pronominal paradigm for at least one nominal feature and whose pronouns are not invariant in form or fusional for case. According to these generalizations, English has fusional case morphology, as shown in (56), which violates the generalization that languages with null arguments do not allow fusional pronouns for case; therefore, pronouns in such language cannot be phonetically null.

     (56) *He* saw *him*.

The same is true of Spanish. The fact that Spanish pronouns have fusional case morphology blocks null arguments, thus overt objects are required, as shown in (57a), although null arguments in subject position are possible because they are identified by agreement, as shown in (57b).

     (57) a. *Él* ***lo***   vio.
               He him   saw
               "He saw him."

            b. ***e** lo*   vio.
               Him saw
               "He saw him."

In the case of Chinese, pronouns have invariant forms in subject and object positions, as in (58a), and only in the case of plurals the particle *men* appears, as shown in (58b).

     (58) a. *Keoi5* tai2dou2 *keoi5* laa3.
              He   saw   him
              "He saw him."

b. Ngo5   ngo5-dei6
   "I/me"   "we/us"
   Nei5   nei5-dei6
   "you"   "you"
   Keoi5   keoi5-dei6
   "He/him/she/her/it/it"   "they/them"

This property complies with both generalizations: on the one hand, pronouns in such language have invariant form for case; on the other hand, pronouns in Chinese have the number marker *men*, which indicates the plural form, and which is not fusional but agglutinating as it is placed after pronouns in singular form. In fact, the existence of number marking makes the so-called radical pro drop (i.e. null subjects and objects) in Chinese possible.

To sum up, the account above results in a typological difference between the languages concerned with here and with regards to DOs. Chinese is a [+null object] language while English and Spanish are [-null object] languages. The normative difference regarding DO realization among Chinese, English and Spanish is summarized and illustrated in (59a) for Chinese and in (59b) and (59c) for English and Spanish respectively:

(59) a. A: Hok6saang1 duk6zo2 gwo2bun2syu1$_i$ laa4?
       Students   read   that   book
     "Do the students read that book?"
    B: Keoi5dei6 duk6zo2 gwo2bun2syu1 laa3. /Keoi5dei6 duk5zo2 e_i laa3.
       They   read   that   book   // they   read
     "They read that book." / "They read it."

  b. A: Do the students read that book$_i$?
     B: Yes, they do. /Yes, they read it. / Yes, they read the book. / *Yes, they read e_i.

  c. A: ¿Los estudiantes leen aquel libro$_i$?
       The students   read that book
     "Do the students read that book?"
    B: Sí, lo$_i$ leen. / Sí, leen el libro$_i$. / *Sí, leen e_i.
       Yes it   read // yes read the book //   yes read
       "Yes, they read it."/ "Yes, They read the book."/ *"Yes, They read e_i."

As we see in the dialogue in (59a), in Chinese the DO *gwo2bun2syu1* ("that book") is legitimately null in the second sentence, while this will result in ungrammaticality in both English and Spanish in (59b) and (59c) where an overt DO (either a DP or a pronoun) is required. However, given a specific context (that is, when the referent is non-specific/non-individuated), English and Spanish could also allow null DOs, as in (60), but they are heavily restricted when compared to Chinese.

(60) a. I'm going to eat *e*.

    b. A: What are you doing?
       B: I'm reading *e*.

    c. Voy a comer *e*.
       go to eat
      "I'm going to eat."

    d. A: ¿Qué estás haciendo?
         What are doing
       "What are you doing?"
      B: Estoy leyendo *e*.
        Am   reading
      "I'm reading."

Examples (59) and (60) point to the existing differences in DO realization between [+ null object] languages (e.g. Chinese) and [- null object] languages (e.g. English and Spanish): null DOs are highly restricted in English and Spanish compared to those in Chinese; in English and Spanish, definite reference must be overtly realized, either lexically via a DP or with an DO pronoun in the case of English and with an DO clitic in the case of Spanish; while in Chinese both definite and indefinite DOs can be either phonetically overt or null.

Despite the fact that both English and Spanish belong to the [- null object] language group, differences in the distribution of null DOs can still be observed between these two languages.

In Spanish, null DOs are permissible when the noun in question is non-referential and non-countable (i.e. mass nouns), as in (61a), or when the referent is a bare plural, as in (61b) (Campo 1986, Clements 1994, 2006).

(61) a. A: ¿Compraste café?
        Bought   coffee
       "Did you buy coffee?"
    B: Sí, (yo) compré *e*.
        Yes I   bought
        "Yes, I bought it."

    b. Quería comprar libros pero (yo) no encontraba *e*.
        wanted buy   books but   I   no found
       "I wanted to buy books but didn't find any."

Campo (1986) argues that the empty DOs (*e*) in the two sentences in (61) are not PRO since the empty they are governed by the verb. They are not DP-traces either since they are not bound from an A-position: the only available A-position in the answer of (61a) and in (61b) is occupied by *yo* ("I"). Therefore, *e* in (61) must be *pro* or a wh-trace. However, *pro* is always interpreted as being definite in reference (Chomsky 1981) while, as noted above, the constructions in (61) are only possible with indefinite DOs. The only possibility for *e* then is to be treated as a wh-trace. As there is no overt wh-operator, it could be assumed that *e* is bound by the null operator OP, following Chomsky (1981) and Huang (1982). Thus, the structures in (61) would be represented as in (62) where it is clear that Campo's (1986) proposal is in line with Rizzi's ECP (1994) (c.f. subsection 1.3.2).

(62) a. OP_i [(yo) compré t_i]
          I   bought
     "I bought it."

    b. OP_i [(yo) no encontraba t_i]
           I   no   found
     "I didn't find it."

These two types of null DOs in (62) are illegitimate in English, as shown in (63), where an overt DO is required in each sentence:

(63) a. A: Did you buy coffee?
     B: *Yes, I bought *e*.

   b. *I wanted to buy books but didn't find *e*.

Another possibility for null DOs in Spanish is when a referential and countable DO referent is salient in the immediate discourse situation; in other words, when the referent is recoverable from the immediate context of the utterance, as shown in (64) (Masullo 2003). These types of null DOs usually appear in spoken Spanish.

[Context for 64: two people leaving a room, one says to the other]
(64) a. Apaga *e*.
        Turn off
        "Turn off the light/the TV etc."

   b. Cierra *e*.
        close
        "Close the door."

The null DOs shown in (64) are not allowed in English either and their appearance will result in ungrammaticality, as shown in (65). The impossibility of these types of null DOs in English seems to be generalized, that is, unrestricted lexically, as shown in (65b) and (65c).

(65) a. *Turn off *e*.
     b. *Shut *e*.
     c. *Close *e*.

The permissibility of null DOs in spoken Spanish also affects a different class of null DOs: DOs with propositional referents, which are usually, and normatively, encoded with the neuter clitic *lo*, as shown in (66) (Alamillo and Schwenter 2007).

(66) a. Juan cree que son buenos pero yo no *lo* creo.
    Juan thinks that are good   but   I   no it think
    "Juan thinks that they are good but I don't think so."
  b. No sé   *e*.
    not know
    "I don't know."

The neuter *lo* in (66a) surfaces as a DO pronoun. It refers to the sentential complement of the verb *creer* ("to think") in the first part of the sentence, i.e. *que son buenos* ("that they are good"). The neuter *lo* is null in (66b) while the sentence is still considered grammatical.

A corpus-based investigation conducted by Alamillo and Schwenter (2007) reveals that the rate of the null neuter *lo* is 27%; and it is so excluding the *no sé* ("I don't know") constructions, where, they argue, the null DO rate is as high as 82%. Alamillo and Schwenter (2007) also list the significant factors that contribute to the choice of null DOs, and the distribution of null DOs per factor considered is shown in Table 5.

Table 5. Distribution of Null DOs

Sentence type	Weight	null *lo*%	Total N	% of data
Non-declarative	0.79	48%	52	15%
Declarative	0.44	23%	291	84%
	Range 35			
YA				
Present	0.77	52%	71	20%
Absent	0.42	20%	272	79%
	Range 33			
PERSON				
1st/2nd	0.56	33%	236	69%
3rd	0.36	12%	107	30%
	Range 20			
CORPUS				
Habla Culta de Madrid	0.62	40%	99	28%
COREC	0.45	21%	244	71%
	Range 17			

(Alamillo and Schwenter 2007: 118)

In Table 5, each factor group is presented in the leftmost column in caps (a total of 5), and the individual factor values for each group are presented immediately below (a total of 8). The factor groups are presented in decreasing order of significance (as indicated by the *Range* between the highest and lowest factor values for each group). The percentage of null *lo* for each factor value, the total number of tokens per factor value, and the percentage of the data represented by each value are also included.

As can been seen in Table 5, "Corpus" is a significant factor group in the analysis. In fact, the corpora involved in the research, i.e. *Habla Culta de Madrid* and *COREC*, have rather distinct characteristics: the fact that *Habla Culta de Madrid* is selected as favoring the null *lo* could suggest that such null *lo* is more favored in conversation and less frequent in more formal spoken-language situations (e.g. lectures), like those included in *COREC* (Alamillo and Schwenter 2007).

The factor group "Person" is also proved significant in the research: first and second person subjects favor the null *lo* and third person subjects strongly disfavor it. This can be explained by saliency in the context of the utterance, which has been pointed out before as one of the pragmatic features that can explain null DOs (Masullo 2003). Since saliency in the discourse context will be dependent on and interact with the speaker and the interlocutor, i.e. 1st and 2nd person, null DOs are more likely to appear in this kind of interaction.

Another factor selected is the presence or absence of the adverb *ya* ("already"). The presence of *ya* in the same sentence favors the null pronoun, as shown in (67).

    (67) a. Te lo voy a repetir a ver si *lo* entiendes.
            You it go to repeat to see if it understand
            "I'm going to repeat it to see if you understand."

65

b. ¿Ya entendiste *e*?
   already understand
   "Do you understand now?"

The neuter *lo* is overt with the verb *entender* ("to understand") in the sentence without *ya* (67a), while a null *lo* occurs in the sentence where *ya* appears (67b). A potential explanation for this is that the adverb *ya* foregrounds the aspectual interpretation of the verb, specifically a change of state, and backgrounds the DO referent; this would explain that when the adverb is present in the sentence, the null pronoun, rather than the neuter *lo*, is preferred.

The overt or null realization of the neuter *lo* in Spanish does not seem to be straightforward and it could be a matter of preference. In English, similar structures also exist, as shown in (68).

(68) a. I understand (you) now.
   b. Now I see *e*.
   c. I get you.

All the three sentence in (68) have the same meaning: "I understand what you mean". However, in (68a), the verb *understand* can take either an overt or a null DO without changing the meaning of the sentence. In (68b), the verb *see* must take a null DO otherwise the meaning of the sentence will be "I physically see you". In (68c), the verb *get* must take an overt DO, otherwise the sentence will be ungrammatical. This seems to have something to do with lexis and they can be considered as fixed expressions. Another example is the use of the verb *know* as shown in (69).

(69) a. Please try to talk, you *know*, a little more loudly.
   b. I'm not guessing. I *know* (it)!

In (69a) the fixed expression *you know* is used parenthetically in conversation, as to fill pauses or educe the listener's agreement or sympathy. *Know* in this expression must not take an overt DO. On the other hand, in (69b), regardless of whether the verb *know* takes an overt or a null DO, the meaning of the sentence does not change: I do have the information needed to answer the question so I am not guessing the answer. Spanish structures parallel to the English ones in (69) are illustrated in (70).

> (70) a. Por favor intenta hablar, ya *sabes*, un poco más alto.
>   b. No estoy adivinando. Lo *sé*./*Sé *e*.

In Spanish, *ya sabes* is a parallel expression to *you know* in English and the verb *saber* ("to know") in such expression must not take an overt DO, as shown in (70a), as it is the case in English. However, in (70b), a null DO following *saber* will result in ungrammaticality, and this is different from English.

To sum up, mass nouns and bare plurals in Spanish are permissibly null while this is not the case in English. Apart from these, the subtle difference in the distribution of null DOs between English and Spanish also lies in some fixed expressions or in the use attributed to specific expressions.

The present chapter shows that the distribution of null DOs varies across languages. And even in a single language, the choice of overt or null DOs is not a straightforward issue. So how do children acquire the properties of DOs and in particular the null-overt distinction? Are there any differences between monolingual acquisition and bilingual acquisition? The following chapter presents existing research addressing these two questions.

Chapter 2.   The Acquisition of Objects

In this chapter, a review of some of the research on the acquisition of objects is presented, with a focus on the three languages under investigation in the present dissertation, i.e. English, Chinese and Spanish, though works on other related languages will also be considered. Works on monolingual acquisition and on bilingual acquisition are presented separately.

2.1 The Acquisition of Objects by Monolinguals

Child language at the early stages of language acquisition is characterized by the use of null categories in general and null arguments in particular. Such phenomenon occurs cross-linguistically, regardless of whether the target language requires overt arguments as objects in English or permits null arguments as objects in Chinese. Different explanations have been proposed to account for this phenomenon. The performance account assumes that the child has adult-like grammatical structures from the early stages of language acquisition but produces null arguments as a result of immature or limited processing resources. As the child's processing capacity matures, illicit null arguments will gradually decline until they largely disappear. Other accounts suggest that children start out with a grammar that is different from that of adults'. That is, child early grammar allows null arguments where the adult grammar would not. Later, the child's grammar would develop into one closer and closer to the adult language. In addition to these two accounts, some researchers also adopt a discourse-pragmatic perspective to explain the child's referential choice. That is, the child's referential choice may be discourse-motivated.

The following subsections explore the acquisition of objects in child language from these different points of views.

2.1.1 The Acquisition of Objects in English

Most of the previous works discussing the acquisition of English objects have considered the issue from a discourse-pragmatic perspective and attributed it to different factors: the child's performance limitations (Valian 1991), the child's ability to associate discourse contexts with the realization of objects (Rispoli 1992), the child's use of non-linguistic discourse-pragmatic strategies as an alternative to overt objects (Guerriero, Oshima-Takane, and Kuriyama 2006), influence from language input (Ingham 1993) and the child's conservativity and creativity based on the input (Tomasello 2000, 2001, Tomasello and Brooks 1998), and the child's null cognate object default strategy (Pérez-Leroux, Pirvulescu, and Roberge 2008). A more detailed account is presented in the following four subsections.

2.1.1.1 Performance Limitations

Valian (1991) explains children's omission of verb-arguments from the perspective of performance limitations. She assumes that from the early stages of language development children operate with an abstract knowledge of grammar but are constrained in their language production by performance limitations. In this sense, they are expected to avoid producing utterances which they "know" to be ungrammatical, although they might not be able to produce structures which they "know" are grammatical; there is, therefore, a difference between "knowing" (i.e. the competence of) and "being able to produce" (i.e. the performance of) a structure. She further explains this assumption by predicting that young children will produce a greater proportion of utterances with pure intransitive verbs which refer to verbs that can only appear with no objects (as shown in (71a)) than children who are more advanced in their language development because pure intransitive verbs do not require a direct object argument

and thus demand less processing load than transitive utterances. And then the use of pure transitive verbs, which refer to verbs that can only take an overt object (as shown in (71b)) will increase over time as processing restrictions decrease. Her second prediction is that children are assumed to "know" that direct objects are obligatory with transitive verbs and, therefore, they are expected to produce a high proportion of direct object arguments with verbs that belong to this category. Taking these two predictions as a point of departure, she further proposes that children are also able to identify mixed verbs, which refers to verbs that can appear either with an overt or a null object (as shown in (71c)), from their use in the input. Since producing an utterance with a null object requires less processing capacity than producing one with an overt object, children are initially expected to produce a lower proportion of overt object arguments with mixed verbs than with pure transitive verbs. And then children's production of overt objects with mixed verbs will also increase over time.

(71) a. He slept yesterday in the afternoon.
b. He devoured the food ravenously.
c. He was eating *e*. / He was eating an apple.

In order to test her predictions, Valian (1991) conducts a research based on American English child data. Twenty-one children are audio-taped in natural conversations playing with their mothers. The children range in age from 1;10 to 2;08. All the children are white, and the socio-economic status of their parents range from working class to upper middle class. There are two taping sessions per child-parent pair which are recorded no more than two weeks apart. Session 1 usually lasts half an hour and session 2 goes on for one hour. Taping is performed at the child's home or day care center, or in a college play room. The children's linguistic level is

measured in terms of MLU[6] values, which range roughly evenly from 1.53 to 4.38. The children are then divided into four groups, based on their MLUs. Table 6 shows the mean age and MLU of each group.

Table 6. American Children: Mean MLU, Age, and Utterance Information

	MLU	Age
Group I	1.77	2;00
Group II	2.49	2;05
Group III	3.39	2;05
Group IV	4.22	2;07

(Valian 1991:38)

Valian (1991) divides the verbs produced by the children into three categories: pure intransitive verbs, pure transitive verbs and mixed verbs. 64 verb tokens per child for Group I, 134 for Group II, 160 for Group III and 168 for Group IV contribute to the analysis.

The results of Valian's (1991) study show that the children produce more pure transitive verbs as development proceeds. Figure 1 demonstrates how the proportions of the children's verbs in the three categories change as a function of group, with the largest changes occurring between Group I and Group II: the proportion of pure transitive verbs increase at that point, and the proportions of the other two verb categories decrease.

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[6] The MLU (Mean Length of Utterance) is a measure of linguistic productivity in children. It is derived from two totals: the total number of utterances and the total number of either morphemes (standard MLU) or words (MLUw) for each speaker and in each file/transcript. Strong correlations (0.980-0.998) are found between MLU and MLUw (Arlman-Rupp, van Niekerk de Hahn, and van de Sandt-Koenderman 1976, Hickey 1991, Thordardottir and Weismer 1998, Parker and Brorson 2005). Both MLU and MLUw values are considered as reliable measures of a child's language abilities, as proposed by Brown (1973) and Parker and Brorson (2005).

Figure 1. Children's Production of Pure Transitive, Pure Intransitive and Mixed Verbs
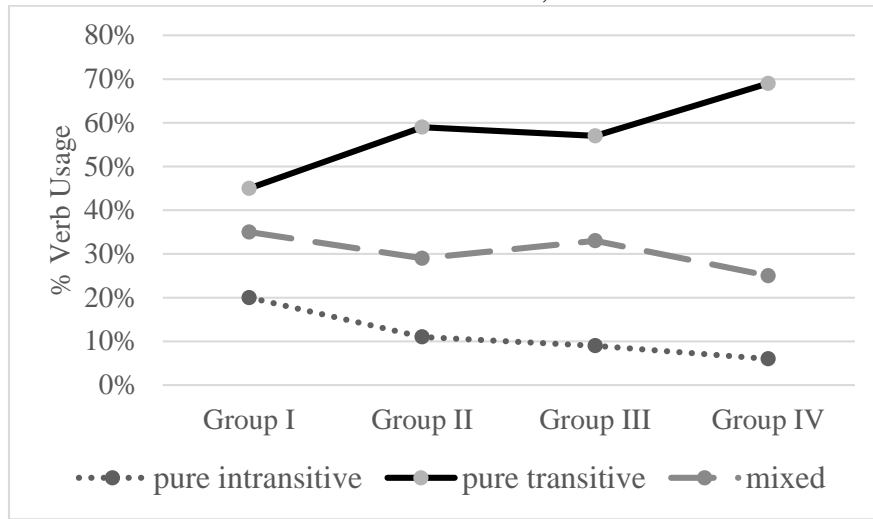
Figure 2 shows that children are reasonably constant in their use (or lack thereof) of objects for verbs which are either intransitive or pure transitive, but they slightly increase their use of objects for mixed verbs: the children seldom use objects with pure intransitive verbs and consistently use objects with pure transitive verbs, even in the early stages (i.e. Group I); on the other hand, the children's use of objects with mixed verbs increases somewhat from Group I to Group II, and remains roughly at that level.

Figure 2. Children's Production of Objects with Different Verb Types
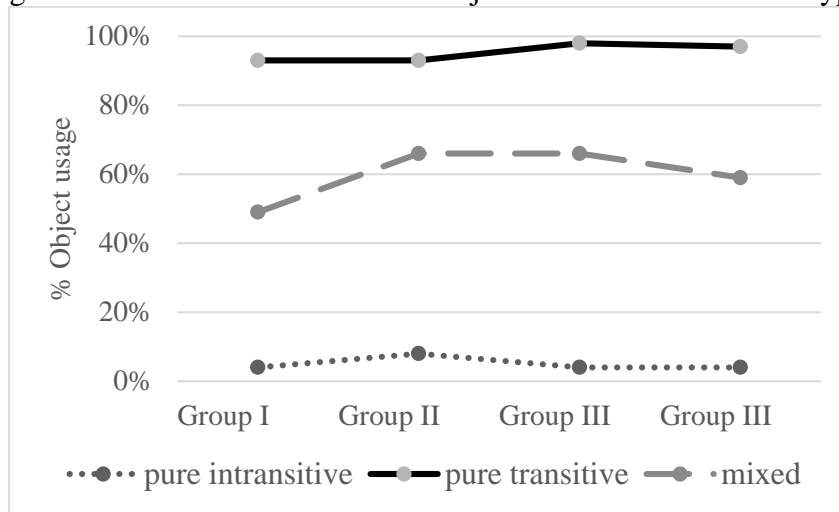
The children's use of objects with different types of verbs indicates that they have the three classes of verbs separated: they recognize the difference between the verbs that must take an overt object and verbs that must not take any objects; they also recognize the verbs that can take either overt or null objects.

The results of Valian's (1991) study also show that the children's use of objects with mixed verbs increases (from 49% to 66%) between Group I and Group II. The children also increase their use of pure transitive verbs (from 45% to 69%) as development proceeds. The researcher argues that these increases seem to be best understood as a decrease in performance limitations: overt objects are always required with pure transitive verbs, but the children have the option of using more intransitive and mixed verbs to get around the cognitive load that an additional constituent would appear to impose. As the children can handle longer sentences, they increase their use of overt objects with mixed verbs as well as their use of pure transitive verbs.

The results of Valian's (1991) study have presented evidence that performance factors are important in children's realization of objects in English.

2.1.1.2 Association between Object Realization and Discourse Conditions

While Valian (1991) attributes object omission in early child English to performance limitation, Rispoli (1992) argues that children's object realization is related to their ability to associate the realization of objects with discourse conditions, as will be shown below.

Pinker (1989) argues that the basis for the semantic representation of a predicate is an a priori, innately given, finite list of semantic features (e.g. manner of motion, manner of causation, dynamism, control of causation). This list acts as a template to help delineate the meaning of verbs. When a child hears a verb in the input, he or she begins to define the verb in

terms of this list, checking the context to determine whether or not each semantic feature in the list is compatible with the context. If a feature is incompatible, the child deletes the feature from the verb definition. The proposed procedure, the Semantic Structure Hypothesis Testing Procedure, depends on an innate, finite list of features, and relies heavily on non-verbal context.

In direct contrast, Gleitman (1990) proposes the Syntactic Bootstrapping Hypothesis, which holds that "children deduce (…) verb meanings in a procedure that is sensitive to their syntactic privileges of occurrence" (Gleitman 1990: 5). The Syntactic Bootstrapping Hypothesis is proposed as a response to the fact that there is no isomorphism between a verb and a non-verbal context. For instance, the verbs *buy* and *sell* can be used to describe exactly the same situation, but assign different actants in the situation to the nominative case argument (i.e. to the subject). Based on cases such as these, Gleitman (1990) argues that the child would have to quickly come to use surface structure, that is, explicit DP arguments, unambiguously marked for grammatical relation, to establish the meanings of verbs. However, Rispoli (1992) points out that syntactic bootstrapping alone seems an unlikely procedure for the acquisition of verb meanings for languages such as Japanese, in which liberal use of zero anaphora (i.e. null objects) is found in the bulk of the input sentences. For example, it is found that in action transitive sentences spoken by caregivers to Japanese toddlers, only 11% have explicit mention of both the actor and the undergoer, and that only 1% have both the actor and the undergoer marked unambiguously as subject and object by case-marking postpositions. Two-year-old Japanese children appear to have quite sophisticated, semantically-based verb subclasses, using verbs in appropriate speech act contexts; however, they do not have control over case-marking postpositions. In light of this evidence, Rispoli (1992) proposes that discourse and speech act information mediate between situations and surface structure, informing the child that certain null arguments are present in the

semantic representation, and that these semantic representations are developmentally prior to the acquisition of case.

Rispoli (1992) then conducts a study on the acquisition of overt and null objects in English with mixed verbs. The purpose of his study is to provide evidence that two-year-old children are sensitive to the relationship between null arguments and discourse context.

As discussed in chapter 1 (c.f. sections 1.3 and 1.4), the presence of overt and null objects is an issue which involves syntax, semantics and pragmatics. This is to say, when a child encounters a mixed verb, he or she must still discover which semantic and pragmatic features constrain the interpretation of the overt or null object. Settling on the wrong motivation would lead to ungrammatical pairings of the object to the discourse-pragmatic context. Rispoli (1992) points out that in the observation of young children's use of mixed verbs, both those with overt objects and those with null objects across relevant discourse contexts, at some point in the development, a functional differentiation between the two argument structures should be found. Observing such differentiation would provide evidence that the children are sensitive to the connection between null objects and discourse context.

Rispoli's (1992) study involves forty English-speaking children from the Kansas City area. The children are audio-taped at home for an hour every month from 1;00 to 3;00. The children are racially and socio-economically diverse. The study focuses on a single mixed verb, i.e. *eat*, which is found in all the forty children's data. Sentences with the verb *eat* that are clearly not spontaneous are eliminated, which include immediate word-for-word imitations, the child's own self-repetitions and parts of poems, songs or routines. Only completely comprehensible sentences are used in the analyses. The children's sentences are coded for the presence of an overt object. Food items and meal names are assumed to be objects. Demonstratives, anaphoric

pronouns and quantifiers found in post-verb position are also coded as objects. Two contrasting

discourse contexts are defined: a context in which an overt object is required (which is termed

"undergoer accessible context" by the author) and a context which is open to a null object (which

is termed "open context" by the author). The contrast in discourse context is applied only to

response sentences, i.e. children's sentences which respond to another speaker's immediately

prior utterances within a single episode, as shown in (72). Sentences that either initiate an

episode or continue a child's turn are not coded for discourse context.

(72) Parent: We got a whole lot of bacon
     Child: Can I eat it?

(Rispoli 1992: 586)

The children's linguistic development is measured by both MLU and cumulative verb

lexicon (CVL), which Rispoli (1992) argues that is cumulative with age and that as children

acquire more verb types, they are expected to be more aware of argument-structure alternations,

such as the overt-null object alternation. Table 7 presents the number of *eat* sentences produced

as well as the null object rate at each CVL level, mean MLU level and mean age.

Table 7. Frequency of *eat* Sentence across Five Levels of CVL

CVL levels	Mean MLU	Mean age	Total sentences	Sentences with a null object	Null object %
≤75	1.60	1;10	180	129	72%
> 75 to ≤150	2.40	2;03	315	114	36%
>150 to ≤225	3.05	2;06	327	101	31%
>225 to ≤300	3.56	2;08	205	45	22%
>300	3.86	2;09	249	50	20%

(Rispoli 1992: 588)

From Table 7 it can be noted that age correlates with CVL and MLU. As the children get

older, their CVL size and MLU increase, and the null object rate decreases.

Table 8 presents the frequency and null object rate for response sentences, further divided into undergoer accessible and open contexts.

Table 8. Frequency and Null Object Rate in Conversational Responses

CVL levels	Mean MLU	Mean age	Undergoer accessible		Open	
			%Overt object	%*Null object	%Overt object	%Null object
≤75	1.60	1;10	34%	66%	30%	70%
> 75 to ≤150	2.40	2;03	74%	26%	55%	45%
>150 to ≤225	3.05	2;06	73%	27%	60%	40%
>225 to ≤300	3.56	2;08	90%	10%	52%	38%
>300	3.86	2;09	98%	2%	70%	30%

(Rispoli 1992: 589)

Table 8 shows that the null object rate is the closest across the two discourse contexts at the lowest CVL and MLU level: 66% in the undergoer accessible context and 70% in the open context. At the next level, there is a noticeably greater difference in the null object rate between the two discourse contexts: 26% in the undergoer accessible context and 45% in the open context, a difference of 19%. The difference in null object rate across the two types of discourse contexts remains significant in the following levels and by the highest CVL and MLU levels, the null object rate in undergoer accessible contexts is 2%, whereas in the open context, the null object rate is 30%, a difference of 28%. These data indicate that the association between discourse context and null object becomes noticeably stronger as the children advance linguistically.

Rispoli (1992) then compares the children individually across a transition point between two CVL levels. Only those children who produce at least four sentences with the verb *eat* in both discourse contexts respectively at both above and below a transition point are considered. The transition point is chosen solely on the basis of the number of children that can be included in the comparison given this criterion. The transition point that allows the comparison of most

children is CVL=225 items, at which four children can be involved. Their data are presented in Table 9 and summarized in Table 10.

Table 9. Frequency of Null Object in Conversational Responses before and After CVL=225

Children	CVL<225				CVL ≥225			
	Undergoer accessible		Open		Undergoer accessible		Open	
	Overt object	Null object	Overt object	Null object	Overt object	Null object	Overt object	Null object
No. 2	5	2	0	5	5	0	4	4
No. 6	13	3	7	1	13	0	3	1
No. 28	14	7	8	2	16	0	4	1
No. 32	9	3	4	1	16	1	3	1

(Rispoli 1992: 590)

Table 10. Mean and Range of the Null Object Rate across Discourse Contexts Before and After CVL=225

Discourse context	Null Object %			
	CVL<225		CVL ≥225	
	Mean	Range	Mean	Range
Undergoer accessible	27%	19%-33%	2%	0%-6%
Open	39%	14%-100%	30%	25%-50%

(Rispoli 1992: 591)

Table 10 shows that across the transition point of CVL=225, the mean null object rate in the undergoer accessible condition of the four children falls from 27% to 2%. The figure also falls in the open context, but not as dramatically as the one in the undergoer accessible context (from 39% to 30%). Moreover, the variability in the null object rate decreases across the transition point. Before this point, the range of null object rates in the undergoer accessible context (19%-33%) is contained within the range of null object rates in the open context (14%-100%). After the transition point, the range of null object rates in the two contexts does not overlap. Rispoli (1992) argues that though the transition point is chosen based on the availability of the data without any theoretical import and only four children are involved in the individual analysis, the longitudinal data from individual children are congruent with the pooled data in an

important way: the association between object realization and the discourse context becomes stronger as the children's linguistic proficiency increases.

To sum up, Rispoli's (1992) study suggests that two-year-old children are sensitive to the relationship between null objects and discourse context. Evidence for the establishment of sensitivity can be seen at CVL level 2, or a mean age of 2;03 and mean MLU of 2.4. At this point a great increase in the difference in null object rates across discourse contexts is observed compared to the previous CVL level (from 3% to 19%) and this figure remains significant from then on.

English is a language where objects are typically overt. However, null objects are also possible under certain contextual conditions and for a set of transitive verbs, as Valian (1991) and Rispoli (1992) also show. These works suggest then that children acquiring English as a first language (L1) need to master discourse properties to fully acquire the differential properties of (null and overt) objects in English. That is, although objects are produced from the initial stages, the difficult task is to acquire the contextual and grammatical properties that are necessary for the production of null object constructions.

Similar to Rispoli's (1992) study, Guerriero, Oshima-Takane, and Kuriyama (2006) investigate the relationship between children's referential choice for verb arguments and the pragmatic features of discourse referents across different developmental stages. The researchers point out that child English is replete with null arguments, and, at some point, children need to learn that such utterances are ungrammatical in English and that overt arguments need to be supplied.

It is assumed that children understand the referents of verb arguments even when they are producing non-adult-like null arguments and that these understood referents are represented as

elements in the sentence structure (Cummins and Roberge 2005, c.f. chapter 1, subsection 1.3.1). Guerriero, Oshima-Takane, and Kuriyama's (2006) research takes a discourse-pragmatic approach, which has shown some success in explaining null arguments in adult language (Groefsema 1995, Levinson 2000, c.f. chapter 1, sections 1.2, 1.3 and 1.4). This approach is different from the performance-based approach (Valian 1991) and the competence-based approach (Hyams and Wexler 1993). The former proposes that children's ungrammatical null arguments occur at the level of speech production due to the limited capacity of producing long utterances, as we have just discussed; the latter proposes that children's underlying grammatical competence is different from adults' competence and thus allows null arguments in occasions where the adults' grammar would not. On the other hand, Guerriero, Oshima-Takane, and Kuriyama's (2006) approach integrates grammar with pragmatic principles in the understanding of how referring expressions are represented not only in syntax, but also in discourse.

Research indicates that adult speakers show sensitivity to discourse-pragmatic factors presumed to underlie the differential use of referring expressions in discourse (Du Bois 1987, Chafe 1994). Some recent studies indicate that children, like adults, also show sensitivity to the informativeness features of discourse referents and provide some preliminary support for a discourse-pragmatic explanation of child null arguments (Clancy 1993, Allen 2000, Narasimhan, Budwig and Murty 2005). To further address this issue, Guerriero, Oshima-Takane, and Kuriyama (2006) conduct a study on the referential strategies of verbal arguments in the production of monolingual English-speaking children and their mothers. The aim is to detect whether their referential choices are motivated by the pragmatic features of discourse referents. The researchers propose that null arguments in early language occur in accordance with pragmatic principles of discourse and that the same discourse-pragmatic principles are reflected

throughout development, including the eventual mastery of language-specific argument forms. They argue that the production of overt and null arguments is not random, but follows a systematic pattern and that this pattern is predicted on pragmatic features of discourse referents. The same discourse-pragmatic principles underlie all forms of argument representation, whether the referential choice is an overt or a null argument.

Guerriero, Oshima-Takane, and Kuriyama (2006) systematically analyze the relationship between the argument form (i.e. null, pronominal, or lexical) and referential status (i.e. given or new) of verb arguments in the children's and their mothers' linguistic production in two studies. Based on the discourse-pragmatic account, they propose the Language-Universal Hypothesis. That is, the mothers will tend to use lexical forms for new information but non-lexical forms (either null or pronominal) for given information when talking to their children. In the case of the child production, the researchers hypothesize that, similar to their mothers, the children will tend to lexicalize new information and non-lexicalize given information from an early stage of language development. In addition, they also hypothesize that the children's use of argument forms for given information might not necessarily be consistent with grammatical features of English from the beginning of language development, but that their use will be consistent with discourse-pragmatic principles. In other words, the children will use non-lexical forms in reference to given information, even though such forms are non-adult-like.

In study 1, analyses are performed on the referential choices of the English-speaking children and their mothers at two different time points in the children's development (i.e. 1;09 and 3;00). In study 2, analyses are conducted at four different time points in the children's linguistic development in order to trace the developmental trajectory of their referential strategies for verbal arguments more precisely (i.e. 1;09, 2;00, 2;06 and 3;00).

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Six typically-developing monolingual English-speaking children and their mothers from middle-class families in Canada are involved in study 1. The children are observed from 1;09 to 3;00. The children and their mothers visit a university playroom which serves as an observational room in which they are video-recorded. Each mother-child dyad is individually recorded in naturalistic interaction. The mothers are instructed to play and interact naturally with their children, as they will do at home. Each section covers approximately 50 minutes at 1;09 with a short break in between each 25 minutes and approximately 25 minutes at 3;00. There are twelve sessions in total, six at each age period (i.e. 1;09 and 3;00).

All transitive and intransitive verbs produced by the children and their mothers are analyzed. Sentence types include declaratives, exclamatives, imperatives, tag questions, and yes-no interrogatives. Coding is restricted to nominal referring expressions only, whether these appear as null, pronominal, or lexical arguments. All subject and direct object arguments fitting such criteria are coded for (i) the form (i.e. null, pronominal or lexical) and (ii) the pragmatic information/referential status (i.e. given or new). Only arguments appearing with matrix clauses are coded. Arguments appearing in relative or embedded clauses, subordinate clauses, *to*-infinitive clauses, or nominal *–ing* participle clauses (e.g. replying *Sleeping* as the answer to the question *What is the kitty doing now?*) are not coded, though arguments appearing within two compound clauses are. Arguments referring to activities or events (e.g. I went *fishing*) are excluded from the analysis since they do not have specific referents. Within null arguments a distinction is made between those that are grammatically accepted and those that are not. Only arguments appearing in spontaneous speech are coded, excluding those appearing in memorized or routine phrases.

The children produce an average of 106.83 intelligible utterances at 1;09 and 116.83 intelligible utterances at 3;00. Their mean MLUs are 1.44 and 3.62 in each of the two age periods respectively.

The three-way interaction among referential status, argument form and age is found to be marginally significant for the children. The children show a tendency to increase their usage of non-lexical forms in reference to given information between 1;09 and 3;00, whereas there is no corresponding increase in their usage of lexical forms. In reference to new information, while there are slightly more non-lexical forms than lexical forms at 1;09, this tendency is reversed at 3;00, at which time the children use more lexical forms than non-lexical forms. Statistical analyses have shown that the main effect of form and that of referential status are both significant, and there is a significant two-way interaction between the two. Guerriero, Oshima-Takane, and Kuriyama (2006) inspect the data and point out that this two-way interaction is due to the fact that the children talk about given information using non-lexical forms most of the time whereas they talk about new information using lexical and non-lexical forms in the same proportion. It should be noted that the children talk about given information most of the time across ages. The children's use of arguments increases as they get older (i.e. they produce more verbs) and this main effect of age is significant.

On the other hand, in the mothers' production, the three-way interaction among referential status, argument form, and children's age approaches significance. The two-way interactions between referential status and argument form, referential status and children's age, argument form and children's age are all found to be significant. The main effect of referential status and that of argument form are both significant, but no main effect of children's age is found. The mothers consistently use more non-lexical forms than lexical forms in reference to

given information, and more lexical forms than non-lexical forms in reference to new information, and this tendency is more clearly observed when the children are 3;00. Similar to their children, the mothers talk about given information more frequently than about new information across the age periods, though they talk about given information more often at the earlier age period.

The results of study 1 show that the Language-Universal Hypothesis is supported by the mothers' data but not by the children's data: the mothers tend to non-lexicalize given information and to lexicalize new information; on the other hand, at 1;09, the children tend to use more non-lexical, rather than lexical forms in reference to new information. Guerriero, Oshima-Takane, and Kuriyama (2006) argue that this phenomenon suggests that the children at this early age period do not know how to refer to new information appropriately. By 3;00, however, the children's referential choices reflect the use of appropriate discourse-pragmatic strategies: more lexical than non-lexical forms are used to refer to new information, and the children's use of non-lexical forms outnumbers that of lexical forms in reference to given information.

Guerriero, Oshima-Takane, and Kuriyama (2006) then conduct another study to analyze children's and their mothers' linguistic as well as non-linguistic pragmatic behavior and to investigate if speakers use non-linguistic pragmatic information to supplement non-lexical forms used in reference to new information. That is, if non-linguistic information as well as linguistic referential forms are considered, whether the children will show evidence of sensitivity to language-universal discourse-pragmatic principles from early stages.

Based on their findings in study 1, they propose the Non-linguistic Pragmatic Hypothesis. That is, at earlier stages of language development, the children will use a non-linguistic referential strategy, such as pointing or eye gazing in order to indicate intended referents if they

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use non-lexical forms in reference to new information. They further hypothesize that the children's use of lexical forms in reference to new arguments will increase and will become more consistent with their language development.

In study 2, longitudinal data from two monolingual English-speaking children, Alex and Nancy, from middle-class families in Canada and from their mothers are analyzed. Like in study 1, each mother-child dyad is individually video-recorded in naturalistic interaction in an observational room. The mothers are instructed to play and interact naturally with their children as they will normal do. The children and the mothers are observed at four different developmental periods, when the children are 1;09, 2;00, 2;06 and 3;00, though the children are divided into different groups based on MLU level rather than age which gives a more precise evaluation of the children's linguistic development. Four MLU levels are set: period 1 (MLU=1.00-1.99), period 2 (MLU=2.00-2.99), period 3 (MLU=3.00-3.99) and period 4 (MLU=4.00 and above). A sample of 80 coded utterances is obtained for each period for the two children, with an exception that one child produces a total of 26 utterances containing verbs at period 1. The transcription and coding processes are the same as the ones described for study 1. In addition, each argument representing a referent that is coded as "present" in the situational context is further coded for whether it is (i) accompanied by a non-linguistic pragmatic correlate or (ii) not accompanied by a non-linguistic pragmatic correlate.

The results of study 2 show that neither child produces appropriate reference to given and new information in period 1. Mastery of discourse-pragmatic skills begins to surface between periods 2 and 3, between MLU 2.00-3.00, which is in line with Rispoli's (1992) findings. Nancy seems to have mastered pronominalization of given referents as well as lexicalization of new

referents by period 2. Alex shows lexicalization of new referents by period 2, but he does not master pronominalization of given referents until period 3.

The two mothers' data show very similar patterns. Across the four periods, both mothers pronominalize given referents and lexicalize new referents, with one exception in period 2: a mother uses more pronominal than lexical references for new arguments. The children's patterns are similar to those of their mothers at the later period.

Guerriero, Oshima-Takane, and Kuriyama (2006) then specifically analyze the children's and the mothers' non-linguistic pragmatic correlates used in conjunction with non-lexical arguments in reference to new information to test their Non-linguistic Pragmatic Hypothesis. All null and pronominal arguments are combined into a non-lexical category. The results of the data analysis show that the two children almost always supplement non-lexical forms in reference to new information with additional non-linguistic correlates, ranging from 80% to 100% of the time. Similarly to their children, both mothers use additional non-linguistic information consistently whenever they use non-lexical forms in reference to new arguments, from 80% to 100% of the time.

Study 2 confirms the findings in study 1 as well as Rispoli's (1992) findings in that children are not sensitive to linguistic discourse-pragmatic principles of communication at early stages of linguistic development and that this sensitivity is developed at around 2;00-3;00. Moreover, the Non-linguistic Pragmatic Hypothesis is supported: the mothers supplement most non-lexical references to new information with non-linguistic pragmatic correlates; a strikingly similar pattern is obtained in the children. This behavior is observed from as early as period 1, which indicates that the children are in fact sensitive to the higher informational value of new referents, even though they do not use a lexical form.

Guerriero, Oshima-Takane, and Kuriyama's (2006) two studies have shown that English children's and their mothers adopt similar non-linguistic discourse-pragmatic strategies at the very early stage, and that the children's linguistic discourse-pragmatic strategies gradually approach those of their mothers. However, they do not specifically address the differences between non-lexical references, i.e. between null and overt pronominals.

2.1.1.3 Linguistic Environment: the Role of Input

Ingham (1993) investigates the relation between the argument frames used in the adult input and children's acquisition of verb syntax. He points out that the null object of a verb is related to part of the lexical specification of its argument structure, as it is illustrated in (73).

(73) a. They ran away but we followed *e*.
　　　b. John aimed at the target and missed *e*.
　　　c. The team was doing well, so Mary joined *e*.
　　　d. *They ran away but we chased *e*.
　　　e. *John aimed at the target and hit *e*.
　　　f. * The team was doing well, so Mary supported *e*.

(Ingham 1993: 96)

The examples in (73) show that null objects are ungrammatical with some verbs (as in (73d)-(73f)), but not with others (as in (73a)-(73c)). Such examples indicate that English does not have a regular anti-passive construction which, as a productive morpho-syntactic process, removes the direct object from a normally transitive verb. Rather, the appearance of some null objects with English transitive verbs has traditionally been taken to be a matter of lexical idiosyncrasy (Chomsky 1964, 1965, Wasow 1976). So how do children learn to satisfy requirements in this area of verb syntax? The lexical specificity of null objects seems to rule out acquisition by means of setting a parameter that applies across the language as a whole, in the

manner of the NSP (as seen in chapter 1, subsection 1.3.2). Ingham (1993) argues that, because of lexical specificity, the acquisition of overt and null objects seems to be more closely related to the acquisition of argument-structure alternations (Pinker 1989).

Ingham (1993) points out that the study of the learnability of verb argument structure seems to have gone through two phases. In the first (Baker 1979, Roeper 1981), it is claimed that children do not overgeneralize argument structures. This assertion is made on the basis of the requirement that language should be learnable from positive evidence only. It is argued that, because explicit correction will not be reliably available to children, they will not be able to ascertain the ungrammaticality of sentences such as those in (74).

> (74) a.*We reported the police the accident.
>   b.*They covered a blanket over her.
>   c.*The magician vanished the handkerchief.
>
> (Ingham 1993: 97)

Baker (1979) maintains that because adults do not use *report* with a double-object construction, as in (74a), children will safely avoid such errors. Therefore, input data plays a crucial role: children will use a particular construction with a verb only if that construction has been witnessed in the input with that verb.

However, empirical data have shown that children do overgeneralize verb argument structures (Bowerman 1974, 1982, Lord 1979). Children have been found to produce utterances such as those in (75) which seem to depart from the adult use of the verbs involved.

> (75) a.*I said her no. (Christy 3;01)
>
> (Bowerman 1988: 79)
>
>   b.*I'm going to cover a screen over me. (Eva 4;05)
>
> (Bowerman 1988: 80)
>
>   c.*Will you climb me up there and hold me? (Eva 3;02)
>
> (Bowerman 1988: 79)

More recently, it has been claimed that verb argument-structure overgeneralizations are a consequence of imperfect acquisition of verbs' lexical semantics and of the constraints applying to lexical rules (Pinker 1989, as mentioned previously in the present subsection, Gropen et al. 1991). When the semantic rules and properties affecting argument-structure alternations are acquired correctly, developmental errors with verb argument structures will disappear. Pinker's (1989) theory is thus able to account for developmental errors in argument structure and also provides for ways in which children can "recover" from errors and reach the adult knowledge of verb's syntactic privileges.

Whereas for Baker (1979) input data play a crucial role in ensuring the acquisition of only the adult-like argument structures, the effect of Pinker's (1989) theory is to downplay the role of the linguistic environment. In much of the experimental work by Pinker and his associates, children use a verb in unwitnessed argument structures, apparently on the basis of cognitive and semantic features of the events being denoted by that verb. They learn a novel verb in the gerund form, with no syntactic evidence in the input as to how it can be used. So what children need to acquire verb argument structures, it appears, is not item-specific syntactic evidence in the input, but appropriate knowledge of the lexical semantic representations appropriate to each verb.

Further support for Pinker's (1989) position comes from experimental findings showing that children who are given syntactic input evidence of argument structure with a novel verb do not restrict themselves to it. Without input evidence, children have been shown to create an agentive meaning for a novel verb presented intransitively (Maratsos et al. 1987); that is, presented with the novel change-of-state verb *fud* in a sentence such as the one in (76) without receiving syntactic input evidence that this novel verb can be used transitively.

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(76) The dough is *fudding*.

<div align="right">(Ingham 1993: 98)</div>

Conversely, they create a self-agentive intransitive meaning for a novel transitive verb, also without input evidence (Braine et al. 1990). For example, the experimenter produces a transitive sentence as shown in (77).

(77) I'm *mishing* the rabbit.

<div align="right">(Ingham 1993: 98)</div>

In an event being described by a novel locative verb, children encode a location or a moving entity as a grammatical direct object, depending on whichever seems to be more "affected" (Gropen et al. 1991). Ingham (1989) likewise also finds evidence that children's using a verb transitively is based, not on hearing a verb used in a transitive frame, but on learning its meaning as involving an affected entity. Therefore, children are clearly not dependent on syntactic input to provide a model for how to use a particular verb. Consequently, children are, for a time at least, prepared to use verbs in argument structures that go beyond what they have heard in the input.

The issue now comes to what causes children to retreat from overgeneralization errors. Pinker (1989) argues that children go through a period when they have not yet acquired the language-specific rules that constrain argument-structure alternations. This being the case, children produce utterances such as the examples in (79).

Two key propositions can thus be found in the argument-structure acquisition literature. One concerns children's flexibility regarding verb argument structure. The other, put forward by Pinker (1989), is that at the age when they are producing argument-structure overgeneralizations, children have not yet acquired the "narrow-range" semantic constrains on lexical rules

responsible for argument structure alternations. Taking these two propositions in conjunction, it would be natural to expect that young children's verb uses will be typically unruly and error-prone. However, in naturalistic settings, this does not seem to be the case. The errors reported by Bowerman (1974, 1982) are taken from diary studies of her own two children over a period of at least seven years. It may be assumed that the number of verb-containing utterances observed by an investigator in such a lengthy period of time would run into many hundreds of thousands, at least. However, the number of argument-structure errors reported by Bowerman in her various publications totals a few hundred at the outside. Even with two children whose argument-structure errors are numerous enough to call a researcher's attention, it can be seen then that frequent errors in verb argument structure are not characteristic of children acquiring languages. So what is it that keeps children from making errors most of the time?

Baker's (1979) approach places great theoretical weight on the ability of children's learning procedure to keep track of how a verb has been used in input. However, Pinker (1989) adopts the position that syntactic input does not constrain children's syntactic uses of verbs. The force of his learnability paradox, that is, how children retreat from overproductivity despite no negative evidence, depends crucially on the assumption that children are productive in their acquisition of argument structure. If they are reliably constrained by input, the learnability paradox will not arise. The constraints in Pinker's (1989) theory come from narrow-range semantic rules. However, as his experimental work indicates, these seem to be acquired relatively late and, therefore, apparently do not account for verbs' generally well-behaved syntactic complementation in young children's speech.

Gleitman (1990) and Landau and Gleitman (1985) draw attention to the possibility that children acquire verbs' semantic representations from the syntactic frames in which they appear,

an acquisition mechanism that has become known as "syntactic bootstrapping". However, as mentioned previously in the present section, it seems unlikely that syntactic bootstrapping alone can account for the acquisition of verb meanings for languages such as Japanese and Chinese, in which liberal use of zero anaphora is found abundant in the input sentences (as argued by Rispoli 1991).

Ingham (1993) then proposes that the acquisition of overt and null objects is an idiosyncratic matter of category-selection (c-selection), which pertains to the idiosyncratic facts about a verb that cannot be predicted from its meaning. Ingham (1993) points out that the need for c-selection can be illustrated with the contrast in (78).

(78) a. John ate *e*.
    b. *John devoured *e*.

(Ingham 1993: 101)

The semantic role of the object is the same in both sentences in (78), yet the object in (78a) can be null while it is obligatorily overt in (78b). Ingham (1993) further points out that a null object in English has often been considered as a matter of lexical idiosyncrasy. Allerton (1975, 1982) distinguishes verbs that take indefinite null objects, such as *eat*, and verbs that take contextual null objects, such as *follow*. Allerton (1982) proposes that a verb's lexical entry needs to record these particular properties. Which such indications, a direct object is held to be obligatory. Fillmore (1986) likewise argues that idiosyncratic information about null arguments is recorded in the verb's lexical entry.

Ingham (1993) then claims that the consequences for acquisition of taking a null object to be an idiosyncratic matter of c-selection are that children have to acquire which verbs allow a null object and which verbs do not since c-selection does not depend on general semantic

principles. This requires the acquisition mechanism to track verbs in the input to observe whether a null object is possible. Input information will then have a privileged role to perform: it alone will be responsible for the acquisition by children of adult-like verb use in this domain. And since c-selection is not reducible to semantic criteria, to the extent that it needs to be acquired in its own right, null objects thus need to be learned on their own terms.

Hyams (1986) and Hyams and Wexler (1993) consider that the appearance of null objects is not a grammatical process in English early grammars. In the study of data from two children, Hyams and Wexler (1993) find that obligatory objects, which refer to objects taken by pure transitive verbs, strongly tend to be overt at the stage when sentence subjects are still optional. They argue that pragmatic factors do not account for the imbalance between null subjects and null objects. They claim that presumably, the null objects that occur in their data can be attributed to performance factors, a view that is in line with Rispoli's (1992). This is to say, output limitations may have restricted the child's sentence length, or the child may have just happened to cease phonation before the object constituent is uttered, for whatever reason.

It is important to be clear about what exactly "obligatoriness" is. For Hyams (1986) and Hyams and Wexler (1993), null object *pro* is not licensed, and it is not simply the projection of a DP category in object position that is obligatory; their view is that it is the assignment of an internal argument theta-role to an overtly realized syntactic constituent that is obligatory. In other words, if children are to avoid illicit null objects, they need to know that the internal argument cannot be lexically saturated (Rizzi 1986).

However, in English, there are many verbs that can be saturated and thus can take a null object (c.f. chapter 1, sections 1.3 and 1.4). Rispoli (1992) looks at the acquisition of the null objects taken by a single verb (i.e. *eat*) in young children's natural production. He finds that at an

earlier stage of development children frequently produce a null object after *eat* when the understood object refers to something in the discourse context, as in the conversation between a parent and a child at the age of 2;06 in (79).

(79) Parent: Popcorn$_i$.
     Child: I eat ***e***$_i$.

(Rispoli 1992: 589)

This use is taken to be a violation of a discourse principle that a null object with a verb such as *eat* cannot be understood as referring to a discourse topic (Fillmore 1986). At the later stage, such violations decline almost to zero. Rispoli (1992) observes that children tend to realize more overt objects of *eat* with increasing MLU but also concludes that appropriate null objects are acquired as children's discourse abilities develop.

However, children's early production of null objects with a verb such as *eat* does not bear directly on the learnability problem of obligatoriness: *eat* is a mixed verb and thus it is very likely to find such verb taking a null object in the input. The learnability problem arises if children hypothesize object optionality with a verb. Rispoli's (1992) findings do not, therefore, engage this question. They suggest, rather, that children may register the availability of null objects with mixed verbs such as *eat* at an early stage but take some time to acquire the discourse condition on when null objects are permitted.

To address the learnability issue, it is, therefore, necessary to investigate how children use pure transitive verbs whose objects are always required to be overt in English. Do children treat such verbs differently from mixed verbs? The essential focus of this question lies in that, if children never hear a verb used with a null object, will they avoid using it with a null object? Ingham (1993) attempts to answer this question through two studies of children's acquisition of

verb transitivity. One is a case study of a single child before the age of two years old, comparing her verb use with that of her mother's. The other, an experimental study, looks at whether children acquire null objects conservatively at the age of around four years old.

In study 1, Ingham (1993) investigates if mixed verbs and pure transitive verbs coincide in the child's and in the mother's usage by analyzing the production of an American English-speaking child, Naomi, in the Sachs corpus in CHILDES (MacWhinney 2000). Utterances produced by the child between the ages of 1;08 and 1;11 and those produced by her mother during the same period are involved. Mixed verbs and pure transitive verbs are manually searched in the corpus and then coded in terms of both the nature of their object (null or overt) and in terms of the context immediately following the example. Ingham (1993) then compares the utterances with the same verbs produced by the mother with those produced by Naomi in terms of direct object realization.

The earliest samples of Naomi's production in which the targeted verbs appear are at ages 1;08 to 1;09. However, data collection is relatively infrequent at this period which contains a total of no more than 14 targeted verb tokens. At 1;10 and at 1;11 however, there are a total of 298 tokens. The results of the data analysis show that most of Naomi's uses of transitive verbs (which include both pure transitive verbs and mixed verbs) do not take an overt object. However, little can be concluded from these data because the mixed verb *push*, which can take both overt and null objects, takes up most of the tokens. There are only four tokens of verbs requiring an obligatory overt object, and, out of these, two of them appear with null objects. At age 1;10, there is a large increase in the use of transitive verbs (both mixed and pure transitive). Naomi produces in total 151 tokens, among which 14 take an overt object. At 1;11, 147 tokens are produced, all but 8 with overt objects. Of a total of 22 instances of null objects at ages 1;10 and

1;11, 9 are cases where null objects are licensed. The 13 ungrammatical uses occur with the verbs *find*, *fix*, *get* (*3), *hit*, *like*, *put* (*3), *take*, *take off* and *want*. Overall, then, from 1;10 to 1;11, Naomi can be considered to have produced direct objects in accordance with adult acceptability in 285 out of 298 cases, that is, 95.6% of the time.

During the same four-month period, the mother uses 37 transitive verbs types (including both pure transitive and mixed) that Naomi also produces. Transitive verbs in the mother's transcripts are divided into two types: (i) verbs that always take an overt object in the transcripts and (ii) verbs that appear sometimes with an overt object and some other times with a null object; all mixed verbs in the transcripts demonstrate their two different structures (i.e. followed by an overt object or by a null object). Thirty verbs produced by the mother in the transcripts always appear with an overt object, whereas only seven verbs in the mother's production appear to take both overt and null objects.

The thirty verbs used only with an overt object by the mother, which Naomi also uses, are shown in Table 11 where frequencies of object realization by the child are indicated.

Table 11. Naomi's Object Realization at 1;10-1;11 with Verbs Used Only with Overt Objects by the Mother

Verb	Overt Object	Null Object
Break	1	-
Bring	2	-
Change	1	-
Clean	5	-
Cut	1	-
Drink	2	-
Close	9	-
Do	22	-
Drop	3	-
Find	14	*[7]1
Get	14	*3
Have	1	-
Hold	1	-
Leave	4	-
Like	25	*1
Make	4	-
Move	3	-
Need	14	-
Pick up	3	-
Put	5	*3
Take	4	*1
Take off	5	*1
Tear	1	-
Throw	2	-
Use	1	-
Want	78	*1
Wash	2	1
Watch	3	-
Total	239	12

(Ingham 1993: 111)

As shown in Table 11, with the verbs that only appear to take overt objects in the mother's data, Naomi's null object rate is 12/251 (4.8%). On the other hand, as shown in Table 12, with the seven verbs that appear to take both overt and null objects in the mother's input, Naomi's null object rate is 10/50 (20%). Ingham (1993) points out that this figure is almost

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[7] *Null Object indicates that the null object is ungrammatical.

identical to the mother's null object rate (19%) with the same verbs. This difference is highly

significant on a test of proportion (z=3.4739, *p*<.0006, two tailed) (Ingham 1993:109).

Table 12. Naomi's DO Realization at 1;10-1;11 with Verbs Used with Overt and Null DOs by the Mother

Verb	Overt object	Null object
Eat	9	7
Fix	3	1
Kiss	2	-
Push	4	1
See	11	1
Read	10	-
Touch	1	-
total	40	10

(Ingham 1993: 112)

In Ingham's (1993) study 1, it is found that null objects produced by Naomi correspond

to adult grammar uses 95% of the time. At the same time, Naomi's null subject rate is 52% at

1;10 and 42% at 1;11, which departs drastically from adult-like use. This imbalance between the

production of null subjects and null objects supports the empirical claim made by Hyams and

Wexler (1993) that direct objects as a class, unlike subjects, do not appear to have been

grammatically null in Naomi's grammar. Furthermore, Ingham's (1993) study 1 also shows that

Naomi has a statistically significant preference for null objects with the verbs that appear with

both overt and null objects in her mother's input if compared to those verbs that only appear to

take overt objects. Naomi's low error rate on null objects can thus be related to input information

shown to be available to the child. Although not establishing a causal link, this finding is

consistent with the theoretical claim that null objects, where appropriate, are learned from input

and stored in a newly acquired verb's lexical representation for the child to use in his/her own

production.

From Naomi's case it appears that parental use of null objects can be linked to children's use of null objects at a fairly early stage of grammar acquisition (i.e. from 1;08-1;11). However, new verbs continue to be learned throughout childhood and into adulthood. Is there evidence that children go on making use of a lexical acquisition mechanism that pays attention to the syntactic complementation of verbs in the input? In order to answer this question, Ingham (1993) conducts a second study which looks at considerably older children to see if input evidence can be linked to null object production in an experimental setting.

In study 2, thirty-six four-year-old children attending local public and private nursery schools in the United States are involved. None of the children is reported as having speech or language difficulties, and all of them are monolingual English speakers.

The children are shown actions carried out with unfamiliar tools and are trained to produce a verb form associated with each action. In the first action, play dough is pressed into thin strips using a garlic press. In another, a toy is used to imprint a pattern on a flat piece of play dough. In the third action, small pieces of play dough are spun around by activating a toy blender. In each action, the play dough is affected by the action, though the manner in which it is affected varies across actions: the play dough undergoes a salient change of shape in the first action; its appearance is altered in the second action; in the third action, the pieces of play dough are set in motion but their shape or physical appearance does not alter.

While seeing these three actions, children hear them described using unfamiliar verb forms. These are chosen to reflect degrees of potential familiarity, at least as regards the child's recognition vocabulary. For action 1, the novel verbs *seb*, *keiz*, and *miv* are used randomly to describe the action. The advantage of introducing novel verbs is that with real English verbs, it is almost impossible to control for how they may have been used in the child's environment and

novel verbs can help to solve this problem. For action 2, the adult word *crinkler*, employed as a trade name by the manufacturers of the toy, is used to denote the tool, and the action is referred to as *crinkling*. Action 3 is denoted by the adult verb *blend*, which children might or might not have in their recognition vocabulary. From the use of these verbs one could explore the consequences for acquiring a low likelihood of previous exposure of the target item (i.e. *blend*, *crinkle*) *versus* the no previous exposure of the target item (i.e. *seb*, *keiz*, *miv*). All verbs are presented in the progressive form.

The children are divided randomly into two groups: A and B. Half of them are presented with sentences in which the verbs only take an overt DO, like the example shown in (80).

(80) I am mivving the play dough.

(Ingham 1993: 113)

Group A children receive eight presentations of each verb in this frame. Group B children hear the actions described with the same verbs but have four presentations in which the verbs take an overt DO (as shown in (80)) and another four presentations in which the verbs take a null object, as shown in the example in (81).

(81) I am mivving.

(Ingham 1993: 113)

This variable input evidence as to object realization is presented alternately. Half the children in group B hear the version with overt objects first, whereas the others hear the version with null objects first. This is done to control for order of presentation.

After the presentation stage, children are asked to respond to the stimulus question, *What is the (name of glove puppet) doing?* Responses are coded according to whether the child realizes a postverbal constituent analyzable as a direct object or not.

Four children do not make tangible responses on any of the tasks. Two are in group A and two are in group B. The remaining thirty-two children produce tangible responses on nearly all items. Table 13 shows the number of tangible responses by these children classified in terms of the input condition in which they are placed.

Table 13. Numbers of Children Giving Responses Across Groups

	Group A		Group B	
	Overt object	Null object	Overt object	Null object
Action 1	13	1	5	10
Action 2	12	4	4	9
Action 3	10	3	6	8
Total	35	8	15	27
Percentage	81.4%	18.6%	35.7%	64.3%

(Ingham 1993: 114)

From Table 13 it is clearly noted that syntactic input is associated with a sharp group difference in the overall percentages of null object uses: the null object rate in group A children (overt object only) is 18.6% while the figure in group B (variable input) is 64.3%. A test of proportion shows the group difference on responses with null objects to be highly significant (z=4.0583, $p < .0004$, two-tailed).

Although some null object uses occur in group A, they are strongly disfavored. In contrast, group B children, those who have been given input evidence of null objects, actually show a strong preference for null objects with two of the three target actions (i.e. actions 1 and 2). Avoidance of null objects with group A children occurs on all the target actions, whether the target verb is a low-frequency adult item (i.e. *blend*) or a novel item. Furthermore, the results of Ingham's (1993) study 2 also show that children do not simply prefer the frame in which they last hear the verb. In group B, those children who last hear a verb taking an overt object give responses with null objects on 12 out of 20 occasions, whereas those who hear a verb taking a

null object last give responses with null objects on 15 out of 22 occasions. The difference between these proportions is not significant (z=0.2299, *p*=.59, two-tailed). Therefore, the highly significant difference between group A and group B for responses with null objects can most plausibly be attributed to the differing input conditions of the two groups.

These results in study 2 appear to support a lexico-syntactic acquisition mechanism permitting children to acquire the frames in which verbs may appear by noting the input evidence for null objects. The lexico-semantic properties of the verbs that could be derived from nonlinguistic cognitive input are identical for the two groups, yet only group B response with a high proportion of null objects, and it is this group that have received input evidence of null objects. Consequently, the semantics of the verbs concerned cannot be held responsible for the group difference on the use of null objects. It should be further stressed that the elicitation question given to both groups is pragmatically neutral, favoring neither responses with overt or null objects. Therefore, from Study 2 it can be seen that it is very likely that the input condition is involved in the pattern of responses. It appears that children have retained the frame of verbs as presented by the experimenter and allow that lexically store information influences their response.

Another question then arises and this is why group B children's responses are 2:1 in favor of null objects rather than overt objects, despite the fifty-fifty balance of frames in the input. It cannot be said that input frequencies are closely reflected in children's production in study 2, whereas in study 1 Naomi's null object rate with verbs that appear to take both overt and null objects almost exactly matches that found in her mother's speech. In study 2 group B children are possibly treating the play dough, which is the affected object in all actions, as some kind of unspecified object retrievable from the background discourse context, in which case a null object

is favored. However, it is important to recognize that children appear reluctant to follow any such discourse rule when they lack input evidence. Group A children produce few null objects, and even those they produce are not unambiguous counterexamples to the claim being made here. They are always single-word responses using the novel verb in the progressive from, as in the exchange between the experimenter and a child shown in (82).

(82) Experimenter: Whats's (name of glove puppet) doing?
           Child: Mivving.

<div align="right">(Ingham 1993: 116)</div>

Such responses are perhaps analyzable as gerunds and do not, therefore, offer incontrovertible evidence of a verb's argument structure. At the same time, the potential ambivalence in this response type does not invalidate the outcome of the experiment. Most of group A children's responses in fact involve verbs with a direct object, unambiguously displaying their preference for the same argument structure as they have heard in the input.

A clear relationship between object realization with transitive verbs (both mixed and pure transitive) in the input to children and children's own object realization with such verbs is shown in Ingham's (1993) two studies. The speech of children acquiring the lexical representation of null objects in English reliably reflects item-specific syntactic evidence in the input. To be more specific, children are significantly less likely to produce null objects when input provides no positive evidence of null objects than they are when input offers them such positive evidence. In other words, input can constrain the acquisition of verb argument structure. In particular, children's production of an overt or a null object after a verb does not derive from its s-selection, but it is strongly influenced by the input.

A contrasting perspective on conservativity in verb acquisition is found in the work of Tomasello (2000, 2001) and Tomasello and Brooks (1998) who propose that the language abilities of a young child are exclusively conservative at the outset. Tomasello claims that "virtually all of early linguistic competence in children is item-based" (Tomasello 2001: 169). Syntactic creativity is taken to emerge later, as a by-product of acquiring a critical mass of examples. Initially, imitation provides the sole basis for language acquisition, and abstract categories and schemas eventually emerge in piecemeal fashion. The evidence in favor of extreme conservativity stems from young children's unwillingness to generalize subcategorization patterns across verbs. Tomasello (1992) reports that half of the early verbs are used in a single frame. A series of studies also suggest that young children have a strong preference for using verbs only in the sentence constructions in which they have heard them (Brooks and Tomasello 1999a, 1999b, Tomasello and Brooks 1998, among others).

Tomasello and Brooks (1998) test children's willingness to generalize transitivity patterns. Sixteen children at 2;00 and sixteen children at 2;06 from the State of Georgia in the United States are involved in the study. The children are exposed to two novel verbs *meek* and *tam* which are used to describe a novel action that is performed with a novel apparatus. The action *meeking* involves a puppet pulling a small object up a ramp. The novel verb *meek* is used to describe either the action of the puppet (when modeled in a transitive construction) or else the action of the object moving up the ramp (when modeled in an intransitive construction). For each enactment, one of the sixteen different puppets representing familiar animals and objects (e.g. puppy, airplane) is used as agent to pull the object up the ramp, and one of the sixteen toy objects (e.g. car, baby) is used as the object going up (i.e. as patient). The action *taming* involves a puppet pushing a small object which is attached with Velcro to a pendulum suspended from a

tripod, causing it to swing back and forth. For each enactment, one of the sixteen puppets (e.g. monkey, carrot) is used as agent to push an object, and one of the sixteen different toy objects (e.g. tree, bear) is used as the object swinging from the pendulum (i.e. as patient). The novel verb *tam* is used to describe either the action of the puppet (when modeled in a transitive construction) or else the action of the object swinging from the pendulum (when modeled in an intransitive construction).

Each child learns one of the novel verbs in a transitive construction (e.g. *the puppet is meeking the ball* or *the carrot tamed the bear*) and the other verb in an intransitive construction (e.g. *the ball is meeking* or *the bear is gonna tam*) with tense and aspect free to vary as appropriate to the situation. For half of the children at each age, *meek* is introduced as a transitive verb and *tam* as an intransitive verb. For the other half, *meek* is introduced as an intransitive verb and *tam* as a transitive verb.

The children are tested individually in two thirty-minute sessions conducted within the span of one week. They are taped and, in addition, a handwritten log is kept of the children's utterances. Two experimenters conduct the procedure: one interacts with the child while the other writes down what the child says. In the first session, the children hear a total number of 64 utterances with *meek*, followed by 64 utterances with *tam*. For each verb, eight sequences of models are provided, with each sequence comprising eight utterances describing the novel action of a particular pair of objects. For instance, if the novel verb *meek* is introduced in a transitive construction, the child will hear 64 utterances of the type *the (agent) is meeking the (patient)* (eight with each of the eight different pairs of objects). If *meek* is introduced in an intransitive construction, the child will hear 64 utterances of the type *the (patient) is meeking* (eight with

each of the eight different pairs of objects). The order of introduction of the verbs is counterbalanced across children.

After presenting the two novel verbs, children's usage of them is encouraged in several ways. First, at regular intervals the experimenter invites the child to name the action by saying "this is called meeking/tamming. Can you say meeking? Say meeking." Second, the experimenter provides opportunities for the child to use the novel verb by asking questions such as "what is going to happen now?", "what is happening with the (patient)?" or "what is the (agent) doing?" The experimenter uses each question format approximately 16 times for each novel verb.

In the second session, the experimenter provides three additional sequences of models for each novel verb (each sequence being made of eight utterances with a particular pair of objects) for a total of 24 additional models for each verb. As in the first session, the experimenter periodically encourages the child to use the novel verb by asking questions at regular intervals. After the third sequence of models, a final elicitation task is administered in an attempt to solicit further usages of each novel verb in the absence of any new linguistic models. First, for the first verb, two new objects are introduced and placed on one apparatus. The experimenter then asks three questions in random order. The elicitation task is repeated three times with unique pairs of objects, providing the child with nine additional opportunities to use the novel verb without prior linguistic models using those objects. The elicitation task is then repeated for the second verb, with the order of the verbs counterbalanced across the children.

The children's utterances with the novel verbs are categorized as transitive or intransitive, with transitive utterances operationally defined as either agent-verb-patient or verb-patient sequences and intransitive utterances operationally defined as either patient-verb or agent-verb

sequences. The results of the study show that when the two-year-old children are introduced to a novel verb in a transitive construction, eleven of the sixteen children produce at least a transitive utterance with the transitively introduced verb, on an average of 4.38 utterances per child. Over half of these utterances are fully transitive utterances with both the agent and the patient overtly expressed (2.13 utterances per child). The same pattern is evident for the intransitively introduced verb. Eleven of the sixteen children at 2;00 produce at least an utterance that matches the adult model, on an average of 4.69 intransitive utterances per child. These results establish that the majority of children at 2;00 can fairly quickly learn to produce a transitive utterance with a novel verb that is modeled transitively, and an intransitive utterance with a novel verb that is model intransitively. On the other hand, these children produce very few utterances that do not match the adult model with the novel verbs, even though they are put under discourse pressure to produce the "opposite" constructions on between 25 and 30 different occasions with each verb. With the verbs produced as intransitive by the adult, only three children produce transitive utterances. With the verbs produced as transitive by the adult, only four children produce intransitive utterances. For the two-year-old children in the study, the average number of matches per child across constructions is 9.1 utterances, roughly seven times the average number of mismatches across constructions which is 1.3 utterances.

Compared to the two-year-old children, the children at 2;06 in the study use the novel verbs about three times as frequently. When these children are introduced to a novel verb in a transitive construction, they produce a high number of transitive utterances. All the sixteen children produce at least one transitive utterance with the transitively introduced verb, on an average of 16.06 utterances per child. The same pattern is evident for the intransitively

introduced verbs. All the sixteen children produce an utterance that matches the adult model, on an average of 12.75 utterances per child.

In comparison to their two-year-old counterparts, the children at 2;06 are more productive with the novel verbs. But there are still some children who use their verbs in ways that do not match adult transitivity. With the verb produced by the adult as an intransitive, nine children produce at least a transitive utterance. Of the 21 tokens produced by these children, 16 are subjectless (e.g. *meek it*). Three children produce a total of five full transitive utterances expressing both the agent and the patient. More children at this age are thus able to use the verb which appears as intransitive in the adult input in a transitive way under pressure, though producing fully transitive utterances with a newly learned verb apparently generates a great processing load so that the children most often produce subjectless transitive utterances.

With the verb produced by the adult as a transitive, ten children produce a total of 30 intransitive utterances, on an average of 1.88 per child. Tomasello and Brooks (1998) argue that in many cases these intransitive utterances conform to the adult English pattern with the patient as the subject. The authors then claim that this suggests that approximately one-third of the sixteen children at 2;06 show at least some evidence of being able to use a verb they hear transitively in an intransitive utterance by using the patient as the subject, that is, as a labile verb, as mentioned in chapter 1 (section 1.2). The average number of matches per child at 2;06 across constructions is 28.8 utterances, roughly nine times the average number of mismatches across construction which is 3.2 utterances.

Different results from those of Tomasello and Brooks's (1998) study are yielded in a study with preschool and school-aged children. Brooks et al. (1999) conduct a similar experiment with twenty-four 3-year-olds, twenty-four 4 and 5-year-olds and twenty-four 8-year-

olds in the same region as in Tomasello and Brooks's (1998) study. The results of Brooks et al.'s (1999) study show that older children fully demonstrate an ability to extend the lexical frame beyond the input, particularly with unfamiliar verbs, with the 3-year-olds being the most willing to produce innovative structures, as shown in Table 14.

Table 14. Percentage of Mismatching Utterances Produced by Children as a Function of the Adult Input

	Familiar transitive verbs	Unfamiliar transitive verbs	Familiar intransitive verbs	Unfamiliar intransitive verbs
3-year-olds	46%	50%	25%	50%
4 and 5-year-olds	8%	25%	29%	42%
8-year-olds	0%	8%	21%	25%

(Brooks et al. 1999: 1330)

Taken together, the studies of Ingham (1993), Tomasello (2001), Tomasello and Brooks (1998), and Brooks et al. (1999) suggest a U-shape pattern for lexical conservativity, as shown in Graph 1.

Graph 1. U-Shape Pattern for Children's Lexical Conservativity
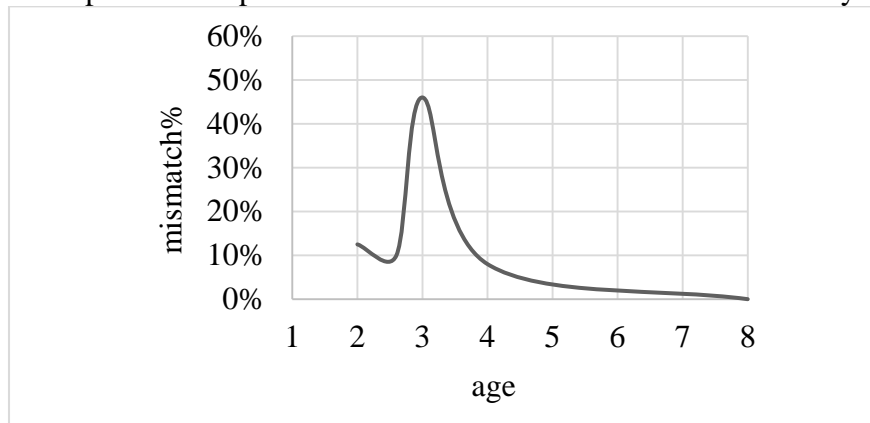
From Graph 1 it can be noted that children's initial use of verbs is faithful to input, but with development, they become productive lexical learners. Later yet, experience, which includes both positive and negative evidence, leads the child again to conservativity (Brooks and

Tomasello 1999a). In other words, children's creativity in terms of argument structure is constrained by sensitivity to the input.

2.1.1.4 Children's Null Cognate Object Default

Although the studies of Ingham (1993), Tomasello (2001), Tomasello and Brooks (1998), and Brooks et al. (1999) provide important evidence about early verb acquisition, Pérez-Leroux, Pirvulescu, and Roberge (2008) argue that the case for imitation in early language production of verbs is not very strong. Pérez-Leroux, Pirvulescu, and Roberge (2008) claim that young children do seem to exhibit productivity in generalizing novel intransitive structures out of novel transitive structures. They argue that Tomasello and Brooks (1998) only count children who produce full SVO transitive sentences as capable of lexical creativity and that they do not consider legitimate null objects so that their assessment underestimates the degree of mismatches between input and production. Even the youngest children in Brooks and Tomasello's (1999a) work produce around 5%-18% transitivity mismatches across conditions. Pérez-Leroux, Pirvulescu, and Roberge (2008) further point out that a careful examination of Tomasello and Brooks's (1998) data reveals a picture at odds with the general view that early verb production is completely conservative. The young children in their study do not avoid innovation, but they prefer null arguments to other configurations. Pérez-Leroux, Pirvulescu, and Roberge (2008) then suggest that Tomasello and Brooks's (1998) study fails to fairly represent children's lexical creativity.

To account for young children's preference of null arguments over other object configurations in language production, Pérez-Leroux, Pirvulescu, and Roberge (2008) assume that children start out with a null cognate object default. That is, the grammar starts with an all-

purpose null object N which is capable of referential features. This means that the initial referential properties of the null cognate object are broader than in the target grammar. Through experience, children learn that null objects have a more restrictive semantics in a language like English, limited to generic, non-individuated null objects, and thus the referential semantics of the null default is blocked. In other words, children set parameters (either [+null object] or [-null object]) early, and developmental changes in various modules of the grammar (morphology, syntactic computations, syntax-pragmatics interface) account for the object optionality phase.

Under this view, the learning problem for the child goes in the opposite direction of the subset principle. If the child starts with an unrestricted null object, some features of the input must aid the child in making inferences about the proper range of meanings of null objects. Pérez-Leroux, Pirvulescu, and Roberge (2008) propose that it is the degree of variability in the relevant marker that will prove relevant in the object domain.

Pérez-Leroux, Pirvulescu, and Roberge (2008) argue that it is conceivable that some types of input experience may prove more or less informative about the generic nature of the null object, whereas others may support the parametric ambiguity. Work on parental interaction in Pérez-Leroux et al. (2006) suggests that adult use of transitive verbs is highly ambiguous, often appearing in contexts with a potential available antecedent, as shown in (83).

> (83) a. *CHI: help me build (th)em.
> *FAT: help you build *e*?
>
> b. *FAT: take it away to your sear now. You should eat *e* at your seat.
> (Pérez-Leroux, Pirvulescu, and Roberge 2008: 385)

The use of *build* and *eat* with a null object in (83a) and (83b) respectively is a meaningful, interpretable choice for an adult (i.e. these are interpreted as activities, without a link

to the potential individuated and specific referent). However, for the child this could be an ambiguous structure, referring to the activities alone, or involving specific reference to the potential antecedent (i.e. *them* in (83a) and *it* in (83b)), as would be the case in [+null object] languages. Therefore, these types of sentences are not unambiguous triggers in the sense of Fodor (1998), since children cannot directly use them to make decisions about the status of null objects in the target grammar. Other property of the input that may prove relevant is association between certain related grammatical markers of genericity and non-individuation (e.g. non-finiteness, modality, aspect, adverbials, etc.) and these can gradually lead to strengthening the lexical association between null objects and the generic object activity interpretation.

Since mixed verbs can appear with either an overt or a null object, it is unlikely that the lexicon alone can support syntactic development. Pérez-Leroux, Pirvulescu, and Roberge (2008) propose that in the first stage of language acquisition, children represent a null cognate object N that bears a referential index, and that this is what allows pronominal optionality, an alternative option that is available to the children. The referential interpretation is eventually blocked out of the null object with help from the various contextual and linguistic cues. At the second stage, null objects are only used in a non-individuated sense. The default null object is retained in mature grammars, but as a semantically restricted default option used with non-individuated, generic reference. It continues to provide the computational basis for interpreting the object, when no other information is present.

Pérez-Leroux, Pirvulescu, and Roberge (2008) state that the null contexts that provide the experience that leads the child to retreat from the initial broader representation may include potential repair exchanges, distributional association with linguistic markers such as tense and aspect morphemes that favor generic *versus* referential reading of objects, etc. Nevertheless, if

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the input is ambiguous, the volume of relevant experience that can support parametric decision may be scarce, leading to late acquisition (Yang 2002). Furthermore, if input ambiguity is what sets the timing of acquisition, it can be predicted that children whose target language includes more variety in types of null objects retain a referential null cognate object N longer than children whose target language only has a subset of null object constructions.

Pérez-Leroux, Pirvulescu, and Roberge (2008) argue that the optionality of pronominal direct objects in obligatory contexts is a diagnostic for the retention of a referential N in the developing grammar. This could in principle affect production of null objects in non-obligatory contexts, where the preceding context does not force object individuation. Pérez-Leroux, Pirvulescu, and Roberge (2008) further hypothesize that children exhibit not only pronominal object optionality, but also overgenerate null objects in contexts that do not require object individuation, where the speaker has the choice to keep the object null or to lexicalize it in order to individuate or add semantic content as in (84).

> (84) What are you doing?
>   a. Eating. (non-individuation)
>   b. Eating my sandwich. (individuation)
>   (Pérez-Leroux, Pirvulescu, and Roberge 2008: 387)

Conceivably, a child using the referential N (i.e. my sandwich) might allow a null object (as in 84a) to replace not only a potential pronominal object, but also a lexical DP in a context where a pronoun would be impossible, such as in (84b).

Based on the issues concerning children's acquisition of null objects mentioned above, Pérez-Leroux, Pirvulescu, and Roberge (2008) propose three hypotheses: (i) children in all languages will go through an optionality stage; (ii) children acquiring languages with simpler typologies of null objects will restrict the semantic distribution of bare Ns earlier than children

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acquiring languages with more complex typologies of null objects; that is, the null object stage will disappear earlier in languages with simpler typologies of null objects than in languages with more complex typologies of null objects; and (iii) children at the initial stage will overgenerate not only null objects in individuated contexts but in all contexts.

Pérez-Leroux, Pirvulescu, and Roberge (2008) examine the three hypotheses in two experimental studies comparing elicited production of objects in individuated and non-individuated contexts in English (the language with a simpler typology of null objects) and French (the language with a more complex typology of null objects). In the task, the experimenter reads a story with a picture to a puppet identified as an unreliable listener. The stories depict a transitive scene involving an agent and an inanimate object. When the puppet gives an incorrect answer, the experimenter repeats the prompt and asks the child to help the puppet to give the right answer. Six mixed verbs, as shown in (85), are selected on the basis of the comparability of both the verbs and the direct objects across the two languages and to maximize the phonological salience of the clitic in French if the child is to produce it. Each verb is presented once per condition.

(85) Construire/build: castle/tower   boire/drink: juice/milk
       Dessiner/draw: flower/girl   frapper/hit: ball/piñata
       Manger/eat: cake/sandwich   couper/cut: paper/curtain
                         (Pérez-Leroux, Pirvulescu, and Roberge 2008: 387)

Under the individuated object condition, the story includes an explicit mention of the direct object in order to introduce it as a possible discourse antecedent. The question prompt also includes the object as a VP topic, in order to force pronominalization (e.g. *what is x doing with y?*). Additionally, the puppet's mistake involves using the target object, with the wrong verb (e.g.

smelling the flower instead of *drawing it*), thus reinforcing the object's role as a potential discourse antecedent.

Under the non-individuated condition, events and illustrations are fully comparable to those in the individuated condition, but for two differences: (i) there is no direct mention of the object in the story; and (ii) the puppet error refers to an entirely different event that does not involve the target object (e.g. *phone his friend rather than eating the bone*). A simple VP question serves as prompt (e.g. *what is x doing?*)

Twenty-nine monolingual French-speaking children between the ages of 3;00 and 5;05 are recruited in Montreal. Twelve adult participants form the control group. The children are divided into three groups according to their age. For the English study, thirty English-speaking children between the ages of 2;09 and 5;11 are recruited in Toronto. Only children whose parents indicate that English is the sole home language are included in the study. The children are divided into three groups according to their age as well. Twelve university students serve as the adult control group.

Table 15 shows the results of the English data for the individuated condition.

Table 15. Distribution of Responses to Individuated Contexts by Age Group in English

Group	*null	Pronominal	Lexical	Other
2-3-year-olds	35%	35%	25%	5%
3-4-year-olds	8.3%	41.7%	46.7%	3.3%
4-5-year-olds	1.7%	43.3%	55%	0%
Adults	0%	63.9%	36.1%	0%

(Pérez-Leroux, Pirvulescu, and Roberge 2008: 389)

From Table 15 it can be noted that adult participants have a majority of pronominal responses and over one-third lexical responses in the individuated condition. There are clear differences in the response patterns of the adults and older children, on the one hand, and the

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youngest group, on the other. The youngest children have a smaller number of lexical responses than the other groups, with the rest of the responses equally divided between the target pronominal responses and the ungrammatical null object (35% for each condition). The youngest children are the only group to have substantial rates of ungrammatical null objects and, in fact, ungrammatical null object responses abruptly decrease for the 3-4-year-old group. The statistical analysis on the proportion of ungrammatical null objects shows a highly significant effect for group ($F(3.38) =7.107$, $p=0.0007$). Post-hoc group comparisons show significant differences between the younger and middle groups ($p<0.05$), and highly significant differences between the younger children and the other groups ($p<0.001$).

In terms of the French data, initially, the French children have substantial rates of ungrammatical null objects, at a rate of approximately one-third of the responses, as shown in Table 16. The rate of ungrammatical null objects decreases over time and by the age of five they represent only one-tenth of the overall results.

Table 16. Distribution of Responses to Individuated Contexts by Age Group in French

Group	*null	Clitic	Lexical
3-year-olds	34.5%	13.2%	50.7%
4-year-olds	25.7%	41.7%	31%
5-year-olds	11.5%	52.6%	29.6%
Adults	1.4%	81.9%	18.1%

(Pérez-Leroux, Pirvulescu, and Roberge 2008: 390)

Like in the English study, the French-speaking children also produce substantial numbers of lexical responses to the individuated object stories. The proportion of these lexical answers decreases with age. Clitic responses are initially only 13% and then increase steadily. However, 5-year-old children still fall short of the adult baseline (53% vs. 82%). Statistical analysis on the proportion of null objects shows a highly significant effect of group ($F (3, 37)=7.524$, $p=0.0005$).

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Post-hoc comparisons show significant differences between 3- and 5-year-olds ($p=0.007$), 3-year-olds and adults ($p<0.0001$) and 4-year-olds and adults ($p=0.002$).

On the other hand, under the non-individuated condition, for all the English-speaking groups, most responses are distributed between the grammatical lexical and null object responses, as shown in Table 17.

Table 17. Distribution of Responses to Non-individuated Contexts by Age Group in English

Group	Null	*Pronominal	Lexical	Other
2-3-year-olds	40%	8.3%	36.7%	15%
3-4-year-olds	25%	1.7%	66.7%	6.7%
4-5-year-olds	31.7%	5%	61.7%	1.7%
Adults	26.4%	2.8%	66.7%	4.2%

(Pérez-Leroux, Pirvulescu, and Roberge 2008: 391)

The differences in distribution of null objects across groups, as in Table 17, are not statistically significant ($F(3.38) =0.488$, $p=0.69$). The distribution of lexical responses across groups approaches significance ($F(3.38) =2.496$, $p=0.07$), with the Fisher between-group comparison showing significant differences between the younger children and the middle group, and the younger children and the adults.

The results of the analysis of the French data, as shown in Table 18, demonstrate that most responses to the non-individuated condition also fall into the target lexical or null object options.

Table 18. Distribution of Responses to Non-individuated Contexts by Age Group in French

Group	Null	*Clitic	Lexical
3-year-olds	33.2%	0%	55.8%
4-year-olds	33.3%	0%	65%
5-year-olds	25.9%	1.9%	66.7%
Adults	27.8%	0%	72.2%

(Pérez-Leroux, Pirvulescu, and Roberge 2008: 391)

The relative proportion of these figures remains constant across the different children's groups and is close to adult performance. The ANOVA on the distribution of null objects across groups shows no significant effect of group. Ungrammatical pronominal responses are absent except for two occurrences in the 5-year-old group (1.9%).

The data analysis on English-speaking and French-speaking children's responses in Pérez-Leroux, Pirvulescu, and Roberge's (2008) study has shown that both groups of children produce ungrammatical null objects. This fact supports the first hypothesis which predicts that not only children whose first language has an object clitic system (e.g. French) but rather all children, including those in a language without clitics (e.g. English), should go through a null object stage where they generate illicit null objects in obligatory contexts.

Hypothesis 2 predicts different rates of developmental resolution of ungrammatical null objects according to the complexity of the typology of null objects in languages. This hypothesis is also confirmed. French-speaking children (the language with a more complex typology of null objects) show a delay in reaching adult targets in comparison to their English-speaking peers (the language with a simpler typology of null objects). This is seen in the overall means of errors, which are substantially higher in the French data, and in the statistical comparisons between children and adult control groups. The younger group of English-speaking children is significantly different from all other groups and adult controls in their rates of ungrammatical null objects. None of the other groups of children differ statistically from the adult controls. In the French groups, the 3-and the 4-year-old children are significantly different from the adult but not between themselves. This provides strong support for different rates of acquisition across languages.

For hypothesis 3, it states that children resolve the null object default as the result of the combination of pragmatic, syntactic and lexical factors. The initial bare N default is capable of (i) having an independent non-individuated interpretation, as in the adult grammar; (ii) behaving anaphorically (therefore, subsuming the optional null object stage observed across languages); and (iii) acquiring reference through context. The hypothesis predicts that children who accept illicit null objects in individuated contexts also prefer null objects in non-individuated contexts in which null objects become an available option.

The English data in the study show that the English-speaking children in general do not show any preferences for null objects in optional contexts. Most of the children who do not produce ungrammatical null objects in the individuated condition prefer not to use null objects in the non-individuated context in spite of its availability. As for the children who have more than one illicit null object, eight out of thirteen prefer using null objects in the optional context. The French data are not so clear, with four out of five children who do not produce illicit null objects showing preference for null objects in the optional contexts. From the group of the French-speaking children who have illicit null objects in individuated contexts, seven out of fourteen exhibit a preference for optional null objects. A correlation between proportions of null objects in individuated and non-individuated stories reveals that for the English-speaking children, the correlation is positive and highly significant. However, for the French-speaking children, the correlation between null objects across conditions is small and non-significant. Therefore, hypothesis 3 receives partial support from English but not from French. This hypothesis thus has to remain for now an interesting possibility.

From Pérez-Leroux, Pirvulescu, and Roberge's (2008) two studies on English-speaking children and French-speaking children respectively it can be noted that all children go through a

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null object stage. This stage does not reflect difficulty in computation, but rather the free availability of referential null cognate objects. Children who are exposed to a wider variety of null objects contexts retain the referential reading of the null cognate object longer than children who are exposed to a narrower variety of null object contexts.

Furthermore, Pérez-Leroux, Pirvulescu, and Roberge (2008) also give an elegant solution to the question of how children show both faithfulness to input and creativity. The researchers argue that children's language acquisition can be attributed to the fundamental operations of syntax paired with a conservative lexicon. The main function of the former, understood as a generative, creative system, is to map linearized objects from a perceptual interface into hierarchically structured objects on a conceptual interface. Children acquire the later by means of a conservative learning mechanism that keeps track of which sentence frames associate with lexical items and find out lexical meaning from this information. Recent work suggests that conservativity in learning is expressed differently in children and adults. In other words, adults and children treat the variable input in different ways (Hudson Kam and Newport 2005): while adults seem faithful to variability in the input, children seem to be faithful to a grammar that is more general and regular than what is expressed in the variable input. Faithfulness at the sentence level rather than at the lexical level is the result of the initial reliance on default structural templates that are universally available. As proposed in Fodor (1998), triggers are simply small pieces of structure that are made universally available by Universal Grammar (UG), and selectively retained via a conservative learning model. These small structures consist of minimal syntactic representations that instantiate both a parameter in UG as well as the trigger that, if selected from the universal inventory, sets the target grammar. The overall nature of

grammatical development is to refine the interaction between these abstract templates and the distributional associations of lexical items.

The results of Pérez-Leroux, Pirvulescu, and Roberge's (2008) experimental work support the conclusion that lexical learning in the verbal domain is driven by syntax. Conceptually, it seems that acquiring the semantics of a given verb involves (among other things) determining the semantic restrictions that this verb imposes on the bare N provided by syntax. We can explain this by assuming that the input, composed of utterances and their linguistic and extra-linguistic context, provides the information needed for identifying these semantic restrictions. The presence of a syntactically required N complement acts as a tool for acquiring the semantics of the verb. The broad referential properties of the default initial N object are progressively replaced by lexical-semantic identification and by relevant mechanisms for linguistic recovery. Language acquisition in the domain of verbal transitivity thus involves crucial modular interactions between lexicon and syntax.

This subsection has addressed children's acquisition of objects in English, a [-null object] language and has accounted for children's early production of objects from different perspectives: performance limitation (Valian 1991), the establishment of sensitivity to the relationship between null objects and discourse context (Rispoli 1992), children's referential choice on a discourse-pragmatic basis (Guerriero, Oshima-Takane, and Kuriyama 2006), children's conservativity to the input (Ingham 1993, Tomasello and Brooks 1998, Tomasello 2000, 2001), and children's initial null cognate object default (Pérez-Leroux, Pirvulescu, and Roberge 2008). The question now is the following: what happens in children's acquisition of objects in the case of [+ null object] languages such as Chinese? This will be the object of the next subsection.

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2.1.2 The Acquisition of Objects in Chinese

In chapter 1, the difference between [- null object] languages (e.g. English and Spanish) and [+ null object] languages (e.g. Chinese) has been discussed. Such a difference can be mainly attributed to the fact that the formers are sentence-oriented languages and the latter is discourse-oriented. This characteristic makes TCs (topic chains) possible in Chinese. Since several sentences can be under the control of the same TC, null arguments can be recovered by the topic of the TC.

In terms of the acquisition objects, in comparison to [- null object] languages such as English, [+ null object] languages have been much less studied in this respect. Wang et al. (1992) have suggested that children acquiring [+ null object] and [- null object] languages show differences in their language production at very young ages, which indicates that parameter resetting may happen at the very early stages. Furthermore, in chapter 1 (c.f. subsection 1.3.2) it has been argued that Rizzi's (1994) ECP and truncation analysis only apply to sentence-oriented languages but do not apply to adult Chinese or child Chinese either (Lee 2000). Neither does Sano and Hyams' (1994) RI analysis on null objects. In contrast, Huang's (2011) investigation of the referential choice of children acquiring Chinese has suggested that, similar to English-speaking children, Chinese-speaking children's referential choice is also in line with the same pragmatic account. A detailed account of these studies is presented in the present subsection.

Wang et al. (1992) make a comparison between Chinese-speaking children and English-speaking children's production of null objects. They first examine Hyams' (1992) proposal in which she argues that English-speaking children start speaking a Chinese-like language, that is, a discourse-oriented language. Hyams (1992) analyzes child English and points out that since children's early verb productions are generally not inflected, under children's initial analysis,

English is morphologically uniform with uniformly simple forms. By assuming that English is a discourse-oriented language, young English-speaking children use null topics to identify the reference of null arguments. Hyams (1992) claims that children will then need to reset the parameter in order to exclude the ungrammatical null arguments.

Wang et al. (1992) point out that a potential problem for Hyams' (1992) analysis lies in that a discourse-oriented child language should have both null subjects and null objects because under topic identification (c.f. chapter 1, subsection 1.3.2), the null subject and null object phenomena are grammatically equivalent. However, according to Hyams's (1992) data, English-speaking children show a clear asymmetry in the production of null subjects and null objects. Hyams (1992) attributes this asymmetry to the lack of variables in the inventory of null elements in early grammar. She claims that all null elements in early child English are *pro* (as defended by Roeper et al. 1984). As null objects can only be variables, under this hypothesis, null objects will not be allowed in the early grammar until some later point when variables mature. She further suggests that matrix null subjects as well as embedded null subjects can be *pro*, though only embedded null subjects can be identified by a c-commanding DP; matrix empty subject are rather identified by a discourse topic. This departs from Huang's (1984) analysis of Chinese in which he proposes that both null subjects and null objects are variables (c.f. chapter 1, subsection 1.3.2).

According to Hyams' (1992) hypothesis, Chinese-speaking children, who will ultimately acquire a real discourse-oriented language, should first exhibit the same null subject/null object asymmetry as English-speaking children, and they should not produce null object structures until the point when they develop variables. Hyams' (1992) hypothesis will also predict two null subject/null object asymmetries for English-speaking children: (i) if they have not yet reset the

NSP by the time they acquire variables, they will produce only null subjects early on but will later include ungrammatical null objects as well once they have developed variables; and (ii) if English-speaking children have reset the NSP before they develop variables, they will never use ungrammatical null objects.

Neither of these two predictions holds. From the empirical works presented before (c.f. subsection 2.1.1), it can be noted that, on the one hand, English-speaking children do go through a null object period, which contradicts the second prediction; and, on the other hand, younger children produce more ungrammatical null objects than older children, which contradicts the first prediction.

In order to fully evaluate Hyams's (1992) proposal, Wang et al. (1992) collect data on the acquisition of objects in English and Chinese. They conduct an experiment to answer the following questions: (i) is a null subject/null object asymmetry exhibited in child Chinese and child English? If so, is it equivalent for the two groups?; (ii) what does the developmental pattern of null objects look like, in terms of the parameterized theory of UG?; and (iii) what is the influence of the linguistic environment during the development of early grammars between the ages 2;00 and 4;06?

Nine Chinese children ranging in age from 2;00 to 4;06 are involved in the experiment. All of them are acquiring Mandarin Chinese as their first language. Their parents are graduate students from either mainland China or Taiwan, studying in the United States. Nine English-speaking children, ranging in age from 2;05 to 4;05 are also tested using the same procedure. Their parents are members of the university community. All the children have normal hearing and there are no recorded developmental delays of any sort. The mothers of the nine Chinese-

speaking children in the experiment are also involved as they form the Chinese adult control group.

The experiment is carried out in the experimenter's home individually for the Chinese children and in the observation room at a day care center individually for the English-speaking children. A story book about the daily life of a little boy named Baldy (who has no hair) is used. A doll house with dolls and furniture corresponding to the settings and characters in the book is used to familiarize the children with the main character. The testing is carried out after the experimenter plays with the children a number of times and establishes rapport. The children's task is to tell the experimenter the story. For the first story, the experimenter and the child play with the doll house and the dolls. Next, the child is asked to read the book about Baldy and then tell a story about him. All interactions with the Chinese-speaking children are conducted in Chinese; and those with the English-speaking children are so in English. For the Chinese adult control group, the nine mothers are asked to tell the story, while pretending that they are talking to their own child. The testing is conducted in the mothers' home without their child or the experimenter being present. The testing material is identical to that prepared for the children. The whole procedure is audio-taped.

The mean percentage of sentences with null subjects for each speaker is calculated based on the ratios of the sentences with null subjects overt the total number of sentences produced when telling the story. The ratios are averaged over the total number of children in each language group and over each MLU level (3.5, 4.5 and 5.25) separately.

The mean percentage of sentences with null objects is calculated using a similar method. The ratio is the total number of sentences with an underlying structure of SVO to the total number of sentences produced with a null object. For the Chinese data, in addition to this

criterion, any two-morpheme compounds that have been identified as a word by the authoritative dictionary *Xiandai Hanyu Cidian* ("Comtemporary Chinese Dictionary") (1973) are not included, even if they have the V + O formation. For example, (86a) is identified as a single word, and thus is excluded; (86b) is counted because it is not identified as a single word.

    (86)a. Xi   zao
        wash bath
        "take a bath"
      b. xi   shou
        wash hands
        "wash hands"

(Wang et al. 1992: 231)

The reason for this constraint is that it is generally agreed among Chinese linguists that a verb + complement compound is not equal to the structure of V + O. Unlike the latter, the former is already in its minimal construction and it is not divisible; therefore, these two types of structures are analyzed differently.

A second measure of the mean percentage of sentences with null subjects for English-speaking children is also calculated in the same way, excluding the sentences with null subjects using a gerund or *to*-infinitive. The reason for this exclusion is that, given the discourse, these kinds of sentences are also allowed in the adult grammar of English. This second measure is labeled *adjusted* in the figures.

Figure 3 shows the mean percentages of sentences with null subjects produced by the Chinese and American children and the Chinese adults.

Figure 3. Sentences with Null Subjects
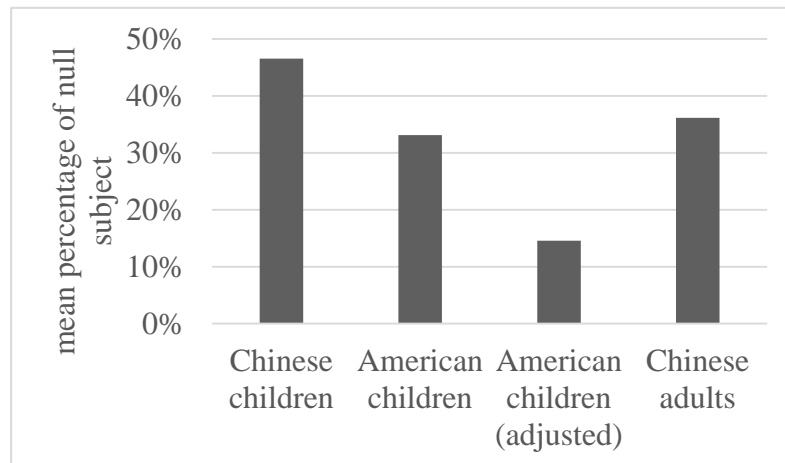
From Figure 3, it can be seen that there is a noticeable difference between the mean percentages of sentences with null subjects produced by the Chinese children and those by the American children (a difference that is even more pronounced if the adjusted data from the American children are considered). Statistical tests show that the differences between the American children and the Chinese children, and between the American children and the Chinese adults are significant; and that the difference between the Chinese children and the Chinese adults is not significant.

Figure 4 shows the mean percentages of sentences with null objects produced by the Chinese and American children and the Chinese adults, from which it can be seen that there is a considerable difference between the rates of the Chinese children, or the Chinese adults, and that of the American children.

Figure 4. Sentences with Null Objects
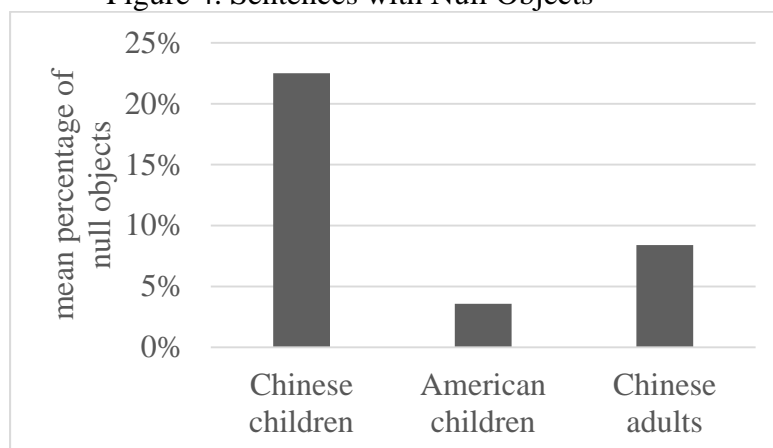
The differences between the American children and the Chinese children, the American children and the Chinese adults, and the Chinese children and the Chinese adults are all statistically significant. In the case of the Chinese children, 27.59% of the total sentences with null objects are considered ungrammatical. The grammaticality of the Chinese null object sentences is judged with respect to the context in which the sentence in question is actually produced. For the American children, 100% of the sentences with null objects are ungrammatical.

Comparing Figure 3 and Figure 4, it can be seen that the null subject/null object asymmetry is not unique to the Chinese children. The ratio of the mean percentage of sentences with null objects to those with null subjects is 0.48, 0.24 and 0.23 for the Chinese children, the American children and the Chinese adults respectively. If the ungrammatical sentences are excluded from the calculation, the ratio for the Chinese children decreases from 0.48 to 0.29, and that for the American children decreases from 0.24 to 0.

The amount of null objects used by the Chinese adults is surprisingly low. However, Wang et al. (1992) believe that the ratio for Chinese adults would be higher than the rate they

would obtain if the data have been collected in an adult-to-adult conversation situation, where most null objects appear, rather than in children's story-telling.

Because of this discrepancy, Wang et al. (1992) conduct a follow-up study with Chinese adults. In this study, five Chinese-speaking adults are interviewed by the experimenter in an adult-to-adult conversational setting. These adults are all women who have recently given birth to their first child. The interviews take place in the adults' home and consist of several parts. First, the adults are asked to tell their child two stories as a warming up. Then, they engage in conversation with the experimenter. The conversations all include the same three topics of discussion: the woman's pregnancy and childbirth, her own lifestyle, and the growth and behavior of her child. The interviews are tape-recorded. Only the conversations are transcribed and scored according to the same procedures as those followed in the initial experiment. The results of the follow-up study show that the average percentage of null objects is 40.1% whereas the average percentage of null subjects is 45.6%. Although the percentage of null objects is much higher than in the initial experiment (8.39%), the difference between null subjects and null objects is still statistically significant.

In order to determine whether there is any relationship between the null subject/null object phenomena and the child's linguistic maturation, the results are recalculated according to the child's MLU level, as shown in Table 19.

Table 19. Sentences with Null Subject/Null Object and MLU

MLU	Null subject %				Null object %		
	Chinese children	American children	American children (adjusted)	Chinese adults Adult-to-child	Chinese children	American children	Chinese adults Adult-to-child
3.5	55.73%	34.57%	25.89%	36.13%	20.19%	8.31%	8.39%
4.5	45.65%	32.37%	8.93%		21.38%	1.47%	
5.25	38.25%	-	-		26.03%	-	

(Wang et al. 1992: 238)

The difference between the Chinese and American groups at MLU 3.5 is not statistically significant. However, Wang et al. (1992) point out that this is essentially due to the youngest American child who has a rate of null subjects comparable to that of his Chinese counterparts. The difference between the groups at MLU 4.5 (Chinese 3-year-olds and American 3-and 4-year-olds) is statistically significant. The American children experience a sharp drop in their use of null subjects. The Chinese children, on the contrary, continue to use null subjects across the three MLU stages.

In terms of the use of null objects, Table 19 shows that the American children use null objects mush less frequently than null subjects. The group at MLU 3.5 use null objects only 8.3% of the time whereas the older children use essentially none. In contrast, the Chinese children use null objects much more frequently than the American children. Their averages of null objects go from 20.19% to 26.03%, with the figures increasing slightly over the MLU stages. Although the adults in the initial study produce far few null objects than the Chinese children (8.39% vs. 22.5), from the follow-up study (adult-to-adult conversation) it shows that the null object rate of the Chinese adults increase to 40.1%. This indicates that the overall production of null objects by the children is approaching the level used by adults in conversational settings.

The Chinese and English children do not differ significantly in their use of null subjects at the earlier MLU stage but they do at the latter MLU stage. On the other hand, for the use of null objects, the two language groups differ significantly across all MLU levels. For the Chinese children, as their MLU increases, the mean percentage of sentences with null subjects decreases and the mean percentage of sentences with null objects increases. By the MLU level of 4.5, their null subject rate is very close to that of the Chinese adults, and their null object rate is approaching that of the adults in the follow-up study by the MLU level of 5.25. For the American children, as their MLU increases, the mean percentage of sentences with null subjects as well as sentences with null objects decrease drastically, which is in line with the corresponding adult grammar. The differences in the use of null subjects and null objects by Chinese and American children indicate that the factors controlling the use of the two types of null arguments in the two groups are distinct.

These results contradict Hyams' (1992) proposal that English children have a Chinese-type language as their initial parameter setting since English and Chinese children do not progress similarly in terms of the use of null objects.

As discussed in chapter 1 (c.f. subsection 1.3.2), the parameter that controls for the use of null arguments in English and Chinese is different, the former being the NSP (Jaeggli and Safir 1989) and the latter being the DOP (Huang 1984). Wang et al. (1992) propose an alternative to Hyams' (1992) hypothesis. That is, part of the formulation of UG is a system of parameters and the initial setting for a particular parameter is the same for all children, constrained by certain principles. For learnability reasons, assuming that parameter setting takes place on the basis of positive evident, it can be expected that the initial setting of the DOP is [- discourse oriented]. If so, the performance of the Chinese children in Wang et al.'s (1992) study indicates that resetting

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of the DOP to [+ discourse oriented] can take place early. As other characteristics of discourse-oriented languages, such as topic-comment structures and discourse-bound anaphors (c.f. chapter 1, subsection 1.3.2), can serve as evidence for determining this parameter setting, it is reasonable to assume that the Chinese children have established this setting and produce null arguments in accordance with this grammatical option.

On the other hand, Wang et al. (1992) believe that the English children's production of null arguments is due to the initial setting of English under the NSP which accounts for the null subject/object asymmetry. Resetting the parameter to disallow null subjects will thus only occur after children develop inflectional agreement, as argued in chapter 1 (c.f. subsection 1.3.2).

In terms of the role that the linguistic environment plays in the parameter-setting account of language development, Wang et al. (1992) point out it is clear that only data from the linguistic environment can trigger the resetting of a parameter. The interaction between children's initial setting, such as the NSP, and the input the children receive in their linguistic environment appears to occur at very early stages of language acquisition and in very subtle ways: even the 2-year-old children display a noticeable difference in the use of null subjects and null objects across languages. Only the Chinese, but not the English children, use null objects to any extent. This can be due to a different parameter from the one involved in the case of the English children.

However, although the English children use null subjects frequently, they still use them less frequently than the Chinese children. In the case of null objects, the difference between English and Chinese children is related to their grammars: the Chinese children's grammar allows null objects while the English children's one does not. However, Wang et al. do not make the claim that the difference in the use of null subjects is a grammatical difference, since null

subjects are legitimate under both the NSP and the DOP. The different rate of null subjects produced by English and Chinese children thus seems to be a prime example of an area where the influence of the linguistic environment is demonstrated. Furthermore, as the children develop, the use of null arguments by the Chinese children approaches that of the adult controls. For example, the Chinese adults produce sentences in which the null argument is interpreted by virtue of a discourse topic established several sentences earlier. The youngest children do not exhibit this kind of long-distance topic chaining. The factors that control the pragmatically acceptable use of null arguments will need to be acquired by Chinese children, independently from the grammatical parameter setting. This is similar to subjects in the case of [+ null subject] languages; apart from the setting as [+ null subject], Spanish children have to learn when using an overt or a null subject is pragmatically adequate. This will be directly related to the linguistic environment.

Lee (2000) investigates issues concerning Chinese-speaking children's production of null arguments. He first examines Sano and Hyams' (1994) optional infinitive analysis (or root infinitives, RIs) and Rizzi's (1994) ECP and truncation analysis (c.f. chapter 1 subsection 1.3.2).

Sano and Hyams' (1994) characterize the null arguments in child language as *pro* and argue that the null argument phenomenon in child language is due to the availability of RIs in early language, and that the acquisition of finiteness will end the null argument period. Rizzi's (1994) ECP claims that empty categories, which include DP traces, variables and null constants bound by null operators, must be chain-connected to an antecedent. As discussed in chapter 1 (c.f. subsection 1.3.2), the ECP does not apply to Chinese, but it could be understood as applying only as a default option. In other words, children may adopt the ECP for identification in their initial grammar. According to the ECP, discourse identification is always achieved via the null

topic in the SPEC of the matrix CP. One thus should not expect to find empty categories in Chinese if the SPEC of CP is already occupied by other elements, such as wh-phrases and sentence final particles, and accordingly, one would expect that empty categories should be prohibited in such sentences.

Lee (2000) examines the issues raised in Sano and Hyams' (1994) and Rizzi's (1994) studies in the light of longitudinal data from a Chinese-speaking child MHZ in Hong Kong from 1;07 to 2;08. The study concerns the following four questions: (i) whether finiteness (as reflected in the use of modals, aspect markers and sentence final particles) blocks the appearance of null arguments in early development; (ii) whether null arguments in early Chinese are related to truncated structures; (iii) whether discourse-identified null arguments can be found in embedded clauses; and (iv) whether null objects are restricted to the third person in early Chinese.

Lee (2000) points out that Chinese has an extremely rich sentence final particle system. These particles signify mood, modality and quantification. Sentence-final particles, which can only occur in root clauses, can be divided into two types: non-interrogative (SFP) and interrogative (Q-SFP). An example of a SFP is the neutral particle *aa3*, whose function is to make the utterance sound complete or make it sound not so blunt, as shown in (87a).

> (87)a. John lei4zo2 *aa3*.
>   John has come
>   "John has come."

(Lee 2000: 7)

>   b. ngo5 jau5 aa3.
>   I   have
>   "I have it."

>   c. Nei5 lei5 m4 lei4 *aa3*?
>   You come not come
>   "Are you coming or not?"

d. bin1go3 lei4 *aa3*?
    Who   come
    "Who is coming?"

<div align="right">(Lee 2000: 7)</div>

This particle can be attached to the end of an affirmative utterance without changing its declarative nature (87b). It can also be attached to the end of a question without changing the its interrogative status, as in (87c, d)

On the other hand, Q-SFPs differ from SFPs in their being able to turn a statement into a question. For instance, *keoi5 lei4* in the sentence (88a) means "he is coming". However, when the Q-SFP *aa4* is added to it, the utterance becomes a yes-no question, as marked in the translation of (88a). When the wh-interrogative particle *le1* is added to a DP, the utterance signals a where-question, as shown in (88b).

(88)a. keoi5 lei4 *aa4*?
    He   come
    "Is he coming?"
   b. baa4baa1 *le1*?
    Dad
    "Where is dad?"

<div align="right">(Lee 2000: 7)</div>

Some SFPs involve focalization, such as *zaa3* "only", and can focus on any element within the sentence. They can occur in concatenation with other SFPs, as in (89).

(89) keoi5 tai2zo2 saam3 bun2 syu1 *zaa3 aa4*?
    He   has read   three   books only
    "He has only read three books, hasn't he?"

<div align="right">(Lee 2000: 7)</div>

The sentence in (89) shows that the focus SFP *zaa3* ("only") occurs before the Q-SFP *aa4*. The SFP has the restrictive focus "only" within the scope of the question operator.

The structure in (90) is assumed in the representation of SFPs in Chinese.

<div align="center">135</div>

(90)[_{CP} [_{C'} [_C SFP]] _{SPEC} Q-SFP]

SFPs would occupy the head position of the complementizer phrase, and Q-SFPs, the SPEC position of the CP, which in Chinese occurs after the complementizer head. This structure can predict the relative order of Q-SFPs after SFPs. It also has the advantage of ruling out sentences with two Q-SFPs, as shown in (91), which contains the Q-SFPs *aa4* and *me1*.

> (91) **keoi5 lei4 aa4 me1?*
>   He   comes
>   "He is coming, isn't he?"

(Lee 2000: 8)

Though sentence final particles are traditionally seen as an optional category, it may be observed that sentences often sound incomplete without a particle; this can be accounted for by the fact that Chinese is not morphologically marked for finiteness distinctions, and final particles can be considered as one of the means to encode finiteness. This proposal is not implausible as the semantic conception of finiteness is related to the completeness of the message being communicated.

Another characteristic pointed out by Lee (2000) which is relevant to the analysis in his study is that functional categories such as aspect, modal, final particles and classifiers emerge early in Chinese child language (between 1;09 and 1;11), according to Lee, Wong, and Wong (1996).

The results of Lee's study as well as the data of two other Chinese children drawn from the studies of Man (1993) and Sze (1997) are shown in Table 20.

Table 20. Null Arguments in Child Chinese

Child	Stages	Age range	MLU	No. of utterances	Null subject %	Null object %
CGK (Man 1993)	I	1;11-2;00	2.40	623	78%	58%
	II	2;02-2;03	2.95	1407	72%	49%
	III	2;04-2;05	3.52	822	59%	39%
	IV	2;07-2;09	3.46	906	56%	42%
WBH (Sze 1997)	I	2;03-2;07	2.31	830	81%	49%
	II	2;09-2;11	2.85	841	71%	31%
	III	2;11-3;01	3.06	688	60%	31%
	IV	3;03-3;04	3.08	475	68%	38%
MHZ (Lee 2000)	I	1;07-1;11	1.44	553	75%	51.6%
	II	2;00-2;03	1.93	1132	70%	41.4%
	III	2;04-2;08	2.50	707	65.5%	43.2%

(Lee 2000: 9)

These findings are similar to those of Wang et al. (1992) as shown in Table 19. First, a high proportion of null subjects (ranging from 56% to 81%) as well as a sizable rate of null objects (ranging from 31% to 58%) are observed in the children under study at different stages of their development. In general, the figures in Lee's (2000) study are slightly higher than those of Wang et al. (1992). This is probably due to the fact that the children in Lee's (2000) study are younger than those in Wang et al.'s (1992).

In connection with the issues raised by the studies of Sano and Hyams (1994) and Rizzi (1994), the first area to examine is whether arguments will be left null in finite contexts. Chinese does not have clear morphological markings for finiteness. Therefore, the criteria proposed by Huang (1982) are that, if a sentence takes aspect marking or contains a modal, then it should be considered as finite. Further, if a sentence contains a sentence final particle, it is finite, in that a final particle marks the presence of a root CP, and adds the modality that makes the sentence complete. Table 21 shows the percentage of null arguments in sentences that contain modal auxiliaries produced by MHZ.

Table 21. Null Arguments in Sentences with Modal Auxiliaries Produced by MHZ

Age range	Modals	No. of sentences with modals	Null subject %	No. of Transitive clauses	Null object %
1;11-2;06	Wui3 ("will") Ho2ji3 ("can") Dak1 ("can")	11	100%	9	78%

(Lee 2000: 10)

From Table 21 it can be noted that in MHZ's speech, only a limited number of modals are used. However, it is clear that the presence of modals does not prohibit null subjects or null objects. In fact, the subjects in these sentences are invariably null and the null object rate is 78%.

Table 22 shows the occurrence of null arguments in sentences with aspectual marking.

Table 22. Null arguments in Sentences with Aspect Markers Produced by MHZ

Age range	Aspect markers	No. of sentences with aspect markers	Null subject %	No. of transitive clauses	Null object %
1;09-1;11	Zo2 (Perfect)	20	100%	3	67%
2;00-2;08	Zo2 (perfect) Zyu3 (durative) Gan2 (progressive) Gwo3 (experiential)	73	62%	49	43%

(Lee 2000: 11)

Table 22 shows that aspect markers do not put any restriction on null arguments despite the fact that these sentences are finite. Before 2;00, the percentage of null subjects is these sentences is 100% and that of null objects is 67%. After 2;00, the figures decrease but remain sizable.

In terms of the influence of sentence final particles, Table 23 shows the percentage of null arguments in sentences that contain at least a verb and terminate with final particles.

Table 23. Null Arguments in Sentences with Final Particles Produced by MHZ

Age	No. of utterances with final particles	Null subject %	Null object %
1;07-1;11	77	77%	38%
2;00-2;08	687	71%	53%

(Lee 2000: 11)

From Table 23 it can be seen that in sentences that terminate with final particles, the percentage of null subjects remains at above 70% along the investigation period and the percentage of null objects maintains at around 38%. If the proposal that final particles can be considered as indicators of finiteness holds, finiteness has no effect on the occurrence of empty arguments.

Now let us turn to Rizzi's (1994) truncation analysis. To account for the German data, Rizzi's (1994) principles only allow the matrix topic to be discourse identified (c.f. chapter 1, subsection 1.3.2). Although this principle does not apply to adult Chinese, it would be of interest to examine whether it is observed in child Chinese. Assuming that Q-SFPs occupy the SPEC of CP, null topics should be blocked in sentences with such particles, and in turn the variables linked to these topics should be illicit. There is no evidence, however, of any blocking effect of Q-SFPs in Lee's (2000) data. Of the 77 utterances with final particles produced by MHZ before 2;00, only one Q-SFP is used, in a sentence with a null subject. Of the 687 utterances with final particles used by the child after 2;00, only two Q-SFPs are found, one in a sentence with a null subject, and the other in a sentence with a null object.

Another elements that may block discourse identification are wh-sentences. In standard government and binding analysis, wh-words in Chinese move to the SPEC of CP at Logical Form (as shown by Cheng 1991). Further analyses have suggested that an empty question operator moves to the SPEC of CP at surface structure in languages like Chinese, or that null wh-

operators are base-generated there (Aoun and Li 1993). In either analysis, the configuration will block discourse identification of null arguments because of Rizzi's (1994) Minimality Principle, as in (40) in chapter 1 (c.f. subsection 1.3.2). Empirically, however, this kind of prediction is not borne out, as shown in Table 24.

Table 24. Null Arguments in Yes-no Questions and Wh-questions Produced by MHZ

Age range	Question type	No. of questions	No. of null subject	Null subject %	No. of transitive clauses	No. of null object	Null object %
1;07-1;11	Yes-no Q (q-sfp)	1	1	100%	0	-	-
2;00-2;08	Yes-no Q (intonation)	1	1	100%	1	0	0%
	Yes-no Q (q-sdp)	2	1	50%	2	1	50%
	Yes-no Q (A-not-A)	1	1	100%	1	0	0%
	What-Q (*mat1je5*)	4	0	0%	4	0	0%
	Who/which-Q (*bin1go3*)	2	0	0%	2	0	0%
	Where-Q (*bin1dou6*)	4	2	50%	4	0	0%
	Why-Q (*dim2gaai2*)	2	1	50%	2	0	0%

(Lee 2000: 12)

Table 24 reports the questions produced by MHZ, from which it can be seen that, before 2;00, the child does not produce any wh-questions; after 2;00, twelve wh-questions are found in the data. Among these twelve wh-questions, three null arguments are detected, all in subject position, resulting in an overall null argument rate of 25%. It should be pointed out here that wh-interrogatives in Chinese are *in situ*, which means that these interrogatives are pronounced in the position where they are interpreted, as shown in (92).

(92)a. Ne1go3 zou5 *mat1je5*? (2;03)
This one   do   what
"What does this one do?"

b. Nei5 jiu3 *bin1go3*?   (2;05)
   You want which one
   "Which one do you want?"

In (92), the wh-interrogatives *mat1je5* ("what") and *bin1go3* ("which one") are in the same position in the two sentences as the grammatical objects would be in their affirmative counterparts, while in English, the wh-interrogatives *what* and *which one* undergo overt wh-movement and thus move to the beginning of the sentences [8]. I argue that the *in situ* characteristics in Chinese as well as the small number of tokens in Lee's (2000) study might contribute to the absence of null objects in embedded clauses in the data.

Although one cannot draw a firm conclusion here because of the small number of tokens, the data at least show that children could produce null arguments in wh-questions.

It has been shown that neither finiteness nor operators in the SPEC of CP seem to suppress null arguments in child Chinese. The next question concerns the possibility of discourse identification in embedded clauses. Do children produce null arguments in embedded clauses in Chinese? Lee (2000) examines the data produce by MHZ as well as by another two children. It is found that even 2-year-old children produce embedded clauses substantially, with 89 tokens for MHZ and more than a hundred for the other two children. MHZ's null subject rate remains at 93% at that stage and his null object rate increases slightly after 2;00 (54% before 2;00 and 69% after 2;00). The other two children's null subject rates are 85% and 100% respectively and their null object rates are 41% and 40%. All the three children produce sizable null arguments in both subject and object positions, which is contrary to the predictions of Rizzi's principles.

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[8] In English this is possible only in specific discourse conditions due to pragmatic factors in the so called "echo questions", for example: *This one does WHAT? You want WHICH ONE?*

Furthermore, the null arguments rates in embedded clauses also exhibit the subject/object asymmetry observed in main clauses: the number of null subjects exceeds that of null objects.

Another issue under consideration in Lee's (2000) study is whether null objects, analyzed as topic bound variables, are limited to third person in child Chinese, as predicted by Rizzi (1994) and Sano and Hyams (1994). Data analysis in Lee's (2000) study indicates that null objects produced by MHZ take first, second, as well as third person reference, as shown in (93).

(93) a. CHI: maa1 pou5 *e*. (1;10)
    mom hug
    "Mom, hug me."

                  (Lee 2000: 16)

 b. gang2 hai6 maa1 faan1 lei4 daa2 lei4 *e* aa4. (2;04)
   Must be   mom come back call   come
   "It must be mom who is coming back and calling you."

 c. (playing with scissors)
   Investigator: nei5 bei2 *e* ngo5, faai3di1
         You give   me   quick
         "Give them to me. Quick!"
    CHI: m4 bei2 *e* aa4. (2;04)
      Not give
      "I won't give them to you."

                  (Lee 2000: 17)

The null object rates among all the objects in first person are 88% before 2;00 and 100% after 2;00; the null object rates among all the objects in second person are 67% before 2;00 and 45% after 2;00; and in third person the rates are 49% before 2;00 and 43% after 2;00. This indicates that children's tendency for first person null objects is much stronger than for third person null objects. The percentage for second person null objects is slightly higher than that for third person null objects. The data taken together therefore disconfirm the hypothesis that null objects are topic-bound variables restricted to third person reference.

Lee's (2000) investigation of Chinese child language shows that the use of putative finiteness markers in Chinese (i.e. aspect markers, modals, and sentence final particles), in the earliest stages of their occurrence, do not block null arguments. Null arguments in child Chinese do not appear to be licensed by truncated structures. Clear evidence can be found for discourse identified null arguments in finite embedded clauses. Topic-bound null objects involve first and second person references and are not limited to third person. In order words, Sano and Hyams' (1994) and Rizzi's (1994) proposals for null arguments are not valid for adult Chinese, as shown in chapter 1 (c.f. subsection 1.3.2), and they do not apply to child Chinese either.

As already pointed out in previous subsection (c.f. subsection 2.1.1), Guerriero, Oshima-Takane, and Kuriyama (2006) have investigated null arguments in child English from a discourse-pragmatic perspective and confirm that English-speaking children's referential choice is discourse-motivated. From the same perspective, Huang (2011) explores Chinese children's referential choice in natural conversation. Since English does not allow null arguments while Chinese does, what is of interest here is to see whether the discourse-pragmatic principles proposed in Guerriero, Oshima-Takane, and Kuriyama's (2006) study will hold cross-linguistically.

In research on adult grammar, there is a long and flourishing tradition of theoretical approaches that consider discourse pragmatics as crucial for a comprehensive understanding of how speakers use syntax in discourse (Groefsema 1995, Larjavaara 2000, Levinson 2000, Cummins and Roberge 2005, Pérez-Leroux, Pirvulescu, and Roberge 2008, among others) (c.f. chapter 1, sections 1.2, 1.3 and 1.4). From this perspective, the choices speakers make are the end results of the interaction of syntactic and pragmatic principles and can only be understood by resorting to an integrated mode of explanation that draws simultaneously on both levels (as

defended by Serratrice 2005). This has important implications for the study of language development as it suggests that the acquisition of grammar may be related to the referential strategies used by adults in conversations with young children (Clancy 1997).

Chinese is characterized by the null argument phenomenon. In general, referents that can be understood from the context do not need to be overt. Furthermore, since Chinese does not have inflection or case marking, the pronominal system is relatively simple, which consists of personal pronouns and demonstrative pronouns. Demonstrative pronouns include the proximal demonstrative *lei1* ("this") and the distal demonstrative *gwo2* ("that"). Personal pronouns include the first person pronouns *ngo5* ("I/me") and *ngo5dei6* ("we/us"), the second person pronouns *nei5* ("you", singular) and *nei5dei6* ("you", plural), and the third person pronouns *keoi5* ("he/she, him/her") and *keoi5dei6* ("they/them"). The Chinese personal pronouns refer primarily to animate entities and are rarely used to refer to inanimate entities, as opposed to the way pronouns are used in English.

Chinese DP types include bare nouns, and nouns used with demonstratives, quantifiers, or possessive constructions. It is suggested that numeral determiners can mark newness and demonstrative ones, givenness. Bare nominals (i.e. nominals with no determiner) can be used in both cases (Huang 2011).

Huang (2011) points out that investigation of the referential choice of children acquiring Chinese from a discourse-pragmatic perspective is particularly interesting since Chinese, unlike English, permits null arguments. The researcher conducts a longitudinal study to explore Chinese-speaking children's referential choice in natural conservation. It is expected that argument representation in Chinese child language is not random, but that it follows a systematic pattern, and that this pattern is predicted on informativeness features of discourse referents

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(Guerriero, Oshima-Takane, and Kuriyama 2006). In other words, the researcher hypothesizes that referential choices for arguments in early language are made in accordance with discourse informativeness.

Two Chinese-speaking children, Lin and Jie, in Taiwan and their mothers are involved in the study. Both children's parents have received post-graduate education. The data used in the study consist of eight hours of video-recorded natural mother-child conversations at the children' homes, with four one-hour sessions with each child. A summary of the two children's data is presented in Table 25.

Table 25. Lin's and Jie's Data

Child	Age	MLU
Lin	2;02	2.6
	2;06	2.8
	2;10	3.2
	3;01	3.5
Jie	2;02	2.0
	2;07	2.4
	2;10	2.8
	3;01	3.1

(Huang 2011: 2060)

The data are coded based on the referential forms (i.e. null, pronominal, or lexical) and on informativeness features. In terms of the latter, Huang (2011) adopts Allen's (2000) criteria, which divide informativeness features into a set of eight. These features determine how informative the children should be when referring to a referent. Each of the eight features has an informative value and an uninformative value. An informative value refers to the situation when the referent at hand is less certain (e.g. absent) and requires high informativeness in the linguistic form. In contrast, an uninformative value refers to the situation when the referent is more certain

(e.g. present) and does not require high informativeness in the linguistic form. The informative and uninformative values for each feature are summarized in Table 26.

Table 26. Informativeness Features

Pragmatic features	Informative value	Uninformative value
Absence	Referent absent from physical context	Referent present in physical context
Contrast	Contrast Contrast emphasized between potential referents	No contrast emphasized between potential referents
Differentiation in context	Two or more potential referents in physical context	Only one potential referent in physical context
Differentiation in discourse	Two or more potential referents in preceding discourse	Only one potential referent in preceding discourse
Inanimacy	Inanimate referent	Animate referent
Newness	Referent new to discourse	Referent not new to discourse
Query	Referent subject of or answer to query	Referent not subject of or answer to query
Third person	Third person referent	First or second person referent

(Allen 2000: 490)

The results of Huang's (2011) study show that when referring to absent referents, the children use a high rate of lexical forms (74.4% in the case of Lin and 62% in the case of Jie); when referring to present referents, the percentage of lexical forms becomes much lower (29.4% for Lin and 23.9% for Jie). In contrast, both children use null forms and pronominal forms to refer to present referents more frequently than they use these forms to refer to absent referents. Chi-square analyses show that the referential choices for absent and present referents are significantly different in both children's data, which suggests that the children are sensitive to the feature [absence] in their referential choice.

A post hoc multiple comparison test is conducted in order to understand which form(s) used by the children contribute(s) to the significant differences. The results show that (i) a

significantly lower percentage of null forms are used for absent referents than for present referents in both children's data; (ii) a significantly lower percentage of pronominal forms are used for absent referents than for present referents in both children's data; and (iii) a significantly higher percentage of nominal forms are used for absent referents than for present referents in both children's data. Therefore, the children's use of all the three types of referential forms contributes to the significant differences observed in the Chi-square analyses.

Similar distribution patterns and statistical results are also observed in terms of the other informativeness features. All the Chi-square analyses reach statistical significance, except for Lin's data with respect to contrast.

These results indicate that both children's referential choices are highly influenced by the informativeness features examined. Furthermore, the post hoc multiple comparison tests for the Chi-square analyses show that Lin's data reveal consistent patterns in the use of referential forms. For all the informativeness features analyzed, it is observed that (i) a significantly lower percentage of null forms are used for referents with informative values (e.g. new, contrastive) than for referents with uninformative values (e.g. old, non- contrastive); (ii) a significantly lower percentage of pronominal forms are used for referents with informative values than for referents with uninformative values; and (iii) a significantly higher percentage of lexical forms are used for referents with informative values than for referents with uninformative values. That is, when Lin refers to a referent with an informative value (i.e. a referent which is less certain), she tends to use a lexical form to provide the required high informativeness. In contrast, when she refers to a referent with an uninformative value (i.e. a referent which is more certain), a null form or a pronominal form will usually be the choice. Thus, Lin uses null forms and pronominal forms in a similar way, which is distinct from the way in which she uses lexical forms.

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On the other hand, Jie's data reveal a slightly different picture. The post hoc multiple comparison tests of Jie's data demonstrate that five of the features (i.e. absence, differentiation in context, differentiation in discourse, inanimacy, and third person) present patterns consistent with those observed in Lin's data. However, three of them (i.e. newness, query, and contrast) show different patterns regarding the use of lexical forms. It is observed that for these three informativeness features, Jie's use of pronominal forms does not show significant differences between the informative values and the uninformative values; the significance observed in the Chi-square analyses results from the distinctive distribution patterns of null forms and lexical forms.

Such results seem to suggest that Jie does not use pronominal forms to differentiate the informative values from the uninformative values of newness, query and contrast. Since informative values usually require high informativeness in linguistic forms, Huang (2011) conducts a further analysis to examine why Jie refers to these new, queried, or contrastive referents with pronominal forms, which are less specific and informative than lexical forms, and whether Jie's uses of these pronominal arguments are communicatively effective. A closer look at Jie's data reveals that the majority of these pronominal forms are demonstratives, and they usually represent referents which are present in the situation contexts. Moreover, these pronominal arguments are usually accompanied by the use of non-linguistic strategies, such as deictic gestures or eye gaze to indicate the intended referents. Therefore, it appears that Jie in fact is sensitive to the lower specificity and informativeness of pronominal forms and the need to supplement pronominal forms with non-linguistic information. With the non-linguistic strategies, these pronominal arguments are usually communicatively effective. In other words, Jie's use of pronominal forms also reflects her sensitivity to the informativeness features.

So why do Lin and Jie show slight differences in terms of their referential choices? A preliminary observation of the mothers' data indicates that this difference may have something to do with the maternal input. That is, Jie's mother, in comparison with Lin's, may use deictic gestures and eye gazing more consistently to supplement pronominal forms for new, queried or contrastive referents. This finding again confirms the role played by the linguistic environment in children's language production.

The results above show that both children in Huang's (2011) study are sensitive to all the informativeness features examined, and their sensitivity is reflected in their choices of referential forms. They tend to use referential forms with high informativeness to represent referents with informative values and to use referential forms with low informativeness to represent referents with uninformative values. In addition to linguistic strategies, non-linguistic strategies also play an important role in the children's referential systems.

In order to investigate whether the children adopt the same referential strategies throughout the investigation period (i.e. from 2;02 to 3;01), Huang (2011) carries out another examination of the children's referential choices at different ages. The results demonstrate that except for Jie's session at 2;10, the children's referential choices for absent referents and for present referents show a statistically significant difference in all other sessions, which reveals the children's early sensitivity to the feature [absence]. In other words, even 2;02 children are able to use different linguistic forms to differentiate between absent referents and present referents.

Similar distribution patterns and statistical results are also observed in the figures concerning the other informative features. The children adopt different referential strategies to represent referents of informative value and uninformative value in all the other seven informative features in all the data session, which suggests that, since the children are as young

as 2;02 and throughout their development, these informativeness features are powerful variables influencing their referential choices.

The findings in Huang's (2011) study are in general in line with those found in Guerriero, Oshima-Takane, and Kuriyama's (2006) study on child English, which indicates that the discourse-pragmatic influence on children's object production may be cross-linguistic: regardless of the type of the target language, children are sensitive to discourse pragmatics at a very young age, though they may first express this sensitivity through non-linguistic strategies. Huang's (2011) study also offers some support for the influence from the language input on the child's production.

2.1.3 The Acquisition of Objects in Spanish

As presented in a previous subsection (c.f. subsection 2.1.1), Pérez-Leroux, Pirvulescu, and Roberge (2008) propose that no matter whether the target language allows null objects, all children will go through a null object stage where they produce illicit null objects in obligatory contexts. Studies on Spanish offer divergent reports on the status of null objects at early stages, both for analyses of spontaneous speech (Lyczkowski 1999, Fujino and Sano 2002) and for experimental elicitation studies (Bedore and Leonard 2001, Wexler, Gavarró, and Torrens 2004, De la Mora et al. 2004 and Castilla and Pérez-Leroux 2010).

In an analysis of three longitudinal corpora from CHILDES (MacWhinney 2000) from 1;08 to 3;11, from 2;06 to 4;11 and from 1;07 to 2;11 respectively, Fujino and Sano (2002) report high rates of illicit null objects at the outset (around 14%-24%) and a substantial decrease around 2;04. However, Lyczkowski (1999) studies the same data and concludes that these three

children very rarely produce null object clitics and malformed or displaced object clitics and that their null object rate is 1.89%.

In terms of experimental studies with Mexican children in the United States, Bedore and Leonard (2001) test object clitics by means of a sentence completion task: *Los niños lavan el carro y luego … lo empujan* ("The boys wash the car and then … they push it"). The younger group (aged from 2;04 to 3;10) produce 15% utterances with null object arguments. On the other hand, in another study with Mexican children in Mexico City, De la Mora et al. (2004) report lower rates of null object arguments in their younger control group (mean age 3;09). They find clitic production increases with the repetition of the referent. In their task, children have to evaluate an incorrect statement, and the target negative sentence requires an overt object pronoun. If children fail to produce the target sentence, the experimenter introduces the standard question prompt as shown in (94).

(94) Experimenter: La madre rompió los platos.
The mother   broke   the   plates
"The mother broke the plates."

Child: No, los lavó.
No them washed
"No, she washed them."

Experimenter: ¿Qué hizo la madre con los platos? (Prompt)
What did the mother   with the   plates
"What did the mother do with the plates?"

(Castilla and Pérez-Leroux 2010: 10)

Target clitic suppliance (i.e. negative response) is 59% on the first trial in their study and 73% with the prompt. De la Mora et al. (2004) report a null object rate of 5% for both trial and prompt.

Wexler, Gavarró, and Torrens (2004) perform an elicitation task with 28 monolingual Spanish-speaking children between 2;00 and 4;00 in Madrid, Spain, as shown in (95), to test children's null clitic production in Spanish.

(95) a. Experimenter 1: Aquí tenemos la Caperucita Roja. El rey la encuentra y piensa:
     "Mira qué despeinada está." Y como tiene un peine, mira qué hace.
       "Here we have Little Red Riding Hood. The king finds her and thinks: 'look what a mess her hair is!' And as he has a comb, look what he does."
   b. Experimenter 2: Yo sé qué hace: lava a la Caperucita Roja.
       "I know what he does: he washes Little Red Riding Hood."

   c. Experimenter 1: No. Díselo: ¿Qué está haciendo el rey a la Caperucita Roja?
       "No! You tell her: what is the kind doing to Little Red Riding Hood?"

   d. Expected response: Está peinándola.
              Is   combing her
           "He is combing her."

An experimenter introduces various characters using puppets and tells a story to the child (95a). A second experimenter gives an incorrect continuation of the story (95b), which the child is to correct (95d). The given context, in which the object is known and has just been mentioned, strongly favors a clitic object rather than a lexical object. Both sentences in present tense and sentences in present perfect are tested, each type with 4 items. Verbs are transitive, and all the expected responses for the child consist in a clitic pronoun and a verb. The results of their study show a low null object rate in 2-year-old children (7.8%) and virtually no null object arguments in older children's production (1.25% in the 3-year-old group and 0% in the 4-year-old group).

More recently, Castilla and Pérez-Leroux (2010) also study the null object phenomenon in child Spanish. The researchers point out that Spanish-children have been observed producing anomalous sentences such as those in (96).

(96) a. *Tú no pones *e*.
            you not put
         "You don't put (it) on."

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b. *Te voy a pelar *e*.
   you go   to peel
   "I'm going to peel you (the apple)."

<div align="right">(Castilla and Pérez-Leroux 2010: 3)</div>

In the two sentences in (96), the direct objects of the transitive verbs *poner* ("to put") and *pelar* ("to peel") respectively are neither overtly realized nor generic in interpretation.

Castilla and Pérez-Leroux (2010) conduct an experiment to evaluate the presence of the null object stage in Spanish-speaking children and investigate the relation between null object clitics and morphological substitution or underspecification errors in early stages of the development of Spanish syntax. They adopt the hypothesis of the transitivity approach, which predicts null objects in early child language for all languages but variation in the rates of convergence across languages, depending on the range and frequency of null object constructions in the adult grammar (Cummins and Roberge 2005).

In Castilla and Pérez-Leroux's (2010) study, 103 typically developing Spanish-speaking children are recruited in nine schools in Cali, Colombia. The children are grouped into three age categories: 3-year-olds, 4-year-olds, and 5-year-olds. Ten Spanish-speaking adults are also involved in the study and form the control group.

The children are presented with short stories illustrated by a picture, as shown in (97), and then asked the prompt question *¿Qué hace x a y?* ("What does x do to y?") and they are expected to answer the question with an overt object.

(97)

Experimenter: La niña y la mamá iban a salir de paseo. La niña se bañó y la mamá la ayudó a
arreglarse. ¿Qué le hace la mamá a la niña?
"The girl and the mom were going for a walk. The girl took a bath and the mom helped her to get
ready. What does the mom do to the girl?"

Child: La peina.
Her comb
"She combs her."

*Peina *e*.
Comb
"She combs (her)"

(Castilla and Pérez-Leroux 2000: 13)

The test consists of eight items balanced by number and gender (i.e. 2 singular feminine

and 2 singular masculine; 2 plural feminine and 2 plural masculine). All responses are recorded,

transcribed and coded. However, when it comes to data analysis, only intelligible transitive

responses are taken into account and they are classified as null clitic (e.g. tomar *e* "he drinks *e*"),

target clitic (e.g. lo toma "he drinks it"), number substitution (which refers to the utterance in

which there is disagreement in number between the DP and the clitic) and, gender substitution

(which refers to the utterance in which there is disagreement in gender between the DP and the

clitic).

The results of the elicitation task show a decrease in the null object rate and an increase

in the productive use of direct object pronouns from the younger age group to the older age

group. The children in the 3-year-old group show a null object rate of 35% compared to 4- and 5-year-old children whose null object rate is 16% and 13% respectively. The null object rate in the adult control group is 4%. ANOVA analyses reveal that null object differences are statistically significant across the groups. Planned comparisons using contrast coefficients reveal that children in the 3-year-old group produce statistically significantly higher percentages of null objects than the 4- and 5-year-old groups. No statistically significant difference is found between the 4- and the 5-year-old groups. The adults produce statistically significantly lower rates of null objects than all the children groups. As null objects decrease, the production of direct object clitic pronouns (target and substitutions) increases. The 3-year-old children produce 63% of the target clitic pronouns, the 4-year-old children 8% and the 5-year-olds 86%. The adults produce the target direct object clitic pronouns at a rate of 96%. ANOVA analyses reveal that the difference in percentages of overt clitic production (target and substitutions) is statistically significant across the groups. Planned comparisons using contrast coefficients reveal that the 3-year-old group produces statistically significantly lower percentages of overt clitics than the 4- and the 5-year-old groups. No statistically significant differences are found between the 4-and the 5-year-old in their percentage of overt clitic production. The adults produce statistically significantly higher percentages of overt object clitics than all the children groups.

When examining the lexical effects on the production of null objects, it is found that, in the children's data, overall the null object rates of three verbs are less than 10%: *abrir* ("to open"), *mirar* ("to look at") and *lavar* ("to wash"). The verb *cortar* ("to cut") takes a null object rate of 12%. The null object rates of *soplar* ("to blow") and *peinar* ("to comb") are 21%. The only verb that takes an overall null object rate of 50% is *leer* ("to read"). In comparison, the three

instances of null objects found in the adults' data are with the verbs *soplar* ("to blow", 2 instances) and *leer* ("to read", 1 instance).

In terms of the number of the target objects, there are higher rates of null objects with prompts eliciting singular clitics than with prompts eliciting plural clitics. Overall, there are 13% null singular objects compared to 5% null plural objects. A two-factor ANOVA on the percentage of null objects over all responses per number for the three children groups was performed and the results indicate a significant difference for number on the percentage of null objects. Furthermore, regarding number substitutions, there are no substitutions of the singular for any of the age groups. In contrast, the substitution of the plural form by the singular is the most frequent type of substitution among all children. A Chi-square analysis reveals that there is no significant association between age group and the frequency of plural substitution.

Regarding the gender of the target object, gender substitutions are found scarce across the three age groups (3%, 2% and 4% respectively) and the comparisons do not indicate any statistical significance. Both cases of masculine target object substituted by feminine object clitics and feminine target objects substituted by masculine object clitics are found and there is no asymmetry between both substitutions.

In sum, the results of Castilla and Pérez-Leroux's (2010) study on Spanish-speaking children's null object stage suggest that, at the earliest stage, children produce a total of 35% null objects over the total number of transitive structures elicited. The study shows a clear developmental trend of an increase in the production of clitic pronouns with age. The most significant change in the clitic data occurs between the ages of 3;00 and 4;00, as does the complementary reduction in null objects. Both of these developmental effects are statistically significant. In contrast, the results of Castilla and Pérez-Leroux's (2010) study do not confirm

the association between the likelihood of a child to produce null objects and to produce morphologically unspecified clitics.

The elicitation experiments in the studies on child Spanish mentioned in the present subsection (Bedore and Leonard 2001, Wexler, Gavarró, and Torrens 2004, De la Mora et al. 2004 and Castilla and Pérez-Leroux 2010) have shown different results. Virtually no cases of null objects are found in the 3-year-olds in Wexler, Gavarró, and Torrens's (2004) study; a 5% null object rate is detected in De la Mora et al.'s study, 15% in Bedore and Leonard's (2001) and 35% in Castilla and Pérez-Leroux's (2010). What should be pointed out is that the children in the 3-year-old group (mean age 3;00) in Castilla and Pérez-Leroux's (2010) experiment are younger than those in the studies of De la Mora et al. (2004) and of Bedore and Leonard (2001) who report no mean but whose range extends from 2;04 to 3;10. The children in the 4-year-old group, whose low end of the age range is 3;09 in Castilla and Pérez-Leroux's (2010) study have 16% null objects in their transitive sentences. This figure is comparable to the facts described in Bedore and Leonard's (2001) study.

Furthermore, several possibilities may contribute to the variability in the results. One could be the different methodology adopted in the studies. There is variation as to how the data are reported: in Bedore and Leonard's (2001) and Castilla and Pérez-Leroux's (2010) studies, the entire range of data elicited is reported, including non-responses. Other studies only classify the data in terms of null, clitic and DP objects, without explicit reference to response rates. Furthermore, there is the question of variation in elicitation methods. In Bedore and Leonard's (2001) study, the researchers adopt a sentence conjunction approach, where the target DP is presented once as the object in the first conjunct, and is also the target object in the second conjunct. De la Mora et al. (2004) introduce a novel procedure. In their experiment, the puppet

simply presents an incorrect description of an event involving the object, which the children are supposed to correct. If children fail to produce a corrective statement, the experimenter follows with the more standard prompt. Significantly, the rates of overt clitic production increase by half from the first trial (after negation) to the second (the question prompt). This could be related to the form of the prompt or, more likely, to the fact that the setup mentions the object twice. If the latter is correct, this suggests that children are extremely sensitive to the organization of the preceding linguistic background, and that the number of repetitions of an antecedent may have a direct effect on pronominal clitic realization. In the elicitation task in Wexler, Gavarró, and Torrens's (2004) study, in which the highest overt object production rate is yielded, a preamble story presents the event to the participants, including the target object. A puppet provides an incorrect description of the event that contains a second mention of the object. Then the child is prompted by a standard question mentioning the object for a third time. In Castilla and Pérez-Leroux's (2010) study, the elicitation task also contains a short story background, but the question prompt is directly presented to the child by the experimenter, no puppet being involved, and no repetition of the prompt is produced. Such differences in elicitation methods may be a potential explanation for the differences in the results. What is more, variation in the lexicon should be taken into account as another variable since in Castilla and Pérez-Leroux's (2010) study the children produce different rates of null objects with different verbs.

Another possibility that could contribute to the difference in the results can be regional variation. Wexler, Gavarró, and Torrens's (2004) is conducted in Spain, Bedore and Leonard's (2001) is conducted with Mexican children in the United States while De la Mora et al. (2004) test Mexican children in Mexico City. Castilla and Pérez-Leroux's (2010) is conducted with Colombian children. In the case of subjects more overtness is found in the Caribbean varieties

than in Peninsular Spanish (e.g. Otheguy, Zentella and Livert 2007, Camacho 2013). However, this is not the case with objects and so null objects are not a property of Latin American Spanish, as they are not in Peninsular Spanish (Schwenter 2006). Despite of this fact, the regional variation factor cannot be ruled out.

2.2 The Acquisition of Objects by Bilinguals

After discussing the nature of monolingual acquisition, the acquisition of objects in bilingual children is explored in this section as it is the target of the present study. First some defining properties of the simultaneous acquisition of two languages are addressed including the notion of interlinguistic influence. Then a review of the literature on object acquisition in bilingual children is provided.

2.2.1 Some Defining Properties of Bilingual Acquisition

So far, the collective weight of the empirical evidence has suggested that bilingual children are able to differentiate between the two languages from early on in their linguistic development (Genesee 1989, Meisel 1989, De Houwer 1990, Genesee, Nicoladis and Paradis 1995, among others). However, the picture with regards to interlinguistic influence remains unclear. Some studies support the Autonomous Development Hypothesis, which suggests that the separation of the two grammars also implies autonomous development without interaction, and thus bilingual development is much like that in monolinguals (De Houwer 1990, Meisel 1994, Paradis and Genesee 1996, among others). Nevertheless, current views are more open to the possibility of interaction and interlinguistic influence between the two languages (Müller 1998, Yip and Matthews 2000, 2005, among others). In particular, proponents of the interaction

between the two languages of the bilingual argue that the development of separate grammars does not preclude interlinguistic influence, which is only to be expected whenever two languages are simultaneously in contact during development. So under this view, what is of interest is the nature of the influence.

Paradis and Genesee (1996) define interdependence of two grammar systems, in other words, interlinguistic influence, as being the systemic influence of the grammar of one language on the grammar of the other language during the course of acquisition, causing differences in a bilingual's patterns and rates of development in comparison with those of a monolingual. The two authors identify three potential manifestations of interlinguistic influence: acceleration, delay and transfer.

First of all, interlinguistic influence from one language into the other could accelerate the acquisition of certain properties in one of the languages of the bilingual. Acceleration refers to the fact that, if a certain property emerges earlier in grammar A, this could trigger the acquisition of this specific property in grammar B and, as a result, it will appear in the bilingual grammar B earlier than it would be the norm in monolingual.

In contrast, it is also possible that the burden of acquiring two languages could slow down the acquisition process in bilingual children, causing them to be behind monolinguals in their overall progress in grammatical development. In other words, bilinguals may acquire a given construction later in development than monolinguals.

The third potential manifestation of interlinguistic influence is transfer, which consists of the incorporation of a grammatical property from language A into language B. In this case, bilinguals pass through stages of linguistic development that monolinguals do not. Paradis and Genesee (1996) point out that this is most likely to occur if the child has reached a more

advanced level of syntactic complexity in one language than in the other. They also point out that such a discrepancy between the two languages of the bilingual could occur because (i) it is typical in the monolingual acquisition of the two languages, or because (ii) the bilingual child is more dominant in one of his/her languages.

Understanding interlinguistic influence in the domain of syntax requires the identification of the conditions under which one developing grammar influences the development of the other grammar. Hulk and Müller (2000) put forward a prominent proposal, namely, the Interference Hypothesis, according to which two conditions are required for negative interlinguistic influence, which consists of a slower or different pattern of acquisition in comparison with monolingual norms (i.e. delay and transfer). They propose that (i) interlinguistic influence occurs at the syntax/pragmatics interface because of the challenge this presents even in monolingual acquisition; and that (ii) for influence to occur, surface structures must be sufficiently similar so that they allow for an initial confusion of underlying forms. At the same time, other approaches have stressed that Hulk and Müller's (2000) two-constraint formulation on influence is deficient when additional language pairs or later stages of syntactic development are examined (e.g. Serratrice, Sorace, and Paoli 2004, Notley, van der Linden, and Hulk 2007). In such instances, researchers suggest that other factors such as input frequency, transparency of syntax-pragmatics mapping and complexity of target structures might be usefully considered. Furthermore, Hulk and Müller's (2000) hypothesis misses out another potential manifestation which is less commonly attested but theoretically consequential; that is, the interlinguistic influence that accelerates bilingual's acquisition of certain structures when compared with monolingual norms (i.e. acceleration).

Against Hulk and Müller's (2000) Interference Hypothesis which predicts only negative interlinguistic influence, Hsin (2012) presents the Structural Transfer Hypothesis (STH), as shown in (98), which supplies conditions for the three types of interlinguistic influence in bilingual first language acquisition as proposed by Paradis and Genesee (1996).

(98) The Structural Transfer Hypothesis
  a. Facilitation occurs when syntactic-structural conditions overlap: an identical syntactic structure is used in both languages, causing bilingual children to produce adult-like utterances earlier in development than monolinguals.
  b. Delay occurs when discourse-pragmatic constraints conflict: the rules for using grammar-external "special" structures are confused, causing bilingual children to produce adult-like utterances later in development than monolinguals.
  c. Interference occurs when parametric settings (broadly construed as grammar-internal regularities) conflict: grammar-specific generalizations interfere with one another, causing bilingual children to produce utterances that neither monolinguals nor adults are found to produce.

(Hsin 2012: 113)

The formulation of the STH in (98a) suggests that there must be available syntactic structures that allow bilinguals to bootstrap one of their grammars onto the other, so that the development of the grammar of one language is in effect facilitated by the prior development of the other. This is in line with the Bilingual Bootstrapping Hypothesis proposed by Gawlitzek-Maiwald and Tracy (1996), which argues that, providing that the two languages in a bilingual child develop at a different pace, the more advanced system will boost the development of the less advanced one. The STH in (98b) predicts that conflicting discourse-pragmatic constrains on a certain domain are technically external to the grammar itself, which leads the bilingual child to overextend an option which is available to the bilingual child as well as to the monolingual acquirer of the affected language. The STH suggests that cross-linguistic cue competition is the

reason for the appearance of interlinguistic influence. In other words, competing grammar-internal regularities give rise to interference, as in (98c).

Hsin's hypothesis on the three potential manifestations of interlinguistic influence is the result of previous empirical work, which will be descripted in detailed in the following three subsections.

2.2.1.1 Acceleration

Hsin (2012) investigates S-E bilinguals' acquisition of wh-questions. Wh-questions produced by monolingual Spanish-speaking children mirror adult ones from the earliest two-word MLU stages, containing all the required functional and inflectional elements (e.g. Pérez-Leroux and Dalious 1998, Serrat and Capdevila 2001). As opposed to the acquisition of wh-questions in Spanish, however, such questions are known to pose difficulties in the monolingual acquisition of English. In fact, monolingual English-speaking children's wh-questions are often non-adult-like in the initial stages of the acquisition process (e.g. Klima and Bellugi 1966, Smallwood 1998), as shown in (99).

> (99) a. What doing? (MLU 1.96)
> b. Where other one going? (MLU 2.50)
> c. What I got in? (MLU 2.91)
> (Manchester corpus, CHILDES)

Most visibly, non-target questions in English systematically display an absence or an incorrect usage of the auxiliary element required in all English questions. But these auxiliary-omission errors, as those in (99), accompany other divergences from the adult grammar, such as accusative subject pronouns (e.g. "where me sleep?") or uninverted S-V ordering (e.g. "where small trailer he should pull?")

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Pérez-Leroux and Dalious (1998) claim that such different patterns of use found in S monolinguals and E monolinguals can be the result of limited availability of syntactic structures. They argue that young children only have access to fully specified projections through the IP level of representation. In the absence of a CP, there is no way to derive both the inflection and the word order required for the production of a target wh-question in English, as shown in (100a), while in Spanish this is perfectly possible, as in (100b).

(100) a. [IP what [VP the tiger say]]
　　　 b. [IP qué [VP dice el tigre]]
　　　　　 what　　say the tiger

(Hsin 2012: 109)

It is generally accepted that it is a defect related to the C-domain[9] that causes E monolinguals' errors in wh-questions.

With the different productive abilities in mind, two directions of interlinguistic influence in the wh-questions of S-E bilinguals can be possible (in addition to the possibility of there being no influence at all): English might exert an influence on Spanish, or otherwise Spanish might

---

[9]According to the Minimalist Program (Chomsky 1995), the clause universally consists of three phrases, the VP, the IP and the CP, which are organized as follows:
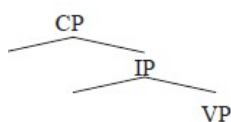
IP and the lower phrases are referred to as I-domain, and the CP as the C-domain. The C-domain as the highest structural level is vulnerable due to the fact that it represents an interface level connecting syntax with other cognitive systems. Furthermore, it connects different levels of grammatical representation: pragmatic and syntactic information are exchanged at the C-level (as in the case of topicalization).

exert an influence on English.

In terms of possible manifestation of influence, it falls into three distinct categories: delay, acceleration and transfer, where delay and acceleration are understood as a quantitative divergence from monolingual norms of development (i.e. bilinguals make a larger or smaller number of a certain type of errors than monolinguals do) while transfer is a qualitative divergence from monolingual norms (i.e. bilinguals produce utterances that monolinguals do not). For example, one might find that the finite verb precedes negation in Spanish, in an analogy with English, as in (101).

> (101) *¿Qué *quieres no* comer?
>   What want   not eat
>
>   (Hsin 2012: 110)
>
> c.f. ¿Qué no quieres comer?
>   "What *do* you *not* want to eat?"

It could also be the case that the child raises the subject above the lexical verb in Spanish, identifying the class of verb (lexical as opposed to auxiliary), and this conditions the relative position of the subject, rather than the verb's finiteness being the conditioning feature, as in (102).

> (102) *¿A quién *Elena ama*?
>   To whom Elena   loves
>
>   (Hsin 2012: 110)
>
> c.f. ¿A quién ama Elena?
>   "Whom does *Elena love*?"

It could also be that the child interprets the abundance of auxiliaries in English wh-questions as a requirement that wh-questions in Spanish need an auxiliary as well, inventing a dummy verb similar to "do" in English, as "has" in (103).

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(103) *¿Cuándo ***has*** ver la película?
　　　　　When　　have see　the film

c.f. ¿Cuándo ves la película?
　　　"When ***do*** you watch the film?"

Interlinguistic influence could consist in the somewhat dramatic deviations from monolinguals' productions as shown above. Likelier, though, is that S-E bilinguals will develop a certain aspect of their syntax more slowly or faster than monolinguals.

Two CHILDES corpora (MacWhinney 2000) containing the spontaneous productions of three S-E bilingual children and their parents (Deuchar and Quay 2001, FerFuLice 2009), along with one monolingual English corpus (Theakston et al. 2001) and one monolingual Spanish corpus (Montes 1987) are analyzed by Hsin (2012). The children are matched for age and MLU; their age at the time of recording span the period from 1;03 to 3;03 and initial MLUs are below 2. All wh-questions in both English and Spanish are extracted from the children's speech and from child-directed speech, and they are inspected for word order, verbal inflection, case and auxiliary use where appropriate.

The results of the analysis show that the bilingual children do not produce null subjects in their English wh-questions, which rules out a negative influence from Spanish (where null subjects are accepted) on English (where null subjects are illegal). Whatever pressure Spanish could have exerted on the NSP setting for English appears to be too weak to overcome the strength of the ECP (Rizzi 1994, c.f. chapter 1, subsection 1.3.2). However, Rizzi's ECP does not preclude the insertion of excessive overt subjects in bilinguals' Spanish wh-questions (as an influence from the overt nature of subjects in English). The analysis of the bilinguals' use of overt subjects in their Spanish production shows that the children reflect monolingual norms, that is, they do not produce significantly more overt subjects in Spanish compared to their

monolingual counterparts.

Therefore, a look at the distribution of overt and null subjects in S-E bilinguals' wh-questions in Hsin's (2012) study yields no sign of interlinguistic influence of any sort, either positively (i.e. acceleration) or negatively (i.e. delay). Importantly, the bilinguals do not surpass their parents with regards to the use of overt subjects in Spanish wh-questions, which signals that the English target requirement that every wh-question contains an overt subject has not influenced the children's Spanish.

Hsin (2012) then conducts another investigation on another related aspect, namely, the use of auxiliaries. She points out that the inclusion of the auxiliary is notoriously variable in monolingual English-speaking children's speech, and thus there is an a priori expectation that S-E bilinguals, who receive abundant overt evidence of auxiliary-free utterances via Spanish, may omit even more auxiliaries than their monolingual peers.

The results of Hsin's (2012) study show that there is a difference in performance between the monolingual English control and one of the S-E bilinguals (Deuchar and Quay 2001). In the monolingual English child's corpus, 29.5% of auxiliary elements are omitted in contexts where they are obligatory. This figure is similar to what is documented in monolingual English-speaking children in Stromswold's (1995) study, which involves a much larger subject pool (14 children). In contrast, the bilingual child never fails to include the auxiliary omissions where it is required in English wh-questions, nor does she fail to invert the auxiliary and the subject or to inflect the auxiliary appropriately. The bilingual's English wh-questions are therefore error-free, in spite of the monolinguals' tendency to err in producing the same type of utterance. This indicates that there is a facilitating instead of delaying effect in the child's bilingualism in this particular area of grammar.

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In the other bilingual corpus, namely, the FerFuLice corpus (Fernández Fuertes and Liceras 2009), only 8 of the wh-questions in the twins' English speech are missing an auxiliary, which contributes to a 10% of error rate. Although the results obtained from this corpus are not quite as clear as those in the Deuchar corpus (Deuchar and Quay 2001), they do follow the same trend. The 10% error rate can be the result of a number of factors, including that the two children are not balanced but Spanish-dominant (S-dominant) S-E bilinguals and their exposure to English is more limited than that of the bilingual child in the Deuchar corpus. A chi-square test also confirms that the patterns of the two bilinguals in the FerFuLice corpus are significantly different from what is observed in the monolingual English-speaking child's corpus (Manchester corpus in CHILDES, MacWhinney 2000). Since the twins are reported to be S-dominant, it is possible that they do not possess a sufficient awareness of English, perhaps even on a phonological level, to have mastered wh-questions as the E-dominant bilingual child in the Deuchar corpus in CHILDES (MacWhinney 2000). It has been proposed that the low phonological salience of the auxiliary element may make the auxiliary difficult to track for young children. Given that the twins in the FerFuLice corpus use Peninsular Spanish phonological traits in their English speech, a fact which might bespeak a weaker capacity for auditory processing of English as well, their ability to process auxiliaries in their caregivers' speech may be inferior to that of the child in the Deuchar corpus (Deuchar and Quay 2001).

The results of Hsin's (2012) study confirm that with respect to interlinguistic influence, the language which receives the influence (i.e. the influenced language) must be in some way vulnerable, a view that is agreed in both the Interference Hypothesis (Hulk and Müller 2000) and the STH (Hsin 2012): the variation in auxiliary-inclusion in monolingual English-speaking children would attest to the vulnerability of this particular domain. As such, without sufficient

exposure to what is needed for forming wh-questions in general, bilingual children, too, may fail to include auxiliary elements even if the underlying structure is available. The paucity of the twins' English input in the FerFuLice corpus (Fernández Fuertes and Liceras 2009) can serve as an explanation for their overall few but more errors when compared to the E-dominant child (who is error-free) in the Deuchar corpus, considering both the phonological challenge that auxiliary elements present and also the limited evidence they have in their daily life to help them develop a rule for including auxiliaries.

In the bilingual corpora, the frequencies of other auxiliary errors are entirely absent or lower than in the monolingual English corpus. This is further attestation that bilingual children have the structure and the appropriate features that allow them to form grammatical questions with statistical regularity rather than at chance, as the monolingual does. Such an overall difference in performance between the monolingual children and the bilingual children is predicted by the STH (Hsin 2012) as previously stated in (98) in the present subsection.

The STH (Hsin 2012) suggests that the availability of syntactic structure, which allows bilinguals to bootstrap one of their grammars onto the other, is needed for the acceleration effect in bilinguals' language development to ocur. In this case, the development of the grammar of one language may be in effect facilitated by the prior development of the other. In Hsin's (2012) study, the advantage of the S-E bilinguals in wh-questions and the use of auxiliaries is seen flowing from Spanish into English. If this is so, how can Spanish support the speedier acquisition of English?

As mentioned previously, with only a limited amount of structure, monolingual Spanish-speakers can produce adult-like wh-questions while monolingual English-speakers cannot. Hsin (2012) thus argues that the best way to explain the disparity between monolinguals' and

bilinguals' performance in wh-questions in English may be that a facet of Spanish grammar could plausibly be at a more advanced stage of development than in the English grammar possessed by a child of the same chronological age. This view is in line with Paradis and Genesee's (1996) proposal on the conditions that can possibly cause transfer. In this case, just as delay and transfer are caused by interactions between the child's two sets of linguistic knowledge, so is acceleration; but rather than getting in the way of grammatical development, acceleration consists of a syntactic structural bootstrapping effect from one grammar to the other.

In S-E bilinguals, the use that Spanish makes of the C-domain causes acquirers of Spanish (both monolinguals and bilinguals) to develop a reliably accessible CP earlier in their linguistic development than acquirers of English can do, based on what is contained in the input.

Crucially, evidence for the C-domain is abundant in child Spanish speech: topicalized and focused objects, often involving clitic left-dislocations; topicalized and focused subjects; and objects and subjects that precede wh-questions; all these structures point towards a need for positions higher than IP in order to get Spanish off the ground. What is more, children acquiring Spanish produce these types of constructions even before 3;00, which indicates that they have available positions that children acquiring English show no sign of possessing at that age. Another source of evidence that the C-domain is active early in Spanish-speaking children's grammar is their tendency to respect target information structural constraints, in particular, the use of *pro* for at-issue subjects and full DPs for new ones (Paradis and Navarro 2003). Hsin (2012) argues that these facts are strong reasons to make the claim that Spanish-speaking children have a CP early, which can be utilized in the English grammar, that is, transferred from Spanish into English, and thus causing acceleration in their production of wh-questions in English.

The positive effect in bilingual acquisition is also found in another study on S-E bilinguals conducted by Fernández Fuertes and Liceras (2010). In their study, the researchers further study the autonomous/interdependence debate and the nature of interlinguistic influence in bilingual language acquisition by investigating whether interlinguistic influence between English and Spanish may occur in the domain of the English copula *be*.

Fernández Fuertes and Liceras (2010) highlight Meisel's (2001) view that interdependence need not exclude the possibility of autonomous development. If this point is considered along with Hulk and Müller's (2000) view that vulnerable parts of grammar are problematic for both monolingual and bilingual children alike, it indicates that, if the acquisition of a specific grammatical property leads to non-adult-like production in the early stages of acquisition (in both monolinguals and bilinguals), and if the acquisition of this particular grammatical structure is attained in one language before it is in another, then if one of the two grammars of the bilingual (grammar A) happens to access or to incorporate the adult requirement before the other grammar (grammar B), this may lead to an acceleration in the incorporation of these requirements in grammar B (and, therefore, before monolinguals would incorporate them), even though the two grammars of the bilingual develop autonomously (Fernández Fuertes and Liceras 2010: 527).

English copula *be* corresponds to two different copula verbs in Spanish, that is, *ser* and *estar*, as shown in (104).

(104) a. John *is* a man.
      Juan *es* un hombre.   [*ser*]
   b. John *is* in the garden.
      Juan *está* en el jardín.   [*estar*]
                    (Fernández Fuertes and Liceras 2010: 528)

The different verb choices (i.e. *ser* and *estar*) in Spanish broadly capture the distinction between what Carlson (1977) defines as sentences with a generic value and those with a non-generic value. The former refer to cases in which a given property is attributed directly to the individual while the latter involve a property attributed directly to a temporal aspect (i.e. a stage) of the individual. *Ser*, as shown in (104a), generally occurs in individual-level (IL) predication while *estar*, as shown in (104b), appears in stage-level (SL) predication. Furthermore, SL predicates are considered to be aspectual while IL predicates are non-aspectual (as argued by Kratzer 1995, Luján 1981, Schmitt 1992, Schmitt and Miller 2007). Fernández Fuertes and Liceras (2010) point out that the aspectual nature of SL predicates constitutes the basis for Becker's (2004) depiction of copula omission in early child English grammar.

Becker (2004) establishes a relationship between Guéron and Hoekstra's (1995) proposal on sentence temporal anchoring and the IL/SL distinction. These researchers define temporal anchoring as a binding relation between Tense (T) and a Tense operator (T_{OP}) in the CP, a relationship that is indicated by the coindexation between Tense and the operator in Tense, as depicted in (105a).

(105) a. CP.. .T_{OPi}.. .TenseP$_i$...VP

(Fernández Fuertes and Liceras 2010: 529)

Becker (2004: 114) argues that this binding relationship could be satisfied by means of two different relationships in the case of child grammars, as indicated in (105b).

(105) b. CP...T_{OPi}...   TenseP$_i$ ...AspP$_i$ ...VP
        CP... T_{OPi}...   ...AspP$_i$ ...VP   option 1
        CP... T_{OPi}...   TenseP$_i$ ...   …VP   option 2

(Fernández Fuertes and Liceras 2010: 530)

A binding relationship could be established either between a Tense operator and the

Aspect category (i.e. option 1), or between a Tense operator and the Inflection/Tense category (i.e. option 2).

The tree diagrams in (106) show how this distinction operates in the case of copula predicates and how it is reflected in the distribution of omission produced by children. Nominal/IL predicates, like the one in (106a), are not aspectual and thus the AspP category is not present. As a consequence, *be* in IP must provide the sentence temporal anchoring so that *be* tends to be systematically overt.

(106) a. John is a man.
    John *e* a man.
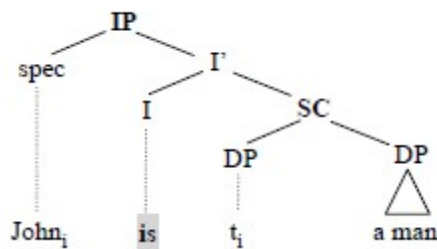
   b. John is in the garden.
    John *e* in the garden.
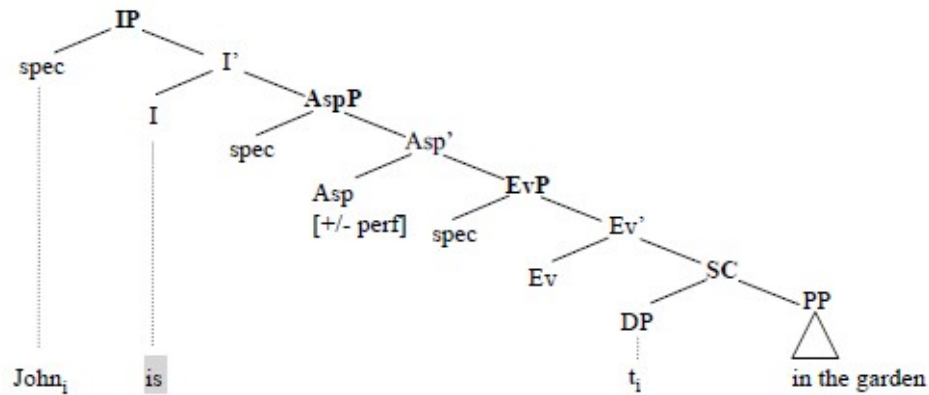
EvP: *event argument*
SC: *small clause*

(Fernández Fuertes and Liceras 2010: 530)

This implies that, from the two possible options in (106a), the explicit one will be favored

so that children will produce a high number of explicit *be* in IL predicates.

On the other hand, SL predicates, like the one in (106b), are aspectual and, therefore, this AspP category provides temporal anchoring in the sentence, so that *be* in IP could be implicit since another category is in charge of temporal anchoring. This is why the implicit option in (106b) tends to be favored by children.

The distinction between IL/SL predicates is applied to the study of E monolingual data by Becker and it will also constitute the framework for the analysis of the patterns of the realization of copula *be* in the English bilingual data in Fernández Fuertes and Liceras' (2010) study. The correlation between this predicate distinction and the copula omission patterns involves the projection of functional structure, i.e. the aspectual category and the possible lack of projection of the inflectional category. The type of functional structure that is projected provides a characterization of the child grammar, and, in particular, of E monolingual language development.

In their observation of the S-E bilingual twins' data (the FerFuLice corpus in CHILDES, MacWhinney 2000), Fernández Fuertes and Liceras (2010) find a very different pattern of copula use in English from what is seen in the E monolinguals in Becker's (2004) study: the bilingual twins omit far fewer copulas than an age- and MLU-matched monolingual; and there are no significant differences between SL and IL predicates. This is an apparent case of positive interlinguistic influence, or in other words, acceleration.

Fernández Fuertes and Liceras (2010) hypothesize that this is an effect of the lexical separation between the copula of SL predicates (*estar*) and the copula of IL predicates (*ser*), whose differentiation facilitates the early implementation of the Temporal Anchoring Constraint requiring an operator in Tense (105 above), as the adult option. That is, the lexical distinction

between the SL and IL predicates in Spanish may trigger the earlier projection of the adult-like inflection, which helps incorporate the inflectional structure, and in particular, the IP (as shown in (106)) that serves as the locus for the overt copula, and thus accelerates the use of overt *be* regardless of the predicate type in English.

Referring back to (98a), on the STH (Hsin 2012), acceleration occurs when syntactic-structural conditions overlaps: so long as a constraint would be independently contained in the two grammars and nothing prohibits sharing, that constraint can be shared to an accelerating effect between the grammars. In Fernández Fuertes and Liceras' (2010) study, English grammar in S-E bilinguals benefits from the indications that the early-established Spanish structure provides for the need to include the copula.

Positive interlinguistic influence from Spanish into English is also found in the domain of subject in the S-E bilinguals (Liceras and Fernández Fuertes in press).

The presence of null subjects has been documented in both Spanish and English in both monolingual and bilingual children in spite of the fact that null subjects with inflected verbs are ungrammatical in adult English (Hyams 1986, 1996; Frazier and De Villiers 1990; Valian 1990, 1991; Wang et al. 1992; Weissenborn 1992; Rizzi 1993/1994; Valian and Eisenberg 1996; Bel 2001; Guasti 2002, Deuchar and Quay 2000; Paradis and Navarro 2003; Liceras et al. 2008; Liceras, Fernández Fuertes, and de la Fuente 2012, among many others).

Some researchers have argued (e.g. Paradis and Navarro 2003) that S-E bilingual children may use more overt subject pronouns in their Spanish than monolingual children due to the fact that subjects are obligatory in English, which has been accounted for as the outcome of interlinguistic influence from English, the [- null subject] language. Taking the previous studies on subject production as well as on bilingual language acquisition as a point of departure, Liceras

and Fernández Fuertes aim at determining: (i) whether the obligatory presence of overt subjects in English has an effect in the distribution of overt/null subjects in the Spanish of S-E bilingual children; and (ii) whether the existence of both null and overt subjects in Spanish has an effect in the distribution of overt/null subject in the English of S-E bilingual children.

Liceras and Fernández Fuertes's (in press) investigation is based on Holmberg's (2005), Sheehan's (2006) and Martínez-Sanz's (2011) Minimalist account of the null subject parameter, in which the null subject parameter is split into the three micro-parameters listed in (107).

> (107) a. The rich agreement parameter
> T lacks/bears an [uD] feature.
>
> b. The PF-interpretability parameter
> T lacks/bears a $*$[10], where $*$ requires the SPEC of T to be spelled out at (Phonetic Form) PF.
>
> c. The Weak/strong nominative Case parameter
> Nominative Case feature [ul] lacks/bears $*$, where $*$ requires movement to SPEC, TP.
>
> <div align="right">(Liceras and Fernández Fuertes in press: 9,
adapted from Martinéz-Sanz 2011: 85)</div>

Under this account, the presence of overt and null subject pronouns in Spanish and overt subject pronouns in English is regulated as follow: (i) the possibility of having a null pronouns is a PF matter, which is possible in Spanish; (ii) in Spanish Extended Projection Principle (EPP)[11] checking proceeds as in English-type languages (Holmberg 2005), and the subject pronoun is not spelled out; and (iii) in Spanish EPP checking proceeds in three steps: first, the null subject needs

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[10] $*$ means that SPEC TP must be spelled out at PF.

[11] The Extended Projection Principle (EPP) (Chomsky 1981) is a linguistic hypothesis about the obligatoriness of subjects. The basic idea of the EPP is that clauses must contain a DP in the subject position (i.e. in the SPEC of TP or IP, or in the SPEC of VP in languages in which subjects do not raise to TP/IP).

to rise to SPEC Tense Phrase (TP) because, even if it bears phi-features, it lacks the deictic/referential [D] feature; this null subject has the option of being overtly realized in Spanish; second, the V + morphological agreement moves to T; finally, feature valuation between the uninterpretable features in T and the interpretable ones in V takes place, as shown in (108) (Liceras and Fernández Fuertes in press: 9).

(108)
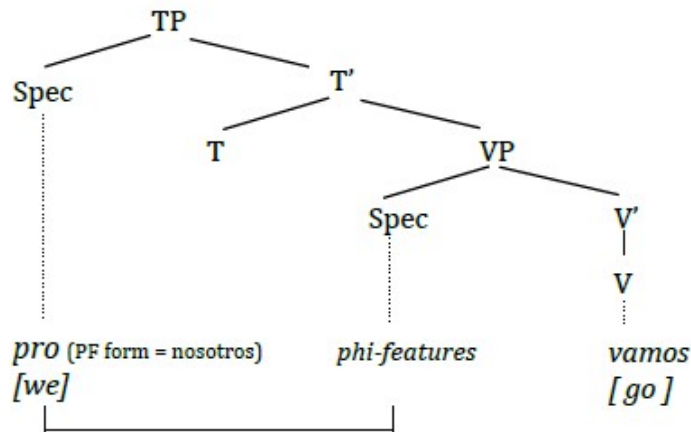
(Liceras and Fernández Fuertes in press: 9)

If overt pronominal subjects are used, the interpretable case feature of V (in T) will valuate the uninterpretable ones in the PF realized pronominal subject (i.e. *nosotros* "we"). This Agree relationship results in feature identity between the SPEC (i.e. the subject in SPEC TP) and its head (i.e. the verb in T) (Liceras and Fernández Fuertes in press: 10).

This analysis allows us to define the null subject parameter in terms of the subset principle. That is, English only represents one option of the parameter, the one that has a PF realization of the subject pronoun. This implies that English is clearly depicted as a subset of Spanish, which as two options: a PF realization (i.e. the overt subject) or a non-PF realization (i.e. the null subject). Under this analysis, Spanish agreement markers and English pronominal subjects have a different status in that Spanish agreement markers are not involved in EPP

checking and it is Spanish weak pronominal subjects that have the same status as English

pronominal subjects. In the case of Spanish, null pronouns are considered to be less marked that

phonetically realized weak pronouns. This indicates that influence from English leading to a

preference for overt pronouns in Spanish should not be strong because the unmarked option will

have more weight (Liceras and Fernández Fuertes in press: 11).

Based on Holmberg's (2005) null subject parameter, Liceras and Fernández Fuertes (in

press) propose four hypotheses, which are divided into two categories: (i) interlinguistic

influence from English into Spanish and (ii) interlinguistic influence from Spanish into Spanish.

Their hypotheses are shown in (109).

(109) Interlinguistic influence from English into Spanish:
   a. The Interference Hypothesis: the Spanish of S-E bilinguals could contain more overt subjects than the Spanish of monolingual children because of influence from the bilinguals' other L1 (i.e. English).

   (Liceras and Fernández Fuertes in press: 12)

   b. No Interference Hypothesis: according to Holmberg's (2005) and Sheehan's (2006) proposal that Spanish has weak overt pronouns which are the phonetic realization of null pronouns and happened to be marked, the possibility that the obligatory realization of overt pronouns in English lead to overproduction of subject pronouns in bilingual Spanish when compared to monolingual Spanish is not expected. In other words, interlinguistic influence should not favor the reinforcement of the marked option (i.e. weak overt pronouns) in Spanish.

   (Liceras and Fernández Fuertes in press: 13)

   Interlinguistic influence from Spanish into English
   c. The Interference Hypothesis: the English of S-E bilinguals could contain more null subject that the English of monolingual children based on the fact that the more economic option of the PF-interpretability micro-parameter (i.e. pronouns with no PF realization as described in (ii) in (107)) would be transferred.

   d. Facilitation Hypothesis: S-E bilinguals would produce less null subjects in English than monolingual children because interlinguistic influence from Spanish would have a facilitating effect. This is to be expected because

Spanish, being the superset language, also provides the PF realization option with overt subject pronouns. This option reinforces the overt value of English subjects, which is the only option in English; so that the null subject stage in S-E bilinguals would be shorter compared to their monolingual counterparts. Due to the fact that overt pronouns in Spanish need not have a pragmatic value, as a consequence of this facilitating interlinguistic influence, the so-called Optional or RI stage[12] (Wexler 1994, 1998; Rizzi 1993/1994) should be shorter-and may have a lower incidence-in bilingual than in monolingual English.

(Liceras and Fernández Fuertes in press: 14)

To test the hypotheses in (109), English data from two bilingual S-E children and one monolingual child and Spanish data from two bilingual children and one monolingual child are involved in the analysis. All the data come from the CHILDES database (MacWhinney 2000). The data of the two S-E bilingual children (Simon and Leo) come from the FerFuLice corpus (Fernández Fuertes and Liceras 2009); that of the E monolingual (Naomi) come from the Sachs corpus and that of the Spanish monolingual (María) come from the López-Ornat corpus. The data selection for the study is summarized in Table 27.

Table 27. Data Selection

Child	Age range	MLUw range (Spanish)	MLUw range (English)	No. verbal utterances (Spanish)	No. verbal utterances (English)	Corpus (CHILDES)
Simon (S-E)	1;10-2;11	1.070-3.705	1.000-2.765	304	302	FerFuLice
Leo (S-E)	1;10-2;11	1.143-3.438	1.000-3.018	379	419	FerFuLice
María (S)	1;07-2;06	1.481-4.647	-	761	-	López-Ornat
Naomi (E)	1;06-2;07	-	1.058-3.689	-	1248	Sachs

(Liceras and Fernández Fuertes in press: 17)

Besides the children's production, the adults' production in the data is also analyzed in order to determine whether and how input could shape the production of null and overt subject pronouns by these children.

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[12] RI stage refers to the period in which children sometimes use infinitival forms of verbs where finite forms are expected according to the adult grammar. For example, *yo poner entonces* ("I to put then") (Leo 2;08) and *no tener café* ("not to have coffee") (Simon 2;07) (FerFuLice corpus, MacWhinney 2000).

In the case of the Spanish data, all the agreement markers for 1st, 2nd, and 3rd person singular and plural as well as 2nd person singular formal and informal (*usted* and *tú*) and 2nd personal plural formal and informal (*ustedes* and *vosotros*) are analyzed. When the referent of a null subject is not obvious, it is codified as "unclear referent". The Spanish forms that cannot carry agreement markers, namely infinitives, gerunds and participles are classified as RIs. All person-number mismatches in verbal morphology (i.e. the mismatches between the forms produced vs. the actual referent) are also identified. Overt subjects are classified as personal pronouns, DPs, CPs, demonstratives, coordinated subjects and RI subjects. Post-verbal subjects with experiencer verbs as well as with transitive verbs, inaccusative verbs, state verbs, etc. are also included.

In the case of the English data, null subjects are also classified depending on the referent (1st, 2nd, 3rd person singular and plural) or the unclear referent. Non-adult-like uninflected forms (i.e. RIs, gerunds and participles) as well as with inflected verbs in the present, past or with a modal are also codified. For overt subjects, they are classified into personal pronouns, DPs, CPs, indefinites, demonstratives, coordinated subjects and non-nominative subjects. Non-adult-like uninflected forms are also identified, as in the case of null subjects. As for tense, the authors isolate the overt subject production with present, past, and modal tenses. Post-verbal subjects and predicates where the copula is omitted are also codified.

In addition, imperatives, adult infinitives, existentials, impersonals, interrogatives, exclamatives involving a wh-word, subject relatives, unproductive forms and vocatives are excluded from the codification for both the Spanish and the English data.

The results of the data classification are shown in Table 28.

Table 28. Distribution of Subject Types across Participants

Child	Spanish			Total Spanish	English			Total English
	Null	**Pronoun**	**Other overt**		**null**	**Pronoun**	**Other overt**	
Simon	74.6%	11.4%	14%	100%	22.5%	63.3%	14.2%	100%
Leo	72%	12%	16%	100%	25%	63%	12%	100%
María	70%	6%	24%	100%	-			
Naomi	-				35.4%	44.4%	20.2%	100%

(Liceras and Fernández Fuertes in press: 22)

Form Table 28 it can be noted that the Spanish null subjects are the ones that used the most (around 70% for both bilinguals and the monolingual) overt pronominal subjects and other overt subjects (i.e. DPs, CPs, etc.). In English, though pronominal subjects are the ones being favored over null subjects and other overt subjects overall (i.e. for both the bilinguals and the monolingual), when comparing between children's preferences for English pronominal subjects, there is a statistically significant difference between the bilinguals' and the monolingual's preference for English pronominal subjects.

After taking a closer look at the data by carrying out contrasts of proportion, Liceras and Fernández Fuertes (in press) conclude that in the case of Spanish, even if the bilingual children produce a higher percentage of subject pronouns than the monolingual child, there is no actual overproduction of subject pronouns in their Spanish. The authors argue that Spanish bilingual children behave like Spanish monolingual children in the respect of subject production because the Spanish no-PF realization option is favored over the Spanish PF realization option.

In the case of English, the results of Liceras and Fernández Fuertes' (in press) study show that there is not more null subjects in child bilingual English than in child monolingual English. In contrast, there is less null subjects in child bilingual English. The authors attribute this to interlinguistic influence with a facilitating effect. That is, the English of S-E bilinguals contain less null subjects than the English of monolingual children because of influence from their other

L1 (i.e. Spanish). This can also be accounted for by the fact that Spanish also has a PF realization option of the parameter. This option, albeit marked in Spanish, reinforces the similar option available in English, which happens to be the subset option with respect to Spanish. This finding is in line with Hsin's (2012) STH (c.f. subsection 2.2.1), in particular, conditions (i.e. when syntactic-structural conditions of the two L1s overlap) for facilitation.

While the simultaneous acquisition of two languages accelerates the children's language development in the three studies mentioned above, it could also have a negative effect, which can demonstrate itself as delay (c.f. subsection 2.2.1.2) or transfer (c.f. subsection 2.2.1.3).

2.2.1.2 Delay

Austin (2009) examines the acquisition of verbal agreement morphology in a cross-sectional study of bilingual Basque-Spanish children and monolingual children acquiring either Basque or Spanish. The author aims to look for evidence of interlinguistic influence from Spanish to Basque in the production of RIs in Basque-Spanish bilingual children in the three forms proposed by Paradis and Genesee (1996), namely, acceleration, delay and transfer, as mentioned previously in this section.

The author points out that Spanish and Basque are synthetic languages in which grammatical morphemes are typically encoded in verbal and nominal affixes rather than forming separate words. However, while Basque is morphologically agglutinative Spanish is fusional.

Verbs in Basque are obligatorily inflected for person, number, gender, tense, aspect and mood. In a periphrastic construction, the participle is inflected for aspect, while the auxiliary carries the morphemes for person, number and tense. As shown in (110), in Basque the inflected auxiliary comes after the participles:

(110) Liburu asko ema-ten   d   - izki   -   o   - t
      Book   many give -IMP AUX- ABS3pl - DAT3sg- ERG1sg
      "I (often) give him/her many books"

(Austin 2009: 453)

In adult Basque, there are three types of non-finite verbs: (i) verbal roots, (ii) present participles and (iii) past participles. Verbal roots and past participles are often homophonous; verbal roots can also be used as infinitives with control verbs, although Basque lacks unique infinitival morphology. What is more, these forms can be used as imperatives. The verb *joan* ("to go") can thus have four meanings, as seen in (111). Out of these forms, non-finite verbs in (111b and 111c) appear as RIs in child Basque.

(111) a. root: joan   "to go"
      b. present participle: joan   "go"
      c. past participle: joan   "gone"
      d. imperative: Joan!   "Go!"

(Austin 2009: 453)

On the other hand, in Spanish, verbs are inflected for tense, aspect, number, person, and, in the case of past participles, gender in certain contexts, such as passive sentences. Agreement morphemes observe the structure in (112a) for regular verbs, with the verb *cantar* ("to sing") as an example.

(112) a. Cant-   -a   -ba   -mos
      b. Verbal root -thematic - tense/aspect   -person/number agreement

The fact that Spanish is a fusional language can be seen in the pervasiveness of portmanteau morphemes such as *-ba* and *-mos* in this language, which simultaneously convey several pieces of information (as shown in (112b)).

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Infinitives in Spanish, unlike in Basque, have a unique morpheme *-r*, which attaches to the verbal root in forms such as *ir* ("to go") and *cantar* ("to sing"). The Spanish infinitive forms appear as RIs in child language, either with an overt or with a null subject, as shown in (113).

(113) a. yo poner entonces   (Leo 2;08)
        I   put   then
        "I to put then."

    b. no tener café   (Simon 2;07)
        not have coffee
        "not to have coffee"

                              (FerFuLice corpus, CHILDES)

The differences between Basque and Spanish non-finite verbs require that a Basque-Spanish bilingual child learn not only that these languages have dissimilar agreement systems but also that the structural configuration of inflection varies in each.

With respect to the acquisition of inflection, previous studies on the issue have suggested that the RI stage represents a universal phenomenon (Liceras, Bel, and Perales 2006). The idea that RIs "develop on a maturational schedule is by now the most widely held view" (Hagstrom 2010:3). In general, RIs are seen from around 2;00 when children start using multi-word utterances up until 3;00, after which a sharp drop-off in the use of RIs is generally observed. However, the starting point of the RI period as well as its length vary across languages. According to Liceras, Bel, and Perales (2006), the RI stage comes to an end at around 1;09 and RIs virtually disappear after 2;00 in typically developing (TD) Spanish-monolingual children, as shown in Table 29.

Table 29. Inflected Verbs *versus* RIs in Monolingual Spanish

Child	Language	Inflected verbs		RIs	
		Stage 1	Stage 2	Stage 1	Stage 2
Magín	SP	91.05%	99.7%	9.8%	0.3%
María	SP	67.7%	97.4%	32.2%	2.6%

Stage 1: from 1;00 to 1;09   Stage 2: from 2;05 to 2;07

Hagstrom (2010) offers a cross-linguistic comparison of the incidence of RIs in early language development as in Figure 5:

Figure 5. Percentage of RIs in Early Languages
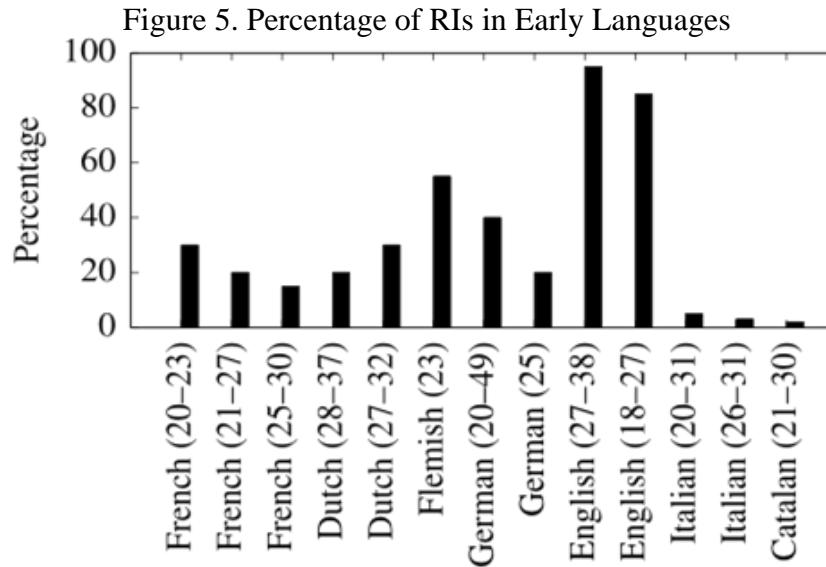
(Hagstrom 2010:2)

From Figure 5 it can be noted that important differences appear across languages in terms of the RI period. When it comes to Austin's (2009) study, it has been suggested that the RI stage lasts until about 2;00 in monolingual Spanish-speaking children but until 3;00 or later in monolingual Basque-speaking children (Ezeizabarrena 2002, Liceras, Bel, and Perales 2006).

When it comes to bilingual children, according to the different maturational schedule in the two languages, interlinguistic influence might occur at a certain age. This is to say, the RI stage lasts until about 2;00 in monolingual Spanish-speaking children but until 3;00 or later in monolingual Basque-speaking children (Ezeizabarrena 2002, Liceras, Bel, and Perales 2006). Acceleration caused because of an influence from Spanish into Basque might be observed in a Basque-Spanish bilingual child: given the earlier maturation for Spanish where the RI stage is overcome sooner, the child could show a shorter RI stage in Basque. And so, if compared to a

Basque monolingual, the Basque of the bilingual could be more adult-like and sooner in this respect.

Conversely, Gathercole's (2007) work predicts that bilingualism may cause a delay in the acquisition of inflections in either language resulting from bilingual children having received less input in each language than monolinguals. That is, the RI stages of Basque and/or Spanish respectively in Basque-Spanish bilinguals will be longer than that of the monolinguals of each language.

Austin (2009) further argues that given that the referential properties of Basque and Spanish RIs are the same with respect to modality, no transfer from Spanish to Basque is expected in such feature of RIs. In particular, the work of Hulk and Müller (2000) and that of Hsin (2012) (c.f. subsection 2.2.1), would predict that there would be no transfer from Spanish to Basque in the use of RIs because there is complete and not partial overlap in RI licensing characteristics and thus no conflict occurs at the parametric setting.

Data from twenty bilingual Basque-Spanish children, eleven monolingual Basque children and nine monolingual Spanish children are involved in Austin's (2009) study. All children are observed from 2;00 to 3;06. The presence and accurate production of verbal agreement are analyzed in utterances with obligatory inflection. Imperatives are excluded since most of them do not have obligatory inflection in Basque. So are self-repetitions, repetitions of other interlocutors and sentences involving code-switching.

Data analysis is conducted by dividing the children into two age groups: group 1 involves those aged 2;07 or under and group 2, those aged 2;08 or older. The results of Austin's (2009) study indicate that the bilinguals produce more RIs in Basque regardless of their age than monolinguals. The difference in RI production between bilinguals and monolinguals is

statistically significant in group 1 while such difference does not reach statistical significance in group 2. Besides, the discrepancy between RI production in Basque and Spanish in the bilinguals is most marked in the children in group 1. Furthermore, no statistical significance in RI production in Spanish is found between the bilinguals and monolinguals across ages. Austin (2009) argues that this is expected since the bilingual children in both groups are much older (at least 3 months) than the age at which the RI stage is reported to end according to the general developmental course of monolingual Spanish speakers.

Therefore, there is no evidence for acceleration in Basque-Spanish bilinguals' RI production in Basque. The shorter RI stage in bilinguals' Spanish does not seem to cause any significant positive influence on their RI production in Basque. On the other hand, evidence for bilingual delay is found in the acquisition of inflection in the bilingual children's Basque, given that the bilingual Basque-Spanish children produce more RIs than their monolingual counterparts.

Bilingual delay is also found in Gu's (2010) research on the acquisition of dative constructions in English and Chinese in C-E bilingual children. The author points out that in English ditransitive verbs have two argument realization options, namely the double object construction (DBO) in (114a), and the prepositional dative (PD) in (114b). In PD constructions, there is a non-benefactive/benefactive distinction, realized by different prepositions, *to* and *for* respectively.

> (114) a. John gave Mary a book. / John baked Mary a cake.
> b. John gave a book to Mary. / John baked a cake for Mary.
>
> (Gu 2010: 89)

Similarly, in Chinese, there are double object constructions (DBOs) and prepositional-like serial verb dative constructions (SVD) in which a grammatical dative marker *bei2*, originally meaning "give", introduces the goal/benefactive argument as the English prepositions do. In addition, apart from DBO and SVD constructions, Chinese also has an inverted double object construction (IDBO), which places the theme and the goal in the reverse order if compared to an English DBO. The three configurations Chinese allows appear in (115).

(115) a. DBO: verb-goal-theme
    b. SVD: verb-theme-dative marker (*bei2*)-goal
    c. IDBO: verb-theme-goal

(Gu 2010: 89)

Unlike English, in which ditransitive verbs have two argument realization options, most Chinese ditransitive verbs only appear in one type of dative constructions in (115). Tang (1998) classified ditransitive verbs in Chinese into three groups: (i) *teach* verbs which appear in DBO, as in (116a); (ii) *send, fry, pluck* verbs which appear in SVD, as in (116b); and (iii) *give* verbs which appear in IDBO, as in (116c). The first two subcategories comprise most ditransitive verbs, while the third one only includes one verb, *bei2* "give".

(116) a. Ngo5 gaau3 keoi5 gwong2dung1waa2   (DBO)
      I   teach   him   Cantonese
    "I teach him Cantonese."

    b. Siu2ming4 gei3zo2 jat1fung1 seon3 bei2 ngo5.   (SVD)
      Siuming   sent   one   letter   give   me
    "Siuming sent a letter to me."

    c. ngo5 bei2zo2 jat1zi1 bat1 keoi5   (IDBO)
      I   gave   one   pen   him
    "I gave him a pen."

(Gu 2010: 89)

It is suggested that IDBO in Chinese is derived from the underlying SVD [*bei2*-theme-*bei2*-goal] (Tang 1998, Yip and Matthews 2007). The second *bei2* is deleted due to a haplology effect, which bans repetition of the same phonological element, as shown in (117), where the second *bei2* is empty (*e*) in IDBO constructions.

(117) Underlying SVD: *bei2*-Theme-*bei2*-Goal
       IDBO: *bei2*-Theme-***e***-Gooal

On the other hand, however, it should be noted again that in Chinese objects can be null given that their referring meaning can be recovered in the discourse context and thus the *theme* in (117) is not necessarily overt. This phenomenon does not occur in English since objects must be generally overt in such language (c.f. chapter 1, section 1.3).

To sum up, both English and Chinese contain DBO and PD/SVD constructions, but Chinese also has a special IDBO. There is no dative alternation in Chinese as each verb class subcategorizes a specific construction while English ditransitive verbs provide two options for argument realization.

As to how the acquisition of these structures proceeds, Gu (2010) refers to previous research on English and Chinese. Snyder and Stromswold (1997) report that monolingual English-speaking children produce DBO significantly earlier that PD, with an average gap of 4.4 months. Furthermore, Viau (2006) reports that monolingual English-speaking children produce directional *to* before PD, and there is a 2.4-month gap from the emergence of DBO to the emergence of the directional *to* and a 0.9-month gap from the emergence of the directional *to* and the emergence of PD. On the other hand, in the case of Chinese dative constructions, Chan (2003) finds that both C monolinguals and C-E bilinguals have difficulty in acquiring the language-specific IDBO construction in Chinese. She points out that children's early utterances

are generally in the non-target DBO order ([*bei2*-goal-theme]), and some contain a topicalized theme ([theme-*bei2*-goal]), or are in the SVD order ([*bei2*-theme-*bei2*-goal]) while the target IDBO construction is [*bei2*-theme-goal]. The error rate of IDBO constructions in monolinguals is around 64% while that in bilinguals is as high as 88% (Yip and Matthews 2007).

In the light of these previous works, Gu (2010) investigates longitudinal data from five C-E bilingual children with different dominant languages between 1;03 and 4;06 from the Hong Kong Child Language Corpus (Yip and Matthews 2007).

The results of Gu's (2010) study on the English data suggest that both C-E bilingual children (regardless of their dominant language) and E monolingual children produce DBO before PD. However, there is a wider gap between bilingual children's first DBOs and first PDs regardless of their dominant language. That is, the C-E bilinguals and E monolinguals start to produce DBO as well as the directional *to* at similar ages respectively. However, the C-E bilinguals start to produce PD at a much later age than the E monolinguals do. The average temporal gap between the emergence of directional *to* and PD in the C-E bilinguals is over 6.7 months compared to the 0.9-month gap in E monolinguals (Viau 2006). These results serve as evidence for delay in C-E bilinguals' development on dative construction in English.

2.2.1.3 Transfer

Apart from delay, evidence for transfer is also found in Gu's (2010) study. When examining the children's production of dative constructions in Chinese, a significant contrast is found between the C monolinguals and the C-E bilinguals.

The monolinguals exhibit a consistent developmental pattern: in general, they acquire SVD constructions before producing other types of dative constructions. In addition, they

produce target IDBO constructions before or concurrently with non-target [*bei2*-goal-theme] constructions.

On the other hand, in the bilingual children's data, no general development pattern is found: non-target English DBO-like dative construction [*bei2*-goal-theme] is observed; most bilinguals do not produce SVD constructions before they first produce target IDBO and non-target [*bei2*-goal-theme] constructions; and few bilinguals produce target DBO structures in their corpora.

In terms of the acquisition time frame of dative constructions in Chinese, it is found that on average the bilinguals produce the first non-target [*bei2*-goal-theme] constructions at 2;05, a month earlier than their monolingual counterparts, while they produce the first target IDBO construction after the age of 2;10. In contrast, after the emergence of the first non-target [*bei2*-goal-theme] construction at 2;06, monolinguals produce the first target IDBO construction at 2;07. Moreover, bilinguals demonstrate a strong preference for the non-target [*bei2*-goal-theme] construction. This preference is not observed in the monolingual children.

Gu (2010) argues that the earlier onset of the non-target DBO-like [*bei2*-goal-theme] structure in the C-E bilinguals' production as well as their preference for such a structure suggests that they are influenced by their English grammar and start to use the non-target constructions at a relatively earlier developmental stage.

This different developmental path in bilinguals and monolinguals is argued to play an important role in influencing children's acquisition of IDBOs: since Chinese IDBO datives are fundamentally SVD constructions with the dative marker *bei2* deleted (as shown in (113)), acquiring the SVD may be a necessary step for children to discover the underlying [*bei2*-theme-*bei2*-Goal] structure and the *bei2*-deletion rule, which generates the surface inverted [*bei2*-

theme-Goal] order (i.e. IDBO). If children do not produce any SVD before their first IDBO, it is questionable whether the underlying structure is in place, and it follows that children may not apply the *bei2*-deletion analysis to form the IDBO.

The analysis of the order of emergence of SVD (including *bei2*-theme-*bei2*-goal constructions) and IDBO in the C-E bilinguals' and C monolinguals' data shows that it is very unlikely that the bilingual children in Gu's (2010) study have formed a syntactic connection between SVD and IDBO. When they start to produce the IDBO construction, they have little knowledge of the SVD structure, and even though one bilingual child in Gu's (2010) study acquires the SVD at an relatively earlier age than the other bilinguals, no evidence shows that she links the two structures together, given that she produces no target IDBO in her corpus.

To sum up, in Gu's (2010) study, transfer is observed from English to Chinese, which is indicated by the quantitative and qualitative differences in C-E bilinguals' performance of dative constructions when compared to their monolingual Chinese counterparts: the bilingual children incorporate the English DBO construction into the Chinese IDBO structure and show strong preference for the non-target [*bei2*-goal-theme] construction. On the contrary, it is very likely that the monolingual children first develop the SVD structure and then develop the IDBO structure based on the SVD one. The monolinguals, however, do not show any preference for the non-target [*bei2*-goal-theme] construction.

Gu (2010) argues that the transfer may be the result of input ambiguity, following Müller's (1998) and Hulk and Müller's (2000) point of view. Müller (1998:153) hypothesizes, as discussed before, that transfer may occur when "two different grammatical hypotheses are compatible with the same surface string", which has been reformulated in Hulk and Müller (2000) as the Interference Hypothesis. That is, the input offers ambiguous evidence with respect

to a specific grammatical property of the target grammar of language B and so language B becomes a prime target of transfer for this specific grammatical property. The possibility for transfer arises when a surface string in the input is compatible with the grammar of language A as well as that of language B. By hypothesizing that the relevant rules and representations provided by the grammar A apply to both languages, the bilingual child can handle the ambiguous data, but will also produce non-target forms in language B based on grammar A. Thus, the bilingual child may use parts of the analysis of one language as a relief strategy in order to cope with ambiguous properties of the other.

On the one hand, as Chinese input does not show overt evidence for the derivation of IDBO, and usually contains many null-object [*bei2*-goal] constructions which exhibit a different surface word order from the target [*bei2*-theme-goal] construction, it may cause ambiguity. On the other hand, in English, the DBO structure [*bei2*-goal-theme] only offers one option since no objects can be null, and, therefore, no ambiguity occurs. In addition, since the English DBO and the Chinese IDBO share a similar surface structure, the Chinese IDBO structure thus fulfills the two conditions proposed in Hulk and Müller's (2000) Interference Hypothesis as well as the condition proposed in Hsin's (2012) STH for transfer, as previously presented (c.f. subsection 2.2.1). That is, the Chinese IDBO structure is a vulnerable domain since even C monolinguals will produce errors in such respect; the Chinese IDBO and the English DBO share a similar surface structure; and in addition, ambiguity occurs in the Chinese IDBO but not in the English DBO. In order to resolve the ambiguity in Chinese, C-E bilinguals seem to apply the explicit English DBO construction to the Chinese IDBO structure.

The account above assumes that children perceive that some properties are ambiguous regardless of whether they actually are or not for an adult. So the question is how to detect what

counts as ambiguous for children. Ambiguity of input can be evaluated through the analysis of monolingual language acquisition data: if monolingual children have problems with the language material in question, it may be suggested that the input contains evidence for more than only one grammatical analysis (lexical, syntactic, semantic, etc.); if input is then ambiguous for the monolingual child, it would also be so for the bilingual child. Müller (2003) uses the term vulnerable C-domains to refer to the potential areas of grammar containing ambiguous input and argues that it is the C-domain that defines the domain for interlinguistic influence in bilinguals, due to its interface nature (Müller and Hulk 2001).

If a specific grammatical area is vulnerable, it would be so for both monolinguals and bilinguals alike. However, a bilingual child can resort to the other L1 and this is the context in which the over-extension would take place and it would go from language A (the unambiguous language) into language B (the ambiguous one). In Gu's (2010) study, the Chinese IDBO construction constitutes a vulnerable domain since both monolinguals and bilinguals show difficulty in acquiring such construction. In the case of bilingual children, they can resort to the dative constructions in English, their other L1, and this is irrespective of the bilingual children's dominant language. This might explain why the English DBO-like structure [*bei2*-goal-theme] is found more popular in the bilingual Chinese data instead of the target IDBO structure [*bei2*-theme-goal], which makes the bilinguals different from their monolingual counterparts.

While language dominance does not seem to play an important role in transfer from English to Chinese in Gu's (2010) study, a number of studies have reported incorporation of elements from the dominant to the non-dominant language (Paradis and Genesee 1996, Gawlitzek-Maiwald and Tracy 1996, Hulk and van der Linden 1996, Döpke 1997, Yip and Matthews 2000, 2006, among others).

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Yip and Mathews (2000) investigate the syntactic development in a C-E bilingual child Timmy with Chinese as his dominant language based on longitudinal naturalistic data. The child is observed from 1;05 to 3;06. The authors take MLUw as the most objective indicator of the child's linguistic development in each language. They point out that according to the MLUw values, the child's Chinese develops faster than his English, especially between 2;01 and 2;08, while after 2;09 the MLUw figures are closely matched. The authors argue that this can reasonably indicate that Chinese is dominant, given that the Chinese input exceeds the English input in the child's language environment and the child shows a preference for Chinese. The authors further point out that on the whole, the child's MLUw values for both languages fluctuate considerably during the period of study and that the fluctuation in English is unlike that of monolingual English-speaking children whose MLU generally increases smoothly over time (Brown 1973: 55).

The authors aim to further study whether and to what extent the two language systems in bilinguals interact. They focus on wh-interrogatives and relative clauses, since these structures differ significantly in English and Chinese.

While English wh-interrogative sentences involve syntactic movement, Chinese ones do not. Wh-interrogatives in English are formed by moving the wh-words to a sentence-initial position (assumed to be the Spec of CP) while wh-words in Chinese remain *in situ* (c.f. chapter 2, subsection 2.1.2 and illustrated in (92)). Yip and Matthews (2000) point out that the contrast between Chinese and English in this respect shows up most clearly in object questions (118a) since subject questions in both languages have the wh-expression appearing in the initial position (118b).

(118) a. Lei5 sik6zo2 mat1je5?
    You   ate   what
    "What did you eat?"

   b. bin1go3 sik6zo2 di1 min6 aa3?
     Who   ate   noodle
    "Who ate the noodles?"

(Yip and Matthews 2000: 195)

Therefore, Yip and Matthews' (2000) study on wh-interrogatives focuses on the development of object questions, and in particular, on *what*-questions.

Observation on the bilingual child's English data shows that he passes through a stage at which wh-phrases are commonly left *in situ*. The placement of such wh-words matches the Chinese counterparts. Moreover, Timmy also uses the phrase *to the what* which corresponds to the Chinese literal translation to refer to *where*.

In contrast, the development of Chinese wh-questions in Timmy is reported to exhibit a pattern similar to that found in the monolingual counterparts in terms of acquisition order and schedule. His earliest spontaneous productive use of *in situ* wh-questions occurs at 1;08. Yip and Matthews (2000) argue that the early-acquired *in situ* wh-questions serve as a basis for transfer from Chinese (the dominant language) into English (the non-dominant language).

The results of Yip and Matthews' (2000) study reveal that the bilingual child produces questions with *in situ* wh-expressions on his own initiative. That is, they are not repetitions or echoes of the prior utterance produced by the adult. The child responds to adults' questions containing wh-movement with wh-*in-situ* questions. The authors argue that the bilingual child's reluctance to reformulate his questions with the wh-word preposed suggests that his own grammar at this stage generates the *in-situ* structure.

The analysis of monolingual data suggests, however, that most examples of wh-*in-situ* are repetitions or echoes of the previous utterance produced by another interlocutor. Yip and

Matthews (2000) argue that these examples do not indicate a developmental phenomenon but one modeled directly on the parental input.

Quantitatively, the percentage of wh-*in-situ* is far higher in the bilingual English corpus data than in the monolingual one. A monolingual English-speaking child is found to produce 1.6% of wh-*in-situ* questions between 1;08 and 2;01 (Peng 1998) while the bilingual child in Yip and Matthews' (2000) study produces 67.6% of wh-*in-situ* questions in English between 1;11 and 3;00.

Apart from the rare occurrences of wh-*in-situ* modeled on the parental utterances in the monolingual data, wh-expressions in wh-questions are shown to uniformly appear clause-initially, which forms a striking contrast with the bilingual data.

Figure 6. Development of *wh*-Questions in Timmy's Data
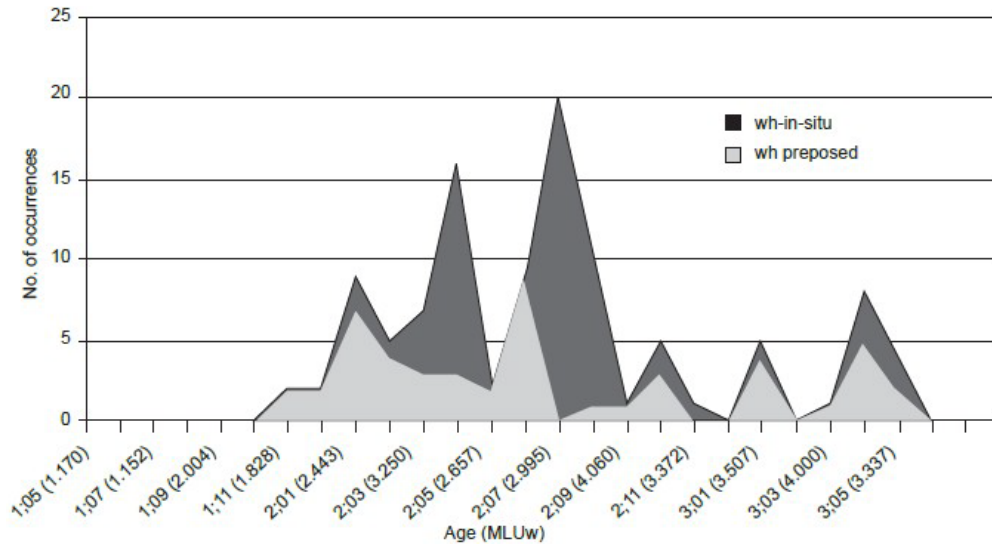
(Peng 1998: 75)

Figure 6 shows the frequency of Timmy's object questions with *what* from age 1;11 to 3;06. A first stage shows preposed *what* (largely in formulaic utterances), followed by a period

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where *what in situ* predominates (from 2;03) and finally another period where the two forms alternate (2;10 onwards).

When examining Timmy's MLUw values, it is found that the peaks in wh-*in-situ* correspond to peaks in the MLUw differential: between 2;00 and 3;00, there are two periods when MLUw for Chinese exceeds that for English (2;04-2;06, 2;08-2;09), and the proportion of wh-words left *in situ* peaks at around the same age (2;05 and 2;08). More generally, transfer is most evident between ages 2;01 and 2;10, after which MLUw for English catches up with that for Chinese. These figures can serve as quantitative evidence for the correlation between dominance and transfer of wh-*in-situ*.

Therefore, the findings on the development of wh-questions in English evidence a stage where systematic influence of Chinese manifests itself in the form of wh-*in-situ* structures in English. Such structures have never been claimed to represent a developmental stage in monolingual English-speaking children. These wh-*in-situ* structures persist in the bilingual child's grammar for a rather extended period. However, they are unlearned gradually soon afterwards as the bilingual child's English progresses (Yip and Matthews 2000: 201).

In terms of relative clauses (RCs), Chinese has prenominal RCs, as shown in (119a) where the modifying clause precedes the head noun *jan4* ("people") whereas in English it follows the head noun *people* (119b).

(119) a. [[Ngo5 sik1 *e* CP] go2 di1 jan4 DP] zau2 saai3.
           I   know   those   people   leave all
     "The people I know have all left."

    b. [DP The people [CP (that) I know *e*]] have all left.

<div align="right">(Yip and Matthews 2000: 196)</div>

The type of RC in (119a) includes a demonstrative *go2* ("those") and a classifier *di1* but no marker of subordination. A notable property of such RCs is that they resemble a main clause. Therefore the RC in (119a) has, at lease superficially, the same form as the main clause in (120).

(120) [$_{CP}$ Ngo5 sik1 go2 di1 jan4]
        I   know those   people
   "I know those people."

<div align="right">(Yip and Matthews 2000: 196)</div>

Yip and Matthews (2000) point out that this resemblance has several implications. Methodologically, it means that such RCs with an object gap (as marked by the low hyphen in (119a)) and their transfer-based counterparts in English are not easy to identify in the child data, since they resemble main clauses; theoretically, it raises the possibility that children could use such RCs without having to acquire any subordination strategies.

In theoretical terms, English relatives are generally assumed to be formed by wh-movement (in the case of wh-relatives) or by null operator movement (for *that*-relatives). In contrast, Chinese relatives clearly do not involve the same kind of movement as their English counterparts. Following Huang (1980, 1995), Hawkins and Chan (1997) propose that the gap in relative clauses in Chinese is bound by a null topic, much as in the case of null objects (c.f. chapter 1, sections 1.3 and 1.4), as shown in (121).

(121) [$_{CP}$ TOPIC$_i$ [$_{IP}$ Ngo5 sik1 e_i] [$_{DP}$ go2 di1 jan4]]
               I   know   those   people
   "The people I know."

<div align="right">(Yip and Matthews 2000: 196)</div>

Assuming such a structure, relativization in Chinese is derived along the same lines as null objects and topicalization. The null topic (TOPIC in (121)) can either be derived by

movement or be generated *in situ*. English structures resulting from transfer will thus be qualitatively different from a target relative clause derived by wh-movement.

Observation on the C-E bilingual child's data yields that RCs emerge in the child's English as early as 2;07, as shown in (122), which follows the Chinese prenominal pattern.

(122) Where's [[CP you buy *e*] [DP that one the motorbike] (Timmy 2;07)
(Yip and Matthews 2000: 203)

The bilingual child produces RCs in Chinese at the same time as they appear in his English (2;07). Chinese RCs whose structures and functions parallel the English examples found in the bilingual child's data are detected, as shown in (123).

(123) a. Santa Claus bei2 lei5 go3 coeng1 le1? (Timmy 2;08)
     Santa Claus give you that gun
       "What about the gun that Santa Clause gave you?"

     b. Where's the Santa Clause give me the gun? (Timmy 2;07)
(Yip and Matthews 2000: 205)

Given the productive use of such structure, Yip and Matthews (2000) argue that the role of transfer in English can be clearly established. The topicalization analysis for (123b) is as in (124).

(124) [CP TOPICi [IP Santa Clause give me *e*i] [DP that gun]]
(Yip and Matthews 2000: 205)

While there are no reports of comparable prenominal RCs in monolingual English development, Hawkins and Chan (1997) suggest that adult Chinese learners of English have a similar transfer-based structure for postnominal RCs in their interlanguage, which involves a null

topic rather than wh-movement. This may illustrate the divergence between the bilingual child's development and that of monolingual children.

In Yip and Matthews' (2000) study, the C-E bilingual child produces RCs which closely resemble main clauses in both English and Chinese. The child's RCs might be considered in typological terms as internally-headed RCs, that is, with the internal structure of a clause but the external syntax of a DP (Yip and Matthews 2000: 205). The Chinese-based RCs serve as a stop-gap measure or "relief strategy" for the bilingual child before the target structure has been acquired in English, which is reported to first emerge at around 3;04. Between 3;00 and 4;00, target-like RCs appear to alternate with those formed with resumptive pronouns in the bilingual child's English production.

From Yip and Matthew's (2000) two case studies of syntactic transfer from Chinese into English in the data from a C-E bilingual child, Chinese dominance appears to be the determining factor for transfer. The relationship is confirmed by the close match between MLUw differential and transfer. This is most evident in the first case study, that is, on wh-*in-situ* interrogative. Yip and Matthews (2000) thus support the condition for transfer as proposed by Paradis and Genesee (1996).

Yip and Matthews (2000) further point out that in the case study that focuses on RCs, there is an alternative possible explanation. That is, RCs emerge earlier in Chinese than in English, in accordance with the typical acquisition schedules for monolingual children in the respective languages. In the interim period, the Chinese structure could then undergo transfer without dominance playing a causal role, which would show support for the alternative interpretation of transfer as proposed by Paradis and Genesee (1996).

From the account above it can be noted that the notion of language dominance has occupied a central role in child bilingual literature (Paradis and Genesee 1996, Gawlitzek-Maiwald and Tracy 1996, Hulk and van der Linden 1996, Döpke 1997, Yip and Matthews 2000, 2006, among others) since it may play a significant role in the occurrence as well as the directionality of interlinguistic influence in bilingual acquisition (Paradis and Genesee 1996). However, there is lack of wide consensus on how it should be defined and measured over time. The following subsection deals with two issues, namely (i) the different definitions of language dominance, and (ii) the different diagnostics and their different nature.

2.2.1.4 The Notion of Language Dominance

The notion of language dominance is used to describe a situation in which one of a bilingual child' L1s is more advanced or is developing faster than the other. This notion is captured in the definition of the term *language dominance* by many researchers. The term is often defined in terms of relative proficiency (Grosjean 1982, Petersen 1988, Genesee, Nicoladis and Paradis 1995, Deuchar and Muntz 2003, Bernardini and Schlyter 2004, Gathercole and Thomas 2009, among others), relative speed of development (i.e. the language that is developing more rapidly than the other (Wapole 2000)), the language to which the child has had the most exposure (Grosjean 2010), language preference (Saunders 1988), relative vocabulary size in each of the two L1s (Nicoladis and Secco 1998), direction of code-switching (Swain and Wesche 1975, Lanza 2004, Liceras, Spradlin and Fernández Fuertes 2005, Liceras et al. 2008) and MLU differentials (Yip and Matthews 2006). While there is no precise clear-cut definition of language dominance, what is uncontroversial is that dominance is by no means static: its patterns fluctuate longitudinally depending on individual experiences (Romaine 1995). Linguistic diagnostics,

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along with other types of diagnostics, have been proposed to identify language dominance in young bilinguals.

In her study of a Danish-English bilingual child named Thea, Petersen (1988) proposes the Dominant-language Hypothesis to account for code-switching involving the combination of lexical and grammatical morphemes in VPs and DPs, as shown in (125).

(125) a. borS
　　　　　"live$_{Danish}$ + -s$_{English}$" "lives"
　　　b. the dukke
　　　　　"the$_{English}$ doll$_{Danish}$"

(Petersen 1988: 483)

The Dominant-language Hypothesis states that in code-switching that involves the combination of lexical and grammatical morphemes, grammatical morphemes of the dominant language may co-occur with lexical morphemes of either the dominant or the non-dominant language; however, grammatical morphemes of the non-dominant language may co-occur only with lexical morphemes of the non-dominant language (Petersen 486). Since Thea's code-switching grammar follows the expected patterns that English grammatical morphemes (possessive determiner "her" in this case) co-occur with both English lexical morphemes, as in (126a) and Danish lexical morphemes, as in (126b), but Danish grammatical morphemes only co-occur with Danish lexical morphemes, as in (126c), but not with English lexical morphemes, the researcher considers Thea to be E-dominant.

(126) a. her dolly
　　　b. her dukke
　　　c. hendes dukke

(Petersen 1988: 486)

Apart from the Dominant-language Hypothesis, Petersen (1988) points out that a bilingual child's dominant language may be defined either behaviorally or through the linguistic context the bilingual child is exposed to. She further lists four independent reasons for considering Thea to be E-dominant. First of all, on the behavioral level, the dominant language is the one that the bilingual is informally considered to be most proficient in. Since Thea is most proficient in English than in Danish based on her parents' perception, this becomes the first reason to consider her to be E-dominant. The second reason has to do with the amount of code-switching that occurs when Thea speaks her respective L1s. The author argues that a bilingual child starting a conversation in language A may code-switch more often into language B than he/she does when he/she starts a conversation in language B and then switches into language A. In this case, language B would be considered as the dominant language since it is more resistant to intrusion (including code-switching). The non-dominant language is often "contaminated" (Petersen 1988) with frequent instances of code-switching. In Thea's case, in a one-hour English-only interview with the child, there is virtually no code-switching from English into Danish. However, when Danish is spoken, there is considerable amount of code-switching between languages on Thea's part. Petersen (1988) claims that this is another reason for considering Thea to be E-dominant. The third reason comes from the language context of Thea. The author points out that social factors often play a role in which language is considered to be dominant. That is, the standard language of the host country, and thus the language used by most of the bilingual's peers, is often the dominant language and the bilingual tends to identify more with his/her peers than with his/her non-host language parents. Since Thea's peers are English speakers, this becomes another reason for considering her to be E-dominant. The fourth reason has to do with Thea's use of grammatical morphemes. In her corpus, among the grammatical

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categories examined in Petersen's (1988) study, statistically there are many instances of English grammatical morphemes (78.92%) and relatively few instances of Danish grammatical morphemes (21.08%) involved in code-switching. The researcher states that this prevalence of grammatical morphemes in English also suggests that the bilingual is E-dominant.

Also internal to the linguistic system are the diagnostics put forward Bernardini and Schlyter (2004) who measure dominance by using MLU and upper bound (UB) (length of the longest utterance in a given sample). These two measurements are also taken by Genesee, Nicoladis and Paradis (1995) and Deuchar and Muntz (2003), who, apart from MLU and UB propose another two indices of relative dominance, including multimorphemic utterances (MMU) and word types. Genesee, Nicoladis and Paradis (1995) study five French-English bilingual participants interacting with their French native speaking mothers and their English native speaking fathers. The bilinguals are recorded in three separate occasions which last between 45 and 60 minutes during approximately three weeks. On two separate occasions, the participants are observed interacting with their mothers and fathers alone and on a third occasion they are observed with both parents present. The parents are asked to do whatever they normally do in a free play situation. The results of the calculation of the four indices are shown in Table 30.

Table 30. Dominance Indices of the French-English Bilinguals

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)		

MLU = mean length of utterance.
MMU = multi-morphemic utterances.
[a] Scores for sessions with both parents present.
[b] The raw frequencies on which MLU, MMU and word types are based are in parentheses.

(Genesee, Nicoladis and Paradis 1995: 617)

The calculation of MLU and UB of the French-English bilingual participants and for each language is carried on the participants' language use in three sessions in order to ensure a more reliable estimate. When counting morphemes, taking into consideration the nature of child language, affixes are considered as separate morphemes in the children's transcription only if the affixes are used productively during the recording session. For instance, a participant uses the suffix –*ing* on numerous verbs, but as there is no evidence of his/her use of verbs with no suffix or with any other suffix, all verbs ending in –*ing* are counted as a single morpheme. The researchers point out that this conservative method of analysis might underestimate the

participants' MLU. UB is calculated as the number of morphemes in the longest utterance in the recording of each child's language. Apart from MLU and UB, the three researchers take another measure, namely MMU, which includes all utterances of two morphemes or more. The MMU scores are calculated as a percentage of all multimorphemic utterances used by the child in French and English across all the three sessions. The authors explain that the MMU is calculated in this way since using each language as the basis of calculation would have simply duplicated the MLU results and would have provided no additional information about relative morphosyntactic development in each language. For example, Ban's MMU scores of 22.03% for French and 77.79% for English indicate that, of all the multimorphemic utterance she uses during all the three sessions, 22.03% are in French while 77.97% are in English. Using English language as the basis for calculating, Ban's MMUs yields 40.71% for English and 49.17% for French, which, according to the researchers, is redundant with MLU. Such method also undervalues the clear dominance the bilingual exhibits in English according to the other indices. Finally, the researchers also take into account the number of word types. This score is calculated for each language as a percentage of the total number of word types used in all the three sessions.

Based on the participants' scores for each index, the researchers make a judgment of their language dominance. However, due to lack of theoretical or empirical basis for making such decisions, the researchers also recognize that the decisions are necessarily impressionistic. In order to verify such judgments, a discriminant function analysis using the four indexes for each session is performed. The function separating each session into either a French-dominant (F-dominant) or E-dominant group is significant (Wilk's Lambda=.00016, $p<.05$). The researchers examine the discriminant scores for the sessions with both parents present, as shown in Table 30. The scores for the other two sessions are discarded as the researchers state that they are

confounded by dominance and context. Small discriminant scores indicate weak group classification and, vice versa, for large scores. Negative discriminant scores are associated with French and positive scores with English. The results of the discriminant function analysis confirm the authors' impressionistic classification of all the participants.

While the definitions mentioned above pay emphasis on a performance notion, Lanza (2004) and Yip and Matthews (2006) argue that language dominance should be related to underlying competence.

Lanza (2004) relates language dominance to children's underlying competence and argues that language dominance is essentially a psycholinguistic phenomenon closely linked to sociolinguistic parameters (172-73). As a psycholinguistic phenomenon, language dominance should be characterized as a property of the mind, albeit influenced by sociolinguistic parameters such as quantity of input and influencing aspects of performance such as fluency. The researcher then proposes that the directionality of code-switching can be an indicator of language dominance in that bilinguals switch to the dominant language more often than to the non-dominant language (Lanza 2004: 173), a view that is in line with those of Petersen's (1988) and Bernardini and Schlyter's (2004).

Lanza's (2004) view on the notion of language dominance is adopted by Yip and Matthews (2006) who state that language dominance should be concerned with the person's knowledge that underlies his/her language use and proficiency and that knowledge of language should be taken to be a mentally represented grammar (Chomsky 1986). The researchers take C-E bilinguals' use of null English DOs as an example, as shown in (127).

(127) [The father takes chocolates off the shelf]
      You get, I eat (Timmy 2;02)
(Yip and Matthews 2006: 100)

The authors point out that such null DOs do not mean that the bilinguals omit the DOs, but are rather part of the structure assigned to sentences in the bilinguals' grammar. The bilingual child's hypothetical representation for the sentence in (127) includes a null topic (i.e. "chocolate") and two null DOs whose reference is determined by the null topic, as formalized in (128).

(128) [*Discourse Topic*$_i$ [$_{CP}$ You get *e*$_i$, I eat *e*$_i$]]
(Yip and Matthews 2006: 101)

In such a view, to be of theoretical interest, dominance must be related to the underlying competence and not merely to a measure of performance or language use (Yip and Matthews 2006: 102).

Yip and Matthews then explore the validity of using MLU differentials as the measurement of dominance across languages. MLU differential refers to the difference between MLU scores for a bilingual' two L1s at a given sampling point or (expressed as a mean) over a period of development. The researchers point out that the dynamic nature of dominance is evident in that the fluctuations in MLU values in a bilingual's two L1s and their differentials can be captured at a particular time interval as well as over an extended period of time.

The definitions mentioned above have been used variably to distinguish dominant from non-dominant speakers. For instance, in Hsin's (2012) study on S-E bilinguals' acquisition of wh-questions (c.f. subsection 2.2.1.1), the bilinguals' language dominance is measured by their overall proficiency in each L1. In Yip and Matthews' (2000) study on C-E bilinguals' acquisition

of wh-*in-situ* questions (c.f. subsection 2.2.1.3) and Gu's (2010) study on C-E bilingual's acquisition of dative structures (c.f. subsections 2.2.1.2 and 2.2.1.3), dominance is measured by the bilinguals' MLUw differentials between their two L1s. In Pirvulescu et al.'s (2014) study in bilinguals' null DO production, which will be discussed in the following section (c.f. subsection 2.2.2.3), dominance is measured based on the children's proficiency in each of their L1s as well as children's exposure to each L1.

According to Petersen (1988), Lanza (1993, 1997) and Paradis and Genesee (1996, 1997), language dominance is defined in terms of the language that provides the lexical and grammatical categories in a functional-lexical code-switching utterance, as illustrated in examples (125-126) above. Different from this view is the one proposed by Liceras, Spradlin and Fernández Fuertes (2005) and later developed in Liceras et al. (2008), which defines language dominance in terms of the language whose functional category is made up of more salient uninterpretable features (Liceras, Spradlin and Fernández Fuertes 2005). These authors offer a reinterpretation of the concept of language dominance in terms of the nature of features of the two languages of the bilingual. That is, in this case, dominance is not linked to the bilingual speaker (i.e. the amount of input received, the number of functional categories produced, etc.) but to the grammatical properties of the two languages involved. In particular, Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) focus on the analysis of Spanish-English code-switching produced between a functional category (i.e. a determiner) and a lexical category (i.e. a noun), as the examples in (129) show:

(129) a. la   chair   / el   pencil
      the$_{Spanish\ fem.}$ chair$_{English}$ / the$_{Spanish\ masc.}$ pencil$_{English}$
   b. the   silla   / the   lápiz
      the$_{English}$ chair$_{Spanish\ fem.}$ the$_{English}$ pencil$_{Spanish\ masc.}$

(Liceras et al. 2008: 828)

Dominance has been used, in the case of code-switching, to determine the preference of structures in (129a) *versus* (129b). So for example, under Petersen's (1988) view on dominance, an E-dominant child would prefer (129b) *versus* (129a) because the functional category (i.e. *the*) is provided by English; while a S-dominant child would prefer (129a) *versus* (129b) as he/she will favor the Spanish determiner (i.e. *la* and *el*). Under Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008), what determines dominance is the language whose functional category is made up of uninterpretable features that have a higher degree of "visibility" and "computational value". That is, in the case of S-E bilinguals and in the case of determiner-noun code-switching, as in (129) above, these bilinguals will systematically favor (129a) *versus* (129b) as the Spanish determiner is the category that involves a higher number of visible features, specifically gender as the contrast in (129a) shows. And this would be so, they argue, regardless of whether these S-E bilinguals have received, for instance, more input in Spanish or in English (that is, disregarding the linguistic and extralinguistic diagnostics in previous views on dominance).

To illustrate their view on dominance based on the strength of linguistic features, child and adult spontaneous code-switching production is classified in terms of English determiners and Spanish determiners, as table 31 shows.

Table 31. DP Code-switching Preferences by Simultaneous S-E Bilinguals

		Age range	Corpus	S Det. + E N.	E Det. + S N.
Children	Manuela	1;03-2;06	Deuchar and Quay (2000) (CHILDES MacWhinney 2000)	16	2
	Mario	3;05-10;02	Fantini (1985)	43	-
	Leo	1;01-5;10	Fernández Fuertes et al. (2000-2005)	22	-
	Simon			5	-
	5 children	2;10-6;02	Lindholm and Padilla (1978)	18	3
Total				104	5
Adults	Adults		Milian (1996) (Myer-Scotton and Jake 2001)	63	-
	Adults		Pfaff (1979) (Myer-Scotton and Jake 2001)	747	-
	Adults		Jake et al. (2002)	161	-
Total				971	-

(Liceras et al. 2008: 839)

Table 31 shows that in functional-lexical DP code-switching, child and adult simultaneous bilinguals reveal a clear-cut preference for the Spanish determiner, as in (129a), over the English determiner, as in (129b). And this is so even if some of the speakers in Table 31 could be very well classified as balanced or even E-dominant bilinguals (i.e. Manuela, Mario) following the input criteria (Liceras, Spradlin and Fernández Fuertes 2005).

In order to capture this fact, the researchers put forward the Grammatical Features Spell-out Hypothesis (GFSH) which argues that in the process of activating the features of the two grammars, the bilingual child makes choices in terms of the language that will provide the functional vocabulary to a given functional-lexical code-switching. As a result of these choices, the functional categories the child code-switching will favor will be those provided by the language whose functional system contains the greater array of uninterpretable features (Liceras, Spradlin and Fernández 2005: 230). If this hypothesis is extended to non-code-switched structures, the bilingual child makes choices in terms of the language that will provide more

transparent and higher computational valued functional feature(s) when producing a given structure where there is conflict in the realization system between his/her two L1s. As a result of these choices, the functional categories the child will favor will be those provided by the language whose functional system contains the greater array of uninterpretable features.

What should be made clear is that the concept of language dominance proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) is not to be understood as referring to the overall knowledge of the language (i.e. the external view on language dominance) but only to the way features are configured in a specific structure (i.e. the internal view on language dominance), so that a bilingual child of languages A and B may be "externally" A-dominant, as defined by Petersen (1988), Lanza (1997) or Nicoladis and Genesee (1998), but still be "internally" B-dominant in a specific domain. That is, once the features of the respective language systems have been activated in this domain, the A-B bilingual child will select the one with the richer array of uninterpretable features (i.e. the one of language B) and this system will be the dominant one.

In the present study, children's language dominance is considered based on the two different perspectives mentioned in the present subsection, namely, (i) the traditional one (i.e. the external view on language dominance) proposed by Petersen (1988), Lanza (1993, 1997) and Paradis and Genesee (1996, 1997), among others, which is mainly measured by comparing MLU values (a diagnostic internal to the linguistic system) and by taking into account the input conditions (i.e. the amount of input of the two L1s) as well as the children's language preference (diagnostics external to the linguistic system); and (ii) the reinterpretation of dominance (i.e. the internal view on language dominance) proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) as captured in the GFSH.

2.2.2 Bilingual Acquisition of Objects

The previous subsection (i.e. subsection 2.2.1.) addresses some defining properties of bilingual acquisition such as interlinguistic influence, acceleration and delay. In the present subsection, the existing empirical studies on the bilingual acquisition of objects will be presented relying on these defining properties.

2.2.2.1. No Interlinguistic Influence

Serratrice, Sorace, and Paoli (2004) compare the distribution of all referential arguments (subjects and objects) in the spontaneous speech of an Italian-English bilingual child from 1;10 to 4;06 with MLU values ranging from 1.1 to 4.8 to the speech of two groups of MLU-matched monolingual children. Since English is not a null object language, the authors predict that the bilingual child would not produce null objects in Italian any more than monolinguals do.

Their results indicate some asymmetries: null objects are produced less than null subjects, and null objects are more frequent in Italian than in English in the bilingual child. Overall, there is a low rate of illicit null objects, but whenever such null objects appear, it is associated to informativeness (contextual recoverability). This finding is in line with those of Guerriero, Oshima-Takane, and Kuriyama (2006) and Huang (2011). Serratrice, Sorace, and Paoli's (2004) data on the bilingual child is fully comparable to that of monolinguals with regard to object acquisition and no evidence for an early phase of interlinguistic influence is found in their study.

While no difference between bilingual children and monolingual children in their performance in DO production is found in Serratrice, Sorace, and Paoli's (2004) study, it is found in studies of other researchers (Yip and Matthews 2005, Paradis, Crago, and Genesee 2006,

Mykhaylyk and Ytterstad 2015, Müller and Hulk 2001, Pérez-Leroux, Pirvulescu and Roberge 2009, and Pirvulescu et al. 2014).

2.2.2.2 Language Transfer

As it is discussed chapter 1, Chinese is [+ null object] language when English is [- null object] language. This refers to the fact that Chinese allows null objects in both finite and non-finite sentences while English requires that the object be phonetically realized in finite sentences. However, the issue of the structural patterns of a given verb is not straightforward as some can take either an overt or a null object according to different discourse contexts. Based on such contrast, Yip and Matthews (2005) conduct a longitudinal study of two C-E bilinguals (Timmy and Sophie) from 1;6 to 3;6 in the domain of objects in English compared to E monolingual children.

The results of the study show that while null objects appear as a developmental feature in E monolinguals (c.f. chapter 2, subsection 2.1.1), quantitative and qualitative differences between the monolingual and bilingual children are observed in English.

Quantitatively, Timmy's null object rates in English from 2;04 to 2;08 range from 9.1% to 28.6%, a higher range than has been reported in any monolingual longitudinal studies at a comparable age[13]. Sophie's null object rates are even higher than Timmy's.

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[13] Naomi's average null object rate is 4.8% from 1;08 to 1;11 in Ingham's (1993) study (c.f. chapter 2, subsection 2.1.1). In another study, Huang (1999) investigates null objects in Adam's data in the Brown Corpus (Brown 1973) in CHILDES (MacWhinney 2000) and finds that between 2;05 and 2;09, the child's average null object rate is 3.5% (2.86%-4.49%).

In the parallel development of Timmy's Chinese in the same period (i.e. 2;04-2;08), the null object rates range from 12.3% to 35.3% and is consistently above 10% throughout the whole investigation period, remaining between 22.9% and 35.8% toward the end of the recording (3;04-3;06). These figures are comparable to those for monolingual Chinese children (22.5% in Wang et al. 1992, 20%-30% in Wong 1998). When comparing the null object rate in Timmy's two L1s, it is found that the range is very similar during the period from 2;04 to 2;08.

What is more, there are five verbs that take a null object most frequently in both Timmy's and Sophie's data, which are *get*, *like*, *put*, *take*, and *want*. Among these five verbs, the verb *put* stands out as taking a null object 35% of the time in Timmy's corpus between 2;04 and 3;06 (with MLUw between 2.4 and 4.2) and up to 100% of the time in Sophie's data between 2;07 and 3;00 (with MLUw between 2.2 and 2.7) whereas the other four verbs vary in their frequency of taking a null object in the two participants' data, ranging from 7% to 57%. Such a high null object rate with the verb *put* is not found in E monolinguals.

Yip and Matthews (2005) point out that the special status of *put* is related to the fact that it takes a locative prepositional phrase as an obligatory complement. Some examples of Timmy's and Sophie's production with *put* are illustrated in (130).

(130) a. INV: Where shall we stick it?
      CHI: Put *e* here.   (Timmy 2;05)
    b. I put *e* in the where?   (Sophie 2;05)
                (Yip and Matthews 2005: 2425)

From the two examples in (130) it can be noted that the obligatory locative prepositional phrase is typically realized in the children's data. In example (130b), the locative *wh*-phrase *in the where* appears in the subcategorized locative position rather than moving to the sentence-

initial position as in English. Instead, such structure resembles the Chinese structure, as shown in (131).

> (131) Baai2 *e* hai2 li1dou6.
>   Put   at   here
>   "Put it here."

<div align="right">(Yip and Matthews 2005: 2426)</div>

Such null object structures as shown in (131) are commonly found in the two children's Chinese, serving as the basis for transfer into English.

Yip and Matthews (2005) also conduct a preliminary analysis of the frequency of null objects in Timmy's and Sophie's Chinese data. The results show that the null object percentages in the two children's data range from 54% to 95%. The figures are on the whole higher than the corresponding frequency of null objects in the children's English. This indicates that the children are not simply treating English like Chinese; instead, they are producing null objects in English under the influence of their Chinese grammar.

Apart from quantitative differences, qualitative differences are also found between the two C-E bilinguals in Yip and Matthews' (2005) study and the E monolinguals in other studies. For instance, there are cases where a verb is used in a Chinese manner by the children, as shown in (132) with the verb *have*.

> (132) INV: where's your school bag?
>   INV: Any books in it?
>   CHI: still have.

<div align="right">(Timmy 2;07)
(Yip and Matthews 2005: 2426)</div>

Apart from the null object in the utterance *still have* in (132), the existential use of the verb *have* suggests language transfer from the Chinese verb *jau5* ("to have") as in the adult Chinese sentence shown in (133).

<div align="center">217</div>

(133) Zung6 jau5.
    Still   have
    "There are still some."

(Yip and Matthews 2005: 2427)

There are also diary data of the two participants in which an English utterance with a null object follows a synonymous Chinese one, as shown in (134a), and the occurrence of null objects in code-switched utterances, as in (134b).

(134) a. [seeing father replacing batteries]
    Jiu3 maai5 aa3. Have to buy *e*.   (Timmy 2;10)
    need buy
    "We have to buy batteries."

    b. Ngo5 jiu3 close *e*… I cannot close *e*.   (Timmy 2;02)
    I   want close
    "I want to close the door."

(Yip and Matthews 2005: 2427)

Yip and Matthews (2005) argue that these cases support the assumption that the Chinese and English structures are parallel for the child and that he is using Chinese as the base language to build up these structures in the two languages.

Yip and Matthews (2005) further point out that another qualitative difference between the C-E bilinguals and E monolinguals involves the mechanism which licenses null objects in Chinese, and which is hypothesized to be transferred to English by bilingual children. The analysis involves a relationship between topicalization of objects and the occurrence of null objects.

(135) Schoolbag put *e* here. Put *e* at the door.   (Timmy 2;07)
(Yip and Matthews 2005: 2427)

In (135), the object of the first *put*, namely *schoolbag*, has been made the sentence topic, while the null object of the second occurrence of *put* refers back to the same topic. This structure assimilates the Chinese TC structure (Huang 1984, c.f. chapter 1). Thus the Chinese counterpart

of (135) would be analyzed as in (136), where [*e*ᵢ] indicates a null object bound by (and referring back to) the sentence topic (marked in bold type).

(136) [_TC_ [_CP_ [_TOP_ **Syu1baau1**ᵢ] baai2 *e*ᵢ hai2 ni1dou6.] [_CP_ Baai2 *e*ᵢ hai2 mun4hau2 dou6.]]
       Schoolbag   put at here   put at doorway there
  "Put the schoolbag here. Put it by the door."
                         (Yip and Matthews 2005: 2427)

The same analysis can be extended to cases where the topicalization is implicit rather than overt, as shown in (137).

(137) You bought this for me. Last time you bought *e*. I know you bought *e*.
                      (Timmy 2;07)
                   (Yip and Matthews 2005: 2427)

In (137), the object *this* is introduced as the object of the first *bought*, then becomes the null topic in the following two utterances, which licenses the null objects in the child's grammar, as shown in (138).

(138)[_TC_ [_CP_ You bought [_TOP_ **this**ᵢ] for me.] [_CP_ Last time you bought *e*ᵢ.] [_CP_ I know you bought *e*ᵢ]].
                   (Yip and Matthews 2005: 2427)

Therefore, in examples like those in (135) and (137), the child's use of null objects can be captured by the analysis proposed for Chinese, as shown in (136) and (138). Such structures are not found in the production of any of the E monolinguals in the existing studies. This further supports the argument for transfer of the Chinese syntactic structure into English.

Yip and Matthews (2005) point out that the findings in their study are in line with the Interference Hypothesis (Müller and Hulk 2000, as in chapter 2, section 2.2.1). The English input includes mixed verbs (e.g. *eat*, *get*) which can take either an overt or a null object under difference discourse conditions, as illustrated in (139).

(139) Let's eat *e*.

(Yip and Matthews 2005: 2428)

In (139), the English null object *e* can only be lexically interpreted in a generic sense (a meal). However, in Chinese, null objects can either be interpreted as generic or, by referring to the null topic, as specific.

In the dual input that a bilingual child is exposed to, input ambiguity with respect to object realization (i.e. overt or null) only arises in English, where verbs like *eat* sometimes obligatorily appear with an overt object and sometimes obligatorily appear with a null object according to different discourse contexts. As opposed to this, in the Chinese input, there is across the board optionality, whereby all transitive verbs are licensed with both overt and null objects. If the bilingual child assumes that English verbs behave like Chinese verbs and posits a Chinese-based representation for the null object sentences in English, they will produce null objects in English with the Chinese-based interpretation.

Roeper (1981: 140) hypothesizes that all subcategorizations are obligatory until positive evidence shows that they are optional. In the case of object realization, E monolinguals' null object rate is far lower than that of the C-E bilinguals' in Yip and Matthews' (2005) study. Overt objects are much more frequent compared to null objects in the E monolinguals' input. In contrast, null objects in the C-E bilingual input are more frequent than those in the E monolinguals' input because of Chinese. Therefore, bilingual children may go beyond the attested English input and posit optional objects in cases where the adult English grammar does not sanction them.

Transfer is also found in Paradis, Crago, and Genesee's (2006) study in which the authors evaluate object production in spontaneous language samples taken from nine French-English

bilingual children with mean MLUw values of 3.71 in French and of 3.49 in English; and from

ten three-year-old French monolinguals with a comparable mean MLUw value. Their data

analysis concentrates on contexts where DO pronominalization is possible, that is, when the

referent of the DO is mentioned within the previous ten lines.

In terms of the pronominal system in the languages under consideration, French pronouns

can be categorized as strong and weak/clitic, in which strong pronouns have a full DP shell, and

weak/clitic pronouns' maximal structure is a subconstituent of DP (Kayne 1975, Jakubowicz et

al. 1998, Cardinaletti and Starke 1999, 2000, Déchaine and Wiltschko 2002). French DO

pronouns (i.e. *me, te, le/la, nous, vous, les*) are preverbal clitics; French tonic pronouns (i.e. *moi,*

toi, lui, elle, nous, vous, eux) and the demonstrative/deictic *ça* are strong pronouns. In the case of

English, DO personal pronouns (i.e. *me, you, him/her/it, us, you, them*) and demonstratives (i.e.

this, that, these, those) are all strong pronouns, as shown in (140).

       (140) a. Brigitte mange *la banane*.
              Brigitte   eats   the banana
           "Brigitte eats the banana."

          b. Brigitte mange *ça.*
             Brigitte   eats   that
           "Brigitte eats that."

          c. Brigitte *la* mange.
            Brigitte   it eats.
          "Brigitte eats it."

          e.*Brigitte mange *la*.
             Brigitte   eats   it
           "Brigitte eats it."

          f. *Brigitte mange *elle*.
            Brigitte   eats   it$_{Nom}$
           "Brigitte eats it."

g. Brigitte donne une banane à *elle*.
    Brigitte   gives   a   banana to her.
    "Brigitte gives a banana to her."

(Paradis, Crago, and Genesee 2006: 41)

As shown in (140a and b), French DP objects and the demonstrative *ça* appear in the postverbal object position, whereas clitic pronoun DOs have to be placed preverbally (as shown in (140c)). Strong tonic pronouns cannot occupy the DO position as DPs can (as shown in (140d and e)), but may appear to the right of the verb as indirect objects in a prepositional phrase (as shown in (140f)). The English glosses for examples (140a) to (140c) show that DP, demonstrative pronoun, as well as personal pronoun objects in English all appear in the postverbal DO position.

The object production in the French data is classified into null object, clitic, *ça*, strong personal pronoun and DP; that in the English data objects are classified into null objects, personal/demonstrative pronouns and DPs.

The results of Paradis, Crago, and Genesee's (2006) study show that in terms of the accuracy of the use of object pronouns bilingual children's in French is 81.6% while that in English is 100%. The accuracy of the French monolinguals is higher (97.3%). However, the difference between the bilinguals and monolinguals in French pronoun production is not statistically significant. By comparing the pronominal object projection in French (77.14%) and English (96.2%) in the data from these bilinguals, the authors detect a significant difference in this respect between the two languages.

In the French data, the bilingual uses clitics less often than their monolingual counterparts (77.1% vs. 85.6%). Among other kinds of overt DOs apart from clitics produced by the children, the bilinguals use only strong pronouns and *ça* (5 instances) but no DPs, while the monolinguals

tend to produce more DPs than strong pronouns and *ça* (8 instances vs. 1 instance). In addition, there is another difference between the object production of bilinguals and monolinguals: the bilinguals produce 10 instances of null DOs while the monolinguals produces 19 instances. These differences are tested to be statistically significant.

Paradis, Crago, and Genesee (2006) argue that interlinguistic influence could explain the difference in such error types as well as the bilinguals' and monolinguals' different preference for the forms of the DO apart from the target one (i.e. clitics). The authors point out that since both French and English have strong pronouns and postverbal lexical DOs, this language pair displays the kind of overlap in the surface distribution for an interface structure that is often associated with transfer. Apart from postverbal DOs, French also has preverbal clitics while English does not offer such an option. Since monolingual French children also show some degree of difficulty in the acquisition of the French pronominal system, French-English bilingual children may turn to the English pronominal system as a relief strategy (as in Müller and Hulk 2001, Paradis and Navarro 2003, Serratrice, Sorace, and Paoli 2004, Hsin 2012). The French-English bilingual children's preference for strong pronouns in the DO position in French in Paradis, Crago, and Genesee's (2006) study may be attributed to the influence from the English pronominal system into the French pronominal system.

What is more, transfer is also found in Mykhaylyk and Ytterstad's study (2015) on the English DOs produced by English-Ukrainian bilinguals. In their study, the two researchers investigate the DO production in the bilinguals' both L1s at a later stage of language development (i.e. from 4 years old to 6 years old).

In the domain of DO realization, Ukrainian and English differ in some important points, as shown in (141).

(141) A: What did Peter do with **the base**? (DO is specific)
B:

Ukrainian:		English:	
a.	Vin jiji rozbyv.	g.	*He it broke.
b.	Vin rozbyv jiji.	h.	He broke it.
c.	Rizbyv jiji.	i.	*Broke it.
d.	Rozbyv.	j.	*Broke.
e.	Vin rozbyv vazu.	k.	He broke the vase.
f.	*Vin rozbyv.	l.	*He broke.

(Mykhaylyk and Ytterstad 2005: 3)

Examples in (141) demonstrate that Ukrainian allows both word-order rearrangement and discourse-related omission in discourse contexts where DOs are mentioned/specified. However, this is not possible in English where DOs have to be overtly expressed in such discourse contexts. Moreover, Ukrainian also exhibits subject-object symmetry and does not allow object-only omissions, thus the ungrammaticality of (141f).

However, in situations where the DO is not mentioned in the discourse context, an overt DO is the only option for both Ukrainian and English, as shown in (142).

(142) A: What did Peter do?   (DO is not unspecific)
B: Vin rozbyv vazu.
  he   broke   vase
  "He broke the vase."

(Mykhaylyk and Ytterstad 2005: 3)

From examples (141) and (142) it can be noted that the syntax of Ukrainian and English overlaps to some extent in the use of DO structures, but the former allows a wider range of possibilities (i.e. V, SVO, SOV and others) while the latter only offers a single option (SVO).

Mykhaylyk and Ytterstad (2015) set to answer three questions, as shown in (143).

(143) (a) How do bilingual children match discourse-pragmatic principles with language-specific rules in the use of null DOs?

(b) Do DO choices of English-Ukrainian bilinguals differ from those used by monolingual Ukrainian monolinguals?

(c) If there is a difference between bilingual and monolingual production, what is the directionality of bilingual language development?

In other to answer these questions, an experiment is carried out by involving 20 bilingual English-Ukrainian bilingual children born and raised in the US from 3;10 to 6;07; the bilinguals are, therefore, heritage speakers of Ukrainian. 21 age-matched Ukrainian monolinguals are also included. The participants are further divided into three age groups: 4 year-old, 5-year-old and 6-year-old. An elicitation task is designed and carried out in Ukrainian and English separately with at least a week's interval where the participants are shown a series of 24 pictures which represent two discourse conditions: (i) the DO is unspecified/not mentioned, as in example (142) and (ii) the DO is specified/mentioned, as in example (141). In the first discourse condition (C1) where the DO is unspecified/not mentioned, the target DOs should be the full DPs in both languages. In the second discourse condition (C2), however, more variable replies could be triggered, which include pronouns, null DOs or full DPs in Ukrainian and pronouns or full DPs in English. The series of pictures shown to the participants deals with a main character, i.e. Peter. The experimenter starts the conversation about the picture and then a puppet named Dragon asks one of the questions: "What did Peter do?", "what did Peter do with the object?" or "what did Peter do to the person?". The testing follows the same procedure with 24 pictures in a pseudo-randomized order. The participants' responses are audio-recoded and then transcribed by classifying the DOs into three categories: (i) full DPs, (ii) pronouns, and (iii) null DOs.

The results of the data analysis show that, on the one hand, in Ukrainian, the distribution of DOs shows a clear contrast between the use of DPs, pronouns and null DOs in the two discourse conditions. In C1, both monolinguals and bilinguals use mostly the target structure (i.e.

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DPs) (from 68% to 96%) while in C2, their responses include high rates of null DOs (from 20% to 68%) and pronouns (from 14% to 66%). On the other hand, in English, while the bilingual participants' responses seem to have a wider distribution depending on their age, they still show the same general tendency: in C1, the majority of the responses are NPs (from 50% to 87%) while in C2, the participants produce high rates of pronouns (from 29% to 77%).

Different factors that may influence the choice of DOs are discussed. First of all, the results of statistical analyses reveal that, in Ukrainian, both monolinguals and bilinguals, regardless of their age, produce more pronouns and null DOs in C2 than in C1 (all p values are less than 0075). However, discourse conditions do not appear to be a significant factor that influence the bilinguals' choice of DOs in English: the youngest bilinguals (i.e. 4-year-olds) produce pronouns ($p=.1380$) and null English DOs ($p=.5225$) in both discourse conditions without an obvious difference; moreover, while the 5-year-olds produce more pronouns in C2 than in C1 ($p=.0001$), they produce null DOs in both discourse conditions ($p=.2518$); the 6-year-old participants produce more pronouns in C2 than in C1 ($p<.0001$) and they virtually produce no null DOs in C1 and produce only 1 instance in C2, which suggests almost adult-like performance.

The researchers further focus on the role played by age and the bilinguals' other L1. The results of the data analysis also demonstrate that the 5-and 6-year-old bilinguals use more null DOs than the monolinguals in C1 in Ukrainian but the instances are very limited in both cases. A similar tendency is found in C2; however, the difference between the bilinguals and monolinguals in their null DO production does not reach statistical significance. Mykhaylyk and Ytterstad (2015) point out that the only noteworthy significant difference is that in C2 the 6-year-old bilinguals produce fewer pronouns than the monolinguals in Ukrainian.

Another comparison is carried out between the English and Ukrainian output produced by the bilinguals. The results show that in C1, the youngest and oldest participants produce significantly fewer DPs in English than in Ukrainian. The difference in the use of pronouns increase by age in both discourse conditions but the bilinguals produce more pronouns in English than in Ukrainian and this tendency seems to get stronger as they grow older. In terms of null DO production, a similar developmental trend is detected in C2. However, its directionality is opposite to that of the pronouns: the use of null DOs decreases with age.

Furthermore, the researchers point out that input conditions might also influence the bilinguals' choice of DOs. It is found that the bilingual participants with older siblings use significantly fewer null DOs in English than in Ukrainian (except for 4-year-olds in C1) when compared to the bilinguals without older siblings; in addition, the former also starts to produce fewer null DOs in English at an earlier age. Moreover, the bilinguals with older siblings also produce more pronouns in English than in Ukrainian.

The two researchers then conclude that both discourse context and language input should be taken into accounts while attempting to explain the bilinguals' developmental trends of DO choices. Regarding the first research question, as shown in (143a), based on the results of the data analysis in Ukrainian, the researchers conclude that the bilingual children have enough knowledge about language-specific discourse-pragmatic rules since they follow the same patterns in the DO choice as Ukrainian monolinguals and consistently use more null DOs in C2 than in C1; however, the bilinguals' English production shows a different pattern and the two authors point out that the reason of the misuse of English pronouns in C1 should be further investigated.

In terms of the second research question, as shown in (143b), the results show that, on the one hand, in Ukrainian, the bilinguals' and monolinguals' choices of DOs are the similar and that no "bilingual impairment" with regard to the choice of DOs is found in both discourse conditions. The results found in the English data, on the other hand, present different patterns: only the 6-year-old bilinguals seem to be adult-like in that they virtually do not produce any null DOs, while the younger bilinguals do. The researchers then compare the null English DO rates produced by the bilinguals in their study with those produced by the E monolinguals in Pérez-Leroux, Pirvulescu, and Roberge's (2008) study (c.f. chapter 1) in C1. In Pérez-Leroux, Pirvulescu, and Roberge's (2008) study, the results of a similar experiment show that in C2 3-4-year-old E monolinguals produce a null DO rate of 25% and the 4-5-year-old E monolinguals produce a null DO rate of 31.5%. These figures are very similar to those obtained in Mykhaylyk and Ytterstad's (2016) study. In C2 where the DO is specified/mentioned, the two researchers compare the results with those found in Pirvulescu et al.'s (2014) study (which will be discussed in subsection 2.2.2.3). In their study, Pirvulescu et al.'s (2014) find 13% of null DOs in 4-year-old E monolinguals and 14% of null DOs in 5-year-old E monolinguals while the figures are higher in Mykhaylyk and Ytterstad's (2016) study (30% in 4-year-olds and 21% in 5-year-olds). Based on these figures, Mykhaylyk and Ytterstad (2016) conclude that C1 might be problematic for both bilingual and monolingual children while in C2, the English-Ukrainian bilinguals produce more null DOs than the E monolinguals, which could suggest influence from Ukrainian into English in bilingual development up to the age of five.

Regarding the third research question, as shown in (143c), which deals with the directionality of bilingual language development, the two researchers point out that the reason why the bilinguals produce few DPs in English than in Ukrainian in the same discourse condition

and show preference for English pronouns could be the result of the bilinguals' limited vocabulary in English and, whenever they do not know a certain noun, they either skip it or replace it by the pronoun "it". The two authors also claim that the reason why the older participants (i.e. 5-and 6-year-olds) have a preference for English pronouns might be different from the one behind the younger participants' choice (i.e. 4-year-olds): at the older stage, it could also be that the children pay more attention to visual specificity and assume that the interlocutor shares their knowledge about the DO, which, in addition, they could see in a previous testing session in Ukrainian; in such cases, the children might license linguistically unspecified DO as known, visually specified elements and mark them with pronouns or null DOs. However, this proposal needs to be further tested. Moreover, the influence of Ukrainian on English is most evident in C2 where the DO is specified. The question "what did Peter do with X?" cannot be answered with a null DO structure in English while subject/object omissions are licensed in Ukrainian. Therefore, the high rates of null DOs in the bilinguals' English DO production and their distinct distribution compared to L1 English, as shown in Pirvulescu et al.'s (2014) study (c.f. subsection 2.2.2.3), suggest influence from Ukrainian on English. The two authors further point out that the results found in their study support the Interference Hypothesis (Hulk and Müller 2000, Müller and Hulk 2001) (c.f. subsection 2.2.2.1).

What is more, Mykhaylyk and Ytterstad (2015) also address the role played by language input. In their study, it is found that those bilingual children with older siblings produce significantly fewer null DOs in English than in Ukrainian (except for the 4-year-olds in C1). The parental questionnaires show that while Ukrainian is the typical language of child-parent communication, conversations among siblings are conducted in both Ukrainian and English. Hence, younger children in such families may receive more English input and have more

extended vocabularies in their two L1s. Such different input conditions could provide possible evidence for the role played by language dominance but the two researchers indicate that more tests need to be carried out in order to confirm it.

While transfer is detected in Yip and Matthews's (2005) and Paradis, Crago, and Genesee's (2006) studies on spontaneous data as well as in Mykhaylyk and Ytterstad's (2015) study on experimental data, the bilingual children in Müller and Hulk's (2001) and Pérez-Leroux, Pirvulescu and Roberge's (2009) studies appear to suffer a delay in object acquisition as compared to their monolingual counterparts, as it will be presented next.

2.2.2.3 Delay: Default Retention

Jakobson's (1968) paradigmatic view on child language acquisition has conceived it, not as the addition of language structures and rules, but as a reduction in the range of possible rules and structures. Through experience in the community language, the child selects and reinforces a subset from within the larger set of structural possibilities. UG is thus conceived as the full set of possible grammars and linguistic categories, while language acquisition is the process of arriving at differentiation and specificity. Following this view, Müller and Hulk (2001), Pérez-Leroux, Pirvulescu and Roberge (2009) and Pirvulescu et al. (2014) study object acquisition in bilingual children and point out that bilingual children may retain default structures longer than monolingual children due to interlinguistic influence. The reasons the different authors give for this default retention are, as it will be shown next, quite diverse: mapping of universal principles onto language-specific principles induce influence, in particular of pragmatic principles onto syntactic principles may induced influence (Müller and Hulk 2001); less amount of input in each

of bilinguals' L1s and higher complexity of the input problem in terms of the lexicon may trigger delay (Pérez-Leroux, Pirvulescu and Roberge 2009, Pirvulescu et al. 2014).

Müller and Hulk (2001) investigate the null object phenomenon in bilingual children acquiring simultaneously a Romance language and a Germanic languages, to be more specific, French-Dutch, French-German and Italian-German bilingual children, by comparing bilingual data with monolingual data.

The authors point out that adult Dutch and German are verb second (V2)[14] null topic languages, which refers to the fact that the constituent in the first position (topicalized) of finite root clauses may be null, as shown in (144).

> (144) a. A: Ga je mee naar de Titanic?
>   Go along   Titanic
>   B: *e* heb ik al   gezien.
>   Have I already   seen
>
>   b. A: Kommst Du mit zur Titanic?
>   Will come you   with the Titanic
>   B: *e* hab ich schon gesehen.
>   Have I already seen
>
>   "A: Will you come along to the Titanic?
>   B: I've already see it."

(Müller and Hulk 2001: 3)

The null object requires a discourse referent. Since Dutch and German are V2 languages, leaving the first constituent null results in a construction where the finite verb occupies first position, as in (144). In contrast to null topic languages like Chinese, multiple null arguments are disallowed in Dutch and German (Müller and Hulk 2001: 3).

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[14] Verb-second (V2) word order is a specific restriction on the placement of the finite verb in a sentence. The V2 principle requires the finite verb to appear in second position of a declarative main clause, whereby the first position is occupied by a single major constituent that functions as the clause topic.

In the case of child Dutch and German, previous studies have suggested that monolingual Dutch and German children produce null objects frequently (40%-50% from 2;03 to 3;01 with MLU 1.38-4.7 in German; 21%-45% from 2;04 to 3;01 with MLU 1.67-3.32 in Dutch) (Kraemer 1995, Jakubowicz et al. 1997, Wijnen and Verrips 1998).

In contrast, adult French and Italian are not null topic languages and they do not license null objects in general, though there is a small class of verbs, such as *savoir/sapere* ("to know") that can take a null object, as shown in (145).

(145) a. A: Tu sais pourquoi il n'est pas venu?
          You know why   he didn't   come
     B: Sais pas *e*.
        know not

     b. A: Sai perché non è venuto?
          Know why   not   came
     B: Non so *e*.
        Not know
    "A: Do you know why he did not come?
    B: I don't know."

(Müller and Hulk 2001: 5)

In terms of child French and Italian, previous empirical studies have shown that monolingual French and Italian children produce null objects very comparatively infrequently (4.2%-11.8% between 2;00-2:07 with MLU 2.92-4.95 in French, 3.2%-22.8% between 2;04-3;00 with MLU 2.47-4.31 in Italian) (Guasti 1993/1994, Jakubowicz et al. 1997).

The monolingual data above indicate that German, Dutch, French and Italian monolingual children go through a null object stage. The languages differ with respect to the extent to which children make use of null objects. Children from a Germanic background produce null objects twice as frequently as children from a Romance background with a comparable MLU. The results of Müller and Hulk's (2001) comparison of the monolingual data

of the four languages point out that children from a Romance background with an MLU below 2.6 produce null objects to a degree comparable to that of children from a Germanic background with an MLU between 2.6 and 3. This suggest that Romance children learn that their language is not a generalized null topic language when their MLU approaches 2.6, at which point their null object rate is around 11% or less. Apart from this, in other study by Müller and Penner (1996), it has been reported that monolingual German and French children's transitional stages last for between two weeks and two months. However, German and Dutch children need longer time to "get rid of" illicit null object constructions as compared to the French and Italian children. Illicit null objects decrease with age in children from all the four language backgrounds, in particular with the lexical instantiation of the C-system. Children with such a system produce illicit null objects to a much lesser extent than children who do not yet show lexical reflexes of the adult C-system.

Müller and Hulk (2001) explain children's production of illicit null objects and lack of constructions related to the C-system by assuming that a structure like (146a) underlies the children's null object constructions, as in (146b), in which PRO is adjoined to IP (Müller, Crysmann, and Kaiser 1996).

> (146) a. Ivar répare *e*.
>   Ivar repears.
>   "Ivar repares it."
>
>   b. [IP PRO$_j$ [IP Ivar répare t$_j$]].

(Müller and Hulk 2001:8)

Müller and Hulk (2001) further suggest that in the early stages of acquisition all children use a pragmatic strategy to license the empty element (PRO) via discourse (as argued by Schaeffer 1997 and Hoekstra and Hyams 1995). Discourse licensing is part of the set of default

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representations which all speakers possess and, as such, is part of the Minimal Default Grammar (Chomsky 1995). During language acquisition, the child's task is to find out what role discourse licensing plays in the specific target language.

In Germanic and Romance languages, the child sees evidence for null objects. In French and Italian, the constructions in (147) may constitute evidence for the structure in (146). In addition, the construction with a fronted topicalized object, as in (147), may support the analysis of an IP-adjoined empty topic.

> (147) a. (Parce que) ça je sais *e*.
>   because   it I know
>
> b. (Perché) questo so *e*.
>   because   it   know
>
>   "(because) I know it."

(Müller and Hulk 2001: 8)

Compared to the Romance languages, the Germanic languages present the child with ampler evidence for the validity of this discourse strategy (i.e. topilicazation) in the adult grammar. Moreover, the structure in (147) allows for multiple adjunction to IP and can account for null arguments in child grammar. It becomes illicit once CP is fully integrated into child grammar since the PRO in IP-adjoined position would be governed by the higher C-head (Müller, Crysmann, and Kaiser 1996), the latter situation contradicting universal constraints (i.e. PRO is allowed in ungoverned contexts only). More generally, once CP is fully activated, the adjoined element is no longer accessible to an external discourse licenser.

Müller and Hulk (2001) analyze data from three bilingual children: a German-French bilingual (Ivar), a Dutch-French bilingual (Anouk), and a German-Italian bilingual (Carlotta). A summary of the three children's data selected is presented in Table 32.

Table 32. Data Selection from the Three Participants

Child	Language	Age range	MLU
Ivar	German-French	2;04-3;05	1.29-6.79
Anouk	Dutch-French	2;03-3;10	1.21-5.63
Carlotta	German-Italian	1;10-2;11	1.13-4.39

The results of the data analysis shows that the three bilingual children perform in a similar way in terms of null objects. The three bilingual children behave similarly with respect to null objects in their Germanic L1s as monolingual children do: they frequently produce null object constructions and they exhibit the same types of erroneous null object constructions; furthermore, the decrease of illicit null objects is also found to be related to the increase of target-like constructions related to the C-system.

In terms of the children's Romance languages, Müller and Hulk (2001) point out that all the three children pass through two major developmental phases: the first phase is characterized by a high number of illicit null objects and the absence of infrequent usage of object clitics and constructions related to the C-system in the adult language; the second developmental phase witnesses the decrease of illicit null objects and the increase of object clitics and C-related constructions. In Ivar, the first developmental phase lasts until the age of approximately 2;11/3;00 (MLU 4.9), in Anouk until approximately 3;1 (MLUw 3.3) and in Carlotta until approximately 2;04 (MLUw 2.6).

During the first developmental phases, all the three bilingual children produce overt object clitics infrequently and they produce a large number of null objects (Ivar's French's mean null object rate is 39.5%; Anouk's French's, 32.5%; Carlotta's Italian's, 36.4%). This indicates that taking MLU values and ages into consideration, the bilingual children differ considerably from the monolingual French and Italian children and resemble monolingual German and Dutch children.

Furthermore, during the period in which there is evidence for the fact that the bilingual children are able to produce two arguments in a clause, their null objects are not restricted to a small class of verb types, but occur with a great variety of verbs instead; and they produce both overt and null objects with the same verbs. These observations indicate that the bilinguals' null objects production cannot be attributed to performance limitations.

Most of the null objects produced by the bilingual children represent a discourse topic, as shown in (148).

> (148) A: Tu as   enlevé   la musique? (=l' horloge)
>   you have taken off   the music   (the clock)
>   Did you take off the clock?"
>
>   B: Oui, remets *e* oci.   (Ivar 2;06)
>   Yes   put back   here
>   Yes, put it back here.
>
>   (Müller and Hulk 2001: 13)

Moreover, the bilingual children's speech exhibits productive use of lexically instantiated topicalization into a pre-subject position, as shown in (149).

> (149) Un aunt libre de Babar je connais.   (Anouk 2;11)
>   An other book of Barbar I   know
>   "I know another book of Babar."
>
>   (Müller and Hulk 2001: 13)

During the first developmental phase, Ivar's speech is characterized by the absence of root wh-question formation, target-like complementizers, relative pronouns and embedded wh-questions. In Anouk and Carlotta, constructions related to the C-system are infrequent during this phase, too. Complementizers such as *que*/*che* ("that") and *si*/*se* ("if/whether") are completely absent in Anouk's French and Carlotta's Italian (Müller and Hulk 2001: 13).

During the second developmental phase, it is shown that the C-system is lexically integrated into the bilingual children's grammar. The lexical instantiation of the C-system in its target form is reflected in the presence of target-like wh-question formation with a variety of wh-words, productive use of relative markers and use of complementizers and wh-words which introduce embedded clauses. The integration of the C-system is gradual in Anouk (2;07-3;3) and Carlotta (2;03-2;10). That is, it takes about eight months. In contrast, Ivar is a "faster" learner (2;10-3;02).

Object clitics start to be used productively by the bilingual children in this phase. Illicit null objects decrease dramatically at the age of 3 in Ivar. In the case of Anouk and Carlotta, the decrease is not as dramatic as that in Ivar and null objects continue to be used once the CP in its adult form starts to be integrated. However, the gradual decrease of illicit null objects is parallel to the gradual increase of C-related constructions and object clitics in both children. In other words, the children who exhibit a rather long transitional phase for the disappearance of illicit null objects also show a gradual development in other grammatical domains, i.e. the usage of objects clitics and constructions related to the C-system.

To sum up, the development of the Romance language in three bilingual children in Müller and Hulk's (2001) study demonstrate a path similar to monolinguals qualitatively but not quantitatively: they use the same types of erroneous constructions but to a much higher degree. Illicit null objects decrease once the C-system is lexically integrated into the child grammar, but they continue for a rather long period in two of the three bilingual children under study. Such a long transitional stage has not been reported for monolingual children. Therefore, there is a sharp quantitative difference between bilingual and monolingual Romance language development in this grammar domain.

Müller and Hulk (2001) suggest that the structure for French and Italian null objects in bilingual children is similar as in monolingual children; that is, a structure where an empty operator is adjoined to IP. The similarity in the structure underlying null objects accounts for the observation that the two acquisition paths do not differ with respect to the types of errors. As has been claimed for the monolinguals, the structure becomes illicit once the C-system is instantiated as acquired in the target systems. Müller, Crysmann, and Kaiser (1996) argue that lexical instantiation of the C-system reflects the fact that there is a c-commanding head C in the children's representation at the second developmental phase, and thus a PRO adjoined to IP, being governed, is no longer licensed. This approach predicts that a PRO in IP-adjoined topic position should be illicit once the C-system has been established. Müller and Hulk (2001) have observed that in the Romance language of all the three bilingual children, illicit null objects decrease once the C-related constructions are used, with an overt representative in C or SPEC of CP.

In terms of quantitative differences between monolingual French and Italian children and bilingual French and Italian children, two types of differences are observed. First, all the three bilingual children produce null objects to a much higher degree in their respective Romance language as compared to monolinguals with a similar MLU and age. The frequency of null objects in the bilinguals' Romance languages corresponds to that found in the Germanic language of the monolinguals. Second, two of the bilingual children continue to produce null objects to a high degree during the stage when evidence of the gradual instantiation of the C-system in its target form is found. In other words, some bilingual children appear to go through a longer transitional stage before fully converging with the target grammar as compared to monolinguals.

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To explain the bilinguals' higher production of illicit null objects in their respective Romance language than monolinguals with a comparable MLU and age, Müller and Hulk (2001) propose that the French and Italian of the bilingual children are indirectly influenced by their respective Germanic languages. Licensing of null constituents via discourse is a universal (pragmatic) strategy during early stages of language acquisition that is available to both monolinguals and bilinguals. In contrast, adult German and Dutch present the bilingual children with substantial evidence for the validity of this discourse strategy. This may cause confusion in the bilingual children who are also acquiring French or Italian. On the one hand, adult French and Italian contain constructions in which the canonical object position is empty; this might give the bilingual child the idea that discourse licensing is also at work in adult Romance language. On the other hand, the French or Italian data are clearly different from the Germanic data, since in most cases, the null object position is licensed by a preverbal object clitic. Therefore, although adult French and Italian seem to contain evidence for more than one analysis from the child's perspective, monolingual French and Italian children will soon abandon the discourse licensing strategy. For the bilingual children, their French or Italian input may present little evidence in favor of a discourse licensing analysis; their Ducth or German input, however, contains a lot of positive evidence for such a strategy. If it is plausible that a discourse licensing mechanism of null arguments is part of the Minimal Default Grammar (Chomsky 1995), the bilingual situation may be rephrased in the following way. The bilingual child (as the monolingual child) has to abandon the Minimal Default Grammar (Chomsky 1995). However, the bilingual child has to do so for both language types. As discussed previously, monolingual children have more problems abandoning the Minimal Default Grammar (Chomsky 1995) for the Germanic languages than for the Romance languages since adult German and Dutch are null topic languages whereas French

and Italian are not. The data from the bilingual children show that they seem to have difficulty giving up the Minimal Default Grammar (Chomsky 1995) in their Romance languages as well. In other words, the null topic character of adult German or Dutch has the effect that the bilingual children is not able to map the universal strategies onto language-specific rules as quickly as the monolinguals do. The bilinguals are confronted with a much wider range of language-specific syntactic possibilities and one of the possibilities seems to be compatible with a universal strategy. Müller and Hulk (2001) argue that the interlinguistic influence from the Germanic language into the Romance language occurs in the bilingual children and such influence is induced by the mapping of universal principles onto language-specific principles, in particular of pragmatic principles onto syntactic principles. Müller and Hulk (2001) term such interlinguistic influence "mapping induced influence" in order to distinguish it from direct interlinguistic influence such as language transfer.

Furthermore, Müller and Hulk (2001) point out that mapping induced influence may also have the effect that the Germanic-Romance bilingual children remain in a transitional stage for a longer time in the Romance languages as compared to their monolingual counterparts. In other words, the Minimal Default Grammar (Chomsky 1995) competes with a language-specific grammar in the Romance language of the bilinguals for a longer time than in monolinguals with a Romance background. The authors argue that this is due to the influence of the null topic characteristic of the Germanic system, which resembles the Minimal Default Grammar (Chomsky 1995) with respect to discourse licensing.

Müller and Hulk (2001) further point out that the bilinguals, like the monolinguals, have to solve the problem of simultaneous access to multiple grammars, that is, the Minimal Default Grammar (Chomsky 1995) and the language-specific grammar(s). In addition, they must cope

with the fact that access to multiple grammars is found in both of the two languages to be acquired and that the languages may converge to different degrees with the Minimal Default Grammar (Chomsky 1995). In this light, it is conceivable that language separation and interlinguistic influence are characteristics of the same developmental stage in a bilingual child.

The appropriateness of a grammar is defined as the proportion of the input sentences with which it is compatible (Yang 1999, 2000). When the input sentence is presented, the learner selects a grammar G with its associated probability P_G, and then performs grammatical analysis. The success or failure of G in analyzing the sentence increases or decreases P_G. In other words, in a bilingual child, mapping induced influence occurs only in those domains of the grammar where the child is confronted with positive evidence for more than one possible structural analysis in one language and the other language favors/reinforces one of the two (or more) analyses. Such domains are termed the vulnerable C-domains by Müller and Hulk (2001) (c.f. subsection 2.2.1). Therefore, one of the two languages (French or Italian in Müller and Hulk's (2001) study) is treated as if responding as frequently as the other language (i.e. German or Dutch) to a particular stimulus, that is, a sentence with an null object in the input for the present purpose.

Pérez-Leroux, Pirvulescu and Roberge (2009) share a similar view on object acquisition in bilingual children as that of Müller and Hulk (2001). They adopt Lebeaux's (1988) view which argues for the existence of structural defaults in grammatical development. These are minimal structures or mechanisms available to the child before language experience makes it possible to put in place language-specific options. In other words, the authors support the view that language develops from generality to specialization.

Pérez-Leroux, Pirvulescu and Roberge (2009) consider a case of language interaction which shows delay in the overt realization of DO in bilingual French-English children. The authors point out that developmental asynchronies, which refers to the fact that a given structure is typically acquired at different points in a bilingual's two languages, may be a possible locus to examine interaction in bilingual development (c.f. Paradis and Genesee (1996)). Besides, differences between the developmental timetables of bilinguals and monolinguals (which can take the form of either delay or acceleration) could be construed as evidence for interdependence between the bilingual's two languages (Meisel 2007).

As previously discussed in chapter 1 (c.f. subsection 1.3.1), Pérez-Leroux, Pirvulescu and Roberge (2009) propose that a V root is systematically merged with a complement but the object may lack lexical content. In the case of null objects, a bare N is merged to the V instead of a DP or other types of overt complements and enters into a semantic hyponymic relation with the V root. That is, the bare N can be considered as a null cognate object. Since this basic operation of merging of a null bare N applies to all verbs, it can be taken as the minimal instantiation of transitivity (as shown in (12a) and (12c) in chapter 1). If an object is merged to V, it will be overt (or *pro* in French) and referential.

Pérez-Leroux, Pirvulescu and Roberge (2009) assume that this minimal instantiation of transitivity is the initial setting in UG. In this case, what children must learn is not that a given verb can or cannot appear with an overt object, but rather the particular semantic relation that holds between the verb and the DO position. In the case of null objects, the authors consider them as part of the universal, initial representation in the grammar of a child: a logical necessity of the core grammatical system that the child brings to the task of development; and at the very initial stages of language development, children start out with a null cognate object default. That

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is, the null object N is an all-purpose object; it does not only represent generic objects, but also specific, individuated objects (c.f. chapter 2, section 2.1.1).

Twenty-one French-English bilingual preschool children in Toronto are involved in the study as well as thirteen age-match monolingual French children from Montreal. The details of the participants' profiles are summarized in Table 33.

Table 33. Comparison between the Monolingual and the Bilingual Group

		Age range	Mean	Median	Standard Deviation	Number
Monolingual	Younger	3;00-3;07	3;03	3;01	2.8 months	7
	Older	3;09-4;01	3;11.5	4;00	1.7 months	6
	Overall	3;00-4;01	3;06.9	3;07	4.9 months	13
Bilingual	Younger	3;01-3;07	3;04.6	3;05	3.1 months	12
	Older	3;09-4;02	3;10.5	3;10	1.6 months	9
	Overall	3;01-4;02	3;07.2	3;07	3.5 months	21

(Pérez-Leroux, Pirvulescu and Roberge 2009: 103)

Pérez-Leroux, Pirvulescu and Roberge (2009) conduct an elicit production study aiming to compare DO production by French-English bilinguals and French monolinguals. The experiment is carried out in a similar way as the one in Pérez-Leroux, Pirvulescu, and Roberge (2008) (c.f. chapter 2, section 2.1.1). That is, the experimenter first shows a picture to the child and introduces the referent by providing a linguistic context. Then the experimenter proposes a prompt question to a puppet, who provides an incorrect response. The child is then invited to help the puppet answer the question correctly. The child hears a total of twelve stories with different mixed verbs and is asked twelve questions, six of which contain overt DPs (i.e. *what is X doing with Y?*) and require responses with overt pronominal DOs and six of which target optional contexts (i.e. *what is X doing?*) and allow responses with null DOs.

The children's DO production is then classified as pronominal, null or DP. Responses that do not include the target verb or are otherwise unrelated to the target question as well as

those with language code-switching (there is only one case) are classified as "other". Table 34 shows the results of the elicitation task.

Table 34. Response Type Elicited per DO form

	Pronominal target			Optional object target		
	DP	Clitic	Null	DP	Clitic	Null
Bilingual	33.1%	11.1%	50.4%	34.6%	2%	53.6%
Monolingual	47.9%	14%	36.8%	63.5%	0%	28.1%

(Pérez-Leroux, Pirvulescu and Roberge 2009: 105)

From Table 34 it can be noted that in the case of the pronominal target condition, where null objects are illicit, both bilingual and monolingual children produce a small proportion of clitics, and most of the responses are either null or lexical DPs. In the case of optional contexts, both bilingual and monolingual children produce null and lexical DPs, but the rates are significantly different. On the one hand, near one-third of the responses produced by the monolinguals are with null pronouns, and the other two-thirds are lexical DPs. On the other hand, more than half of the responses produced by the bilinguals appear with null objects and about one-third of the responses include lexical DPs.

Overall, there are substantial quantitative differences in the percentage of null and lexical DOs between monolinguals and bilinguals. Under both discourse conditions, the bilingual children produce fewer lexical DPs and they favor null objects instead as compared to their monolingual counterparts. A statistical analysis shows that the difference between the rates of retention of null objects between the bilingual group and the monolingual group under both discourse conditions is significant. Pérez-Leroux, Pirvulescu and Roberge (2009) interpret such results as suggesting that, at the same age, children growing up in bilingual environments are retaining the default null object with a full interpretative range.

Pérez-Leroux, Pirvulescu and Roberge (2009) explain bilinguals' longer retention of null objects by assuming that, since the child starts with unrestricted null objects, some features of the experience guide the child in making inferences about the proper range of meanings of null objects. In other words, during language development, children encounter a potential subset problem in the sense that they start with the broader grammar (which contains an unrestricted, all-purpose null object N) and must arrive at a grammar where N can only have generic interpretation. Through experience, children learn that null objects have specific semantic properties across constructions. Pérez-Leroux, Pirvulescu and Roberge (2009) argue that it is a very specific kind of experience that supports the relevant inferences about the proper range of meanings of null objects in the target grammar. Such relevant experience may originate in discourse contexts where the parental feedback can clearly disambiguate between the generic and the referential interpretation. However, such triggering contexts may be rare, and many uses of null objects are ambiguous in that they are compatible with inferred reference. Consequently, when investigating child's object acquisition, one must take into considering the problem of mixed verbs. Pérez-Leroux, Pirvulescu and Roberge (2009) point out that these cases are an integral part of the acquisition problem precisely because they relate to parametric differences: in a [+null object] language, a null object will cover the interpretive range that a definite pronoun has in a [-null object] language such as English. The child has no a priori knowledge of the nature of lexical optionality in transitivity patterns and discourse-licensed null objects; the overall solution must involve the lexicon as well as the syntactic and discourse context. Since it cannot be assumed that a verb will appear exclusively with an overt o null object, this acquisition problem may correspond to a quantitative version of syntactic bootstrapping. Syntactic

bootstrapping is understood as a lexical acquisition mechanism that extracts semantic information from the syntactic environments a word is associated with (Gleitman et al. 2005).

Pérez-Leroux, Pirvulescu and Roberge (2009) propose that such perspective has potential implications for explaining language interaction in bilingual development regarding the developmental schedule of null objects. The authors further point out that two factors may contributed to bilingual children's longer retention as compared to monolinguals: (i) bilingual children's more limited lexical input; and (ii) the additional complexity present in the bilingual lexicon.

The first factor follows Paradis and Genesee's (1996) idea that bilingual children have less input in each language than their monolingual peers since they are likely to have comparable hours of language exposure but these interaction will be divided between their two L1s. This may cause that bilingual children have smaller vocabulary in each language than their monolingual counterparts, as previously argued by Pearson et al. (1997) and Pearson and Fernández (1994). Since transitivity and the acquisition of objects depend heavily on the lexicon, Pérez-Leroux, Pirvulescu and Roberge (2009) predict that such difference in the size of vocabulary may contribute to bilingual delay, regardless of the language type.

The second factor ties bilingual delay to interlinguistic activation of comparable verbal entries. In other words, any additional source of variability in the representation of lexical transitivity will affect the overall development of object acquisition. That is, a child exposed to two languages will have a certain degree of transparency between his two lexicons. For instance, verb pairs such as *eat*/*devour*, *follow*/*chase* are related in sense but differ in object patterns: *eat* and *follow* can take either an overt or a null object whereas *chase* and *devour* strongly prefer overt objects. If one language (Language B) has a verb of the mixed type but the equivalent verb

in the other language (Language A) is a pure transitive verb, use of the item in A may prime the overt object frame in B. The child, however, will continue to hear examples with null objects in B, the language in which the verb is a mixed verb. Bilingual co-activation is likely to introduce one layer of uncertainty in the resolution of transitivity patterns. An example of this is provided in (150).

(150) a. J'ai cherché ce jouet tout la journée mais je n'ai *e* pas trouvé.
       I looked for   this toy   all day   but   I   not   have found

b. J'ai cherché ce jouet tout la journée mais je ne *l'*ai pas trouvé.
       I looked for   this toy   all day   but   not it   have found

c. I looked for this toy all day but I didn't find ***it***.

(Pérez-Leroux, Pirvulescu and Roberge 2009: 109)

The verb *trouver* ("to find") in French, as shown in (150a) and (150b) can take either an overt object or a null object while its equivalent in English (i.e. to find) shows a stronger preference for overt objects. Bilingual French-English children may be more uncertain with the use of such verb in English since its French equivalent continues to offer evidence for null objects.

In general when producing utterances with verbs, all children must solve the lexical problem (how likely is a given verb to take a null object?) concurrently with the syntactic problem (under what conditions does this language allow null objects?). Acquiring two translation equivalents opens the possibility that the subcategorization frames in the two languages can influence each other. This will generate conflicting information about the transitivity of the target verbs, and thus causes delay in the child's decisions about lexical transitivity and its associated syntactic consequences.

In summary, in Pérez-Leroux, Pirvulescu and Roberge's (2009) study, French-English bilingual children suffer a delay in the acquisition of DO in French as compared to their monolingual counterparts. The authors suggest that such delay may be arisen when a given structure (i.e. null objects) is a structural default that may be retained in all adult grammars in restricted contexts (i.e. generic context). This default option serves to provide the computational basis for interpreting the object, when no other information is present. The authors further suggest that such delays should be restricted to situations in which solving a syntactic problem depends directly on information based on interaction between syntax and the lexicon. In comparison to monolingual children, bilingual children have (i) less amount of input in each of their language and (ii) higher complexity of the input problem in terms of the lexicon (i.e. they potentially receive conflicting input about the transitivity patterns of lexical entries by virtue of interlinguistic activation of lexical entries). Pérez-Leroux, Pirvulescu and Roberge point out that either of these two factors, or a combination of the two, may introduce an alteration in the developmental schedule of null objects in the form of extending the period of default retention (2009: 110).

Pirvulescu et al. (2014) also conduct a study on the development of grammar in French-English bilingual children in the domain of null objects with the goal of assessing possible bilingual effects in both languages of the bilingual children. Following the idea that ambiguous input with each language and reduced input for the two languages in bilinguals may make bilinguals different from monolinguals, the authors propose two competing hypotheses. (i) The Bilingual Effect Hypothesis involves that delay is induced by both ambiguous input within each language and reduced input across languages. In the case of objects, this will lead to longer retention of the default representation in both languages (i.e. null objects). Therefore, French-

English bilingual children are expected to produce more null objects in their two L1s compared to their monolingual counterparts. Following the monolingual development asymmetry (i.e. E monolinguals produce less null objects than French monolinguals), it is also expected that French-English bilinguals will produce more null objects in their French than in their English. At the same time, Pirvulescu et al. (2014) also take language dominance into account and expect language exposure as well as use to affect the frequency of null objects and as such to alter the null object rate in unbalanced bilinguals. (ii) The Interlinguistic Influence Hypothesis involves that, if the acquisition schedule of a construction is important, since French monolinguals experience slower convergence towards the target structures than E monolinguals in object acquisition, there could be a delay in English as a result of influence from French in French-English bilinguals. Alternatively, as pronominal convergence is faster in English, English could influence French and an acceleration effect of pronominal convergence could thus be detected in French-English bilinguals' French. In such case, no significantly more null objects in the bilinguals' French would be observed when compared to their monolingual counterparts.

A total of one hundred and twenty-eight children between 3;00 and 6;00 are involved in a picture elicitation task in the study, which include thirty-two balanced French-English bilinguals, eighteen unbalanced (either F-dominant or E-dominant) bilinguals, forty-eight E monolinguals from Toronto and thirty French monolinguals from Montreal. The participants' profiles are summarized in Table 35.

Table 35. Bilingual and Monolingual Children by Age Group

Language	Age group	No. of participants	Mean age	Age range
Balanced bilinguals	3;00	8	3.5	3;01-3;09
	4;00	12	4.5	4;02-4;11
	5;00	12	5.5	5;00-6;01
F-dominant bilinguals	-	8	4.19	4;01-4;11
E-dominant bilinguals	-	10	4.38	4;00-4;08
French monolinguals	3;00	8	3.4	3;00-3;11
	4;00	13	4.5	4;00-4;11
	5;00	9	5.2	5;00-5;07
E monolinguals	3;00	15	3.3	2;11-3;11
	4;00	17	4.5	4;0-4;11
	5;00	16	5.5	5;0-6;01

(Pirvulescu et al. 2014: 503)

The picture elicitation task is conducted in French and English separately, with order of language counter-balanced across participants. Two experimenters, one native French speaker and the one native English speaker, administer the sessions. Eight mixed verbs are used with different events in each language (i.e. different pictures): *eat, drink, read, cut, hit, push, tickle,* and *lick* in English and the French equivalents *manger, boire, lire, couper, frapper, pousser, chatouiller*, and *lécher*. The verbs are in a semi-randomized order for each language (with different ordering of verbs for the French and English versions). For French, four objects are masculine and four are feminine. For each language, there is one training item and four distracters for a total of thirteen items per elicitation task. Half of the items have an animate object and the other half, an inanimate object in order to add diversity to the task corresponding to how clitics are used in the language. Examples of the elicitation task are provided in (151).

(151) a. Qu'est-ce que le garçon méchant fait au chien?   (Animate story)
　　　　"What is the mean boy doing to the dog?"

　　　Target response: Il le frappe.
　　　　　　　　　　He it hit
　　　　　　　　　　"He is hitting it."

Null object: Il frappe *e*.
<div style="padding-left:2em">He hit</div>
<div style="padding-left:2em">"He is hitting (it)."</div>

<div style="text-align:right">(Pirvulescu et al. 2014: 502)</div>

b. Qu'est-ce que le garçon fait avec le jus? (Inanimate story)
<div style="padding-left:2em">"What is the boy doing with the juice?"</div>

Target response: Il le boit.
<div style="padding-left:2em">He it drinks</div>
<div style="padding-left:2em">"He is drinking it."</div>

Null object: Il boit *e*.
<div style="padding-left:2em">He drinks</div>
<div style="padding-left:2em">"He is drinking *e*."</div>

<div style="text-align:right">(Pirvulescu et al. 2014: 503)</div>

The children's responses are coded according to the status of the DOs, which includes five categories: (i) pronominal answer (the target answer), (ii) DP answer, (iii) Null object answer, (iv) other, which include non-responses, non-relevant responses, and responses not using the target verbs, and (v) other pronominals in the case of French strong pronominals such as *lui* ("him") instead of clitics. Responses which are categorized as "other" as excluded from the data analysis.

To test the Bilingual Effect Hypothesis, only the balanced bilingual group and the monolingual groups are involved. The comparison with monolinguals is carried out for both French and English.

In the case of French, the results are shown in Table 36.

Table 36. Distribution of DOs Produced by French Balanced (F-Balanced) Bilinguals and Monolinguals

	Age	DP	Clitic	Null	Other
Monolinguals	3;00	7%	37%	55%	0%
	4;00	18%	44%	36%	0%
	5;00	5%	55%	36%	2%
Bilinguals	3;00	1%	15%	83%	0%
	4;00	12%	19%	66%	2%
	5;00	16%	39%	44%	0%

<div style="text-align:right">(Pirvulescu et al. 2014: 504)</div>

An ANOVA analysis reveals that age and bilingual status (i.e. being bilingual or monolingual) are the two main factors that influence the children's DO production. Within the bilingual group, significant differences are found between 3-and 5-year-olds are differences approaching significance are found between 4- and 5-year-olds, but no significant difference is found between 3- and 4-year-olds. In other words, the behavior with respect to null objects seems to change between 4- and 5-year-olds. In contrast, within the monolingual group, even though the amount of null objects differs between the 3- and 4-year-olds, the difference does not reach statistical significance.

In the case of English, the results are shown in Table 37.

Table 37. Distribution of DOs Produced by English Balanced Bilinguals and Monolinguals

	Age	DP	Pronoun	Null
Monolinguals	3;00	5%	80%	12%
	4;00	6%	79%	13%
	5;00	3%	80%	14%
Bilinguals	3;00	16%	34%	49%
	4;00	5%	37%	55%
	5;00	7%	43%	46%

(Pirvulescu et al. 2014: 504)

An ANOVA analysis finds no significant age effects. A comparison between the monolinguals and the bilinguals reveals that the production of null objects is significantly higher in the bilingual group than in the monolingual group.

In both French and English, the balanced bilingual children have significantly high null object rates than their monolingual peers. One additional observation pertaining to the information in Table 36 and Table 37 is that the null object rates are higher overall in French than in English in these bilinguals and such differences are statistically significant.

In sum, these results indicate that while there are significantly higher rates of null objects in the bilinguals' both languages when compared to the monolinguals, there are also differences in the null object rate across the two languages. The bilinguals' null object rate in each language partially reflects the behavior of the monolinguals in their respective language, showing a higher null object rate in French than in English. Such result is expected, given the developmental asymmetry between the two languages in monolingual children.

The Bilingual Effect Hypothesis in Pirvulescu et al.'s (2014) study is, therefore, confirmed. More null objects are found in bilingual children than in monolingual children. The null object rate, even if higher in magnitude in bilinguals than in monolinguals, follows the specific developmental patterns between French and English as identified in the existing studies.

To determine if the delay in bilingual English is the effect from French, a three-way ANOVA with age, bilingual status and language as independent variables and with null objects as the dependent variable is performed. The results reveal an expected significant main effect of the bilingual status (i.e. bilingual vs. monolingual) and of language (French vs. English) but crucially, no interaction between the bilingual status and language. Therefore, it can be concluded that the delay in bilingual English in Pirvulescu et al.'s (2014) study does not originate out of an influence from French. The hypothesis that asymmetric development follows the developmental schedule of each language and that the bilingual delay is due to an overall bilingual effect can, therefore, be maintained.

If the simultaneous acquisition of two languages induces delay in the domain of DO acquisition, does language dominance play a role, too? In order to answer this question, Pirvulescu et al. (2014) conduct another study, which involved a group of eight F-dominant bilinguals and a group of ten E-dominant bilinguals. A group of twelve age-matched balanced

bilinguals are selected as the control group. The effect of language dominance in F-balanced *versus* F-dominant bilinguals is presented in Figure 7.

Figure 7. Null Object Rates Produce by Balanced and F-dominant Bilinguals
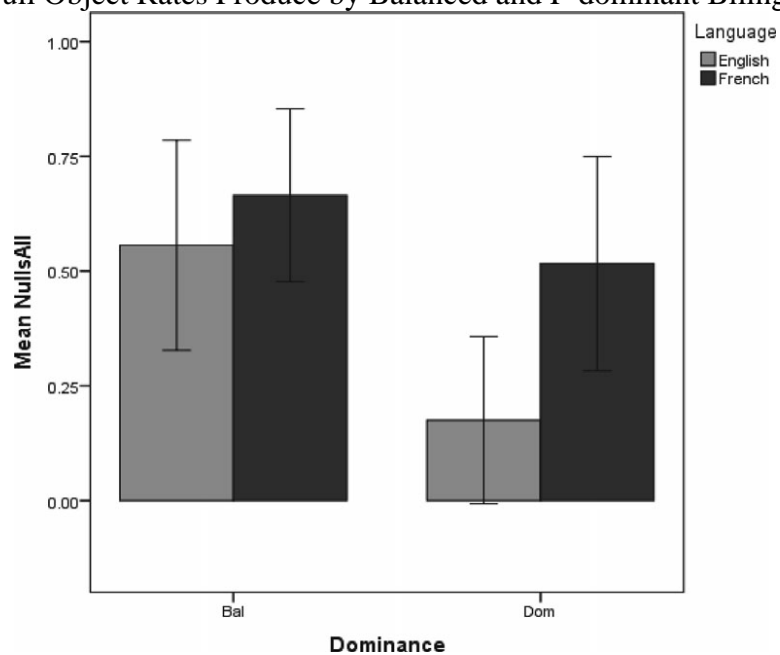
Pirvulescu et al. (2014: 505)

From Figure 7 it can be noted that higher null object rates are found in the bilinguals' French overall when compared to monolinguals (as in Tables 34 and 35 above). An ANOVA with language (French vs. English) and language dominance (F-balanced vs. F-dominant) reveals a main effect of language. There are more null objects in French than in English. However, there is also a significant effect of language dominance. Balanced bilinguals produce more null objects than F-dominant bilinguals. Although the language effects seem more pronounced in the F-dominant bilinguals, there is no significant interaction between language and language dominance.

In order to control for the possible effects of English dominance over French, which would result in the acceleration of pronominal convergence in French, E-dominant bilinguals are

also involved in the comparison with balanced bilinguals and F-dominant bilinguals. The results of the comparison appear in Table 38 which show no significant difference in the null object rate between the E-dominant bilinguals and the balanced bilinguals.

Table 38. Null Objects Produced by Three Groups of Bilinguals in French

Bilingual group	Null object rate
E-dominant	67%
Balanced	69%
F-dominant	51%

(Pirvulescu et al. 2014: 505)

In addition, from Table 38 it can also be noted that the E-dominant bilinguals do not produce more null objects in their non-dominant French than the balanced bilinguals do. There appears to be some key threshold between being dominant in one language and balanced bilingualism that translates into null object retention. However, further reduction in the input does not seem to have additional effects on the extent of null object production.

In sum, the results of Pirvulescu et al.'s (2014) study show support for their first hypothesis, namely, the Bilingual Effect Hypothesis. First, bilinguals produce significantly more null DOs than monolinguals in both languages. Second, development in each of the languages of the bilinguals follows the developmental curve of monolinguals for each language. Third, language imbalance has an effect on null object production: for each language, the more balanced the bilingual, the more null objects the child produces; conversely, the more dominant in one language, the fewer null objects the child produces in that language; and such results converge with the monolingual baseline.

However, interlinguistic influence is ruled out in Pirvulescu et al.'s (2014) study as there is no sign of English influence on French: having English as the other L1 does not lead to a faster resolution of null objects in French in French-English bilinguals; slower development in French

does not seem to influence development in English as no interaction has been found between language and bilingual status.

Similar to Müller and Hulk (2001) and Pérez-Leroux, Pirvulescu and Roberge (2009), Pirvulescu et al. (2014) also advocate a grammatical explanation on null objects in child language. That is, the initial representation in early grammars is a default universal structure and that all children (both monolinguals and bilinguals) start out with an all-purpose null object. Pirvulescu et al.'s (2014) proposal diverges from Müller and Hulk's (2001) in that they do not consider the delay to be the result of "indirect influence" (i.e. input ambiguity across languages). Rather, the authors attribute such a delay found in bilinguals to limited input and more variety in the input, a view in line with Pérez-Leroux, Pirvulescu and Roberge's (2009).

Pirvulescu et al. (2014) further investigate the role played by language dominance (which is mainly determined by the amount of input a child is exposed to, according to the authors). The authors find that similar exposure to two languages (i.e. in the case of balanced bilinguals) already induces a delay compared to the monolingual environment. Taking balanced bilinguals as a baseline, comparative analysis on a small sample (the 4-year-old groups) in their study reveals that further reduction in the input (i.e. in the case of E-dominant bilinguals) does not result in greater delays. However, greater exposure does have a significant impact in decreasing the null object rate (i.e. in the case of F-dominant bilinguals). Pirvulescu et al. (2014) further point out that balanced bilingual exposure and within the age frame considered does have effects in the domain of DOs. The authors then argue that input quantity *per se* is not the problem, but rather input quantity for some domains where there is an available default structure and where the available linguistic evidence enhancing the target grammar may already be infrequent.

2.3 Summary: Main Facts on the Acquisition of Objects

Chapter 2 has been devoted to the review of the acquisition literature on the two issues that constitute the essence of this dissertation and that, in fact, articulate the empirical work that will be presented next. In particular, chapter 2 has been concerned with a description of how objects and object properties are acquired by (i) monolingual speakers of English, Chinese and Spanish and (ii) bilingual speakers. Important notions regarding bilingual acquisition are also included since these intertwine with the acquisition of the specific structure under consideration in this dissertation, i.e. objects.

With regards to monolingual acquisition (section 2.1), different studies suggest that that all monolingual children go through a null object stage regardless of whether the target language allows null objects or not. Different types of explanations have been offered to account for this cross-linguistic phenomenon. Valian (1991) attributes children's production of illicit null objects to performance limitations. That is, children possess adult-like grammatical structures from the early stages of language acquisition but produce null arguments because they have performance limitations, that is, they produce utterances with a limited length and this, as a consequence, involves the omission of categories (objects in this case). As they start producing longer utterances, that is, as the performance limitations start to be overcome, illicit null arguments gradually disappear. Another type of explanation links children' object realization to their sensitivity to discourse contexts (Rispoli 1991, Guerriero, Oshima-Takane, and Kuriyama 2006, Huang 2011). Rispoli (1991) argues that children are not sensitive to the discourse context and, therefore, are unable to associate object realization with discourse context at the earliest stages of language acquisition. Once they establish such sensitivity and association, their illicit null object production reduces. Guerriero, Oshima-Takane, and Kuriyama (2006) and Huang (2011) relate

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children's referential choice to the discourse-pragmatic area. These authors point out that children tend to produce overt DPs to refer to new information and pronouns or null objects accompanied with extra-linguistic signs to refer to information that has already been mentioned or that can be recovered in the discourse context.

Moreover, part of the research on monolingual acquisition of objects has focused on the role played by input, although input is understood differently from one study to the next. Ingham (1993), Tomasello and Brooks (1998) and Tomasello (2000, 2001) have reported children's conservativity to the input. That is, children tend to produce more null objects with verbs that appear to take both overt and null objects in the input (i.e. mixed verbs) than with verbs that only appear to take overt objects (i.e. pure transitive verbs). Pérez-Leroux, Pirvulescu, and Roberge (2008) argue that children's grammar is different from that of adults'. That is, null objects bear not only a non-individuated value but also an individuated value in young children's grammar, and so children need to unlearn null objects' individuated value when exposed to [-null object] languages by relying on the input evidence.

To account for the different developmental patterns of children acquiring a [+null object] language and of those who acquire a [-null object] language, Wang et al. (1992) point out that the null object arguments produced by children acquiring a [+null object] language and by those acquiring a [-null object] language are controlled by different parameters and that children set the parameter at an early age depending on the input they are exposed to.

With respect to bilingual acquisition (section 2.2), and according to the generally accepted view, children who acquire two languages simultaneously possess two language systems from the initial stages of acquisition. Some researchers have argued that these two systems develop independently without interacting with each other (i.e. the Autonomous

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Development Hypothesis; Padilla and Liebman 1975, De Houwer 1990, Nicoladis 1994, Paradis and Genesee 1996, 1997, Meisel 2001, among others) so that the language developmental pattern in bilingual children assimilates that of monolinguals. Other researchers claim that the two systems interact with each other since they are in contact (i.e. the Interdependence Hypothesis; Müller 1998, Yip and Matthews 2000, 2005, among others) so that bilingual children's two languages can have signs of interlinguistic influence. Such influence may manifest itself in three potential ways, if bilinguals are compared to monolinguals, with respect to both the acquisition process and the effect the influence may have in their production: acceleration, delay and transfer (Paradis and Genesee 1996).

On the one hand, according to Hsin (2012), acceleration may occur if there are available identical syntactic structures that allow bilinguals to bootstrap one of their grammars onto the other, so that the more advanced system will boost the development of the less advanced one. On the other hand, delay may occur in the domains in which the two grammar systems have similar but conflicting structures (Hulk and Müller 2000, Hsin 2012), which causes bilingual children to produce adult-like utterances later in development than their monolingual counterparts. Furthermore, delay may occur due to the fact that bilingual children have received less input in each language than monolinguals (De Houwer 1990, Gathercole 2007). With respect to transfer, it may be the consequence of the following factors: (i) the typical maturational schedule is different in each of the languages of the bilingual; (ii) one of the languages of the bilingual is more dominant than the other (Paradis and Genesee 1996); and (iii) a certain domain shares similar but conflicting structures in a bilingual child's two languages; such structures in one language, termed vulnerable domains by Müller (2003), may be less straightforward than those in the other language, and may involve a challenge even in monolingual acquisition (Hulk and

Müller 2000, Müller 2003); in this case, transfer may occur from the language without ambiguity to the one with ambiguity. Existing empirical studies on bilingual acquisition have shown some support for these three manifestations.

Moreover, the notion of language dominance which appears as a determinant factor of interlinguistic influence in some of the previous studies, has also been explored in the present chapter (i.e. subsection 2.2.1.4) with two main focuses, namely, (i) the different definitions of language dominance, and (ii) the different diagnostics and their different nature. While there is no clear-cut definition of language dominance, it is uncontroversial that dominance is not static and its patterns fluctuate longitudinally depending on individual experiences (Romaine 1995). Consequently, different definitions along with different diagnostics have been proposed to identify language dominance in young bilinguals, which include: (i) relative proficiency (Grosjean 1982, Petersen 1988, Genesee, Nicoladis and Paradis 1995, Deuchar and Muntz 2003, Bernardini and Schlyter 2004, Gathercole and Thomas 2009, among others), (ii) relative speed of development (i.e. the language that is developing more rapidly than the other (Wapole 2000)), (iii) the language to which the child has had the most exposure (Grosjean 2010), (iv) language preference (Saunders 1988), (v) relative vocabulary size in each of the two L1s (Nicoladis and Secco 1998), (vi) direction of code-switching (Swain and Wesche 1975, Lanza 2004 and Liceras, Spradlin and Fernández Fuertes 2005) and (vii) MLU differentials (Yip and Matthews 2006).

In terms of DO acquisition in bilingual children, different results are found. Serratrice, Sorace, and Paoli (2004) investigate an Italian-English bilingual child's performance in the domain of DOs and find comparable results in the bilingual child's two L1s as those of monolingual children in their respective language. Yip and Matthews' (2005) study on C-E bilinguals, Paradis, Crago, and Genesee's (2006) study on English-French bilinguals, and

Mykhaylyk and Ytterstad's (2015) study on English-Ukrainian bilingual have found possible language transfer from the bilinguals' one language into the other. What is more, Müller and Hulk (2001), Pérez-Leroux, Pirvulescu and Roberge (2009) and Pirvulescu et al. (2014) have found a delay effect in bilingual children in the domain of DOs and explain such an effect as a default retention. Müller and Hulk (2001) attribute such retention to the indirect influence from one language into the other while Pérez-Leroux, Pirvulescu and Roberge (2009) and Pirvulescu et al. (2014) argue that it is the result of limited input and higher complexity in bilingual children' input.

Chapter 3. Methodology

The present chapter offers detailed information on the research methodology used to carry out the empirical study on DOs based on spontaneous longitudinal linguistic data. In particular, and taking as a point of departure previous works on the analysis of DOs, both those more theoretically oriented (as in chapter 1) as well as those on the monolingual and bilingual acquisition of objects (as in chapter 2), this chapter brings together the objectives and the hypotheses that have guided the present research. Moreover, the participants involved in the study, the data selection procedures as well as the data classification criteria are also dealt with in the subsequent sections.

3.1 Research Objectives and Hypotheses

Taking into account the previous theoretical and comparative accounts of DOs in the languages under consideration as well as previous empirical works on the analysis of the monolingual and bilingual acquisition of DOs, the present research is concerned with the interlinguistic influence in the domain of DO realization and aims at offering a characterization of DOs in the English and in the Chinese spontaneous production of C-E bilinguals.

As discussed in chapter 2 (c.f. section 2.2), interlinguistic influence may occur during the simultaneous acquisition of two languages (i.e. English and Chinese in this particular case). This influence can have three potential manifestations (Paradis and Genesee 1996): (i) facilitation/acceleration, (ii) delay and (iii) transfer. If facilitation occurs, C-E bilinguals may reach the adult grammar requirements in the domain of DOs faster than their monolingual counterparts in each (or in one) of their L1s. If delay occurs, it may take C-E bilinguals longer to reach the adult grammar in the domain of DOs compared to their monolingual peers. Finally, if

transfer occurs, C-E bilinguals may produce non-adult-like structures in the domain of DOs due to the influence of their other L1. Such structures will not be found in monolingual children's production.

Interlinguistic influence may occur due to the different typical maturational schedules of the bilinguals' two languages. In the domain of DOs, according to Müller and Hulk's (2001), Pérez-Leroux, Pirvulescu and Roberge's (2009) and Pirvulescu et al.'s (2014) proposals, all children start out with an all-purpose null object (c.f. chapter 2, subsection 2.2.2.3). In this case, being a [- null object] language, English is divergent from the default universal structure while Chinese is in line with it. As a result, E monolinguals have to experience the period of convergence towards the target structures while Chinese monolinguals do not have to experience such period. In the case of C-E bilinguals, there could be a delay in their Chinese as a result of influence from their English. Alternatively, as DO acquisition matures faster in Chinese, Chinese could influence English in C-E bilinguals. On the one hand, these two possible scenarios can be investigated through the comparison between the performance of C-E bilinguals and monolinguals of the respective L1s. On the other hand, it should be taken into account that, if different maturational schedules are detected in C-E bilinguals, it could be the result of interlinguistic influence or an effect of the so-called bilingual effect (Pirvulescu et al. 2014, c.f. chapter 2, subsection 2.2.2.3). The latter refers to the fact that ambiguous input in each language and reduced input in the two languages may make bilinguals different from monolinguals. To distinguish between the two possibilities (i.e. interlinguistic influence and bilingual effect), a comparison between the English of C-E bilinguals and that of both E monolinguals and S-E bilinguals will also be conducted.

Interlinguistic influence may also be the result of input ambiguity (Hulk and Müller 2000) (c.f. chapter 2, subsection 2.2.1). As discussed in chapter 1, both Chinese and English have overt and null DOs. However, the use of null DOs in English is highly restricted by the discourse context and is less common in the input than the use of overt DOs. The acquisition of English DOs is proved challenging even for monolingual children (c.f. chapter 2, subsection 2.1.1). By contrast, the use of null DOs in Chinese is much less restricted and it is at least, if not commoner than, as common as the use of overt DOs. In this case, interlinguistic influence in C-E bilinguals' production may occur from the L1 that contains no ambiguity (i.e. Chinese) into the L1 that contains it (i.e. English).

Interlinguistic influence may also have something to do with bilinguals' language dominance, which can be evaluated from two different perspectives, namely, the external view on language dominance and the internal view on language dominance, as discussed in chapter 2. On the one hand, according to the traditional view on language dominance proposed by Petersen (1988), Lanza (1993, 1997) and Paradis and Genesee (1996, 1997), among others, interlinguistic influence may occur due to the fact that bilinguals are more proficient in one of their L1s (i.e. the dominant L1) than the other (i.e. the non-dominant L1) (c.f. chapter 2, subsection 2.2.1.4). In this specific case in the present study, the influence may occur from the dominant L1 into the non-dominant L1 in C-E bilinguals. The bilinguals' external language dominance in the present study is mainly measured by comparing MLU values (a diagnostic internal to the linguistic system) and by taking into account the input conditions (i.e. the amount and the nature of input in the two L1s) as well as the children's language preference (diagnostics external to the linguistic system). On the other hand, based on the reinterpretation of dominance proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4),

interlinguistic influence may occur in a certain domain due to the bilinguals' preference for the language with the richer array of uninterpretable features in such domain. When it comes to the present study on C-E bilinguals' DO realization, as referred to in chapter 1 and shown in Table 39 below, both Chinese and English overt DOs can represent specific/ individuated and non-specific/ non-individuated referents. In other words, overt DOs in both English and Chinese are [+/- individuated]. However, while Chinese null DOs are [+/- individuated] as Chinese overt DOs, English null DOs are [-individuated].

Table 39. The Distribution of Overt and Null DOs in Chinese and English

Chinese	English
Overt DOs	
[+/- individuated]	[+/- individuated]
Null DOs	
[+/- individuated]	[- individuated]

From this analysis it can be predicted that C-E bilinguals' preference may be the Chinese DO realization system rather than the English one since the Chinese DO system provides more transparent and higher computational valued functional features. In this respect, the dominant language would always be Chinese (and, therefore, the source of influence), regardless of the amount of input bilinguals are exposed to in the two languages or any other similar factors.

What should be made clear is that the internal view on language dominance is not to be understood as referring to the overall knowledge of the language but only to the way features are configured in a specific structure, so that a C-E bilingual child may be "externally" E-dominant as defined by Petersen (1988), Lanza (1997) or Nicoladis and Genesee (1998), but still be "internally" C-dominant in his/her DO realization. Once the features of the two DO realization systems have been activated, the C-E bilingual child will select the one with the richer array of uninterpretable features (i.e. Chinese DOs) and this system will be the dominant one.

Besides, interlinguistic influence may be affected by verb type (Ingham 1993, Tomasello 2001, Tomasello and Brooks 1998, and Brooks 1999, c.f. chapter 2, subsection 2.1.1.3), which is related to children's conservativity to the input. In English, transitive verbs can be divided into pure transitive verbs and mixed verbs, while such division does not exist in Chinese as all Chinese transitive verbs can take both overt and null DOs. Therefore, such interlinguistic influence would only occur from Chinese into English and would mainly affect mixed verbs in that pure transitive verbs are expected to pose less problems than mixed verbs.

From the accounts above it is noted that for C-E bilinguals both their L1s may exercise interlinguistic influence on each other with respect to the production of null and overt DOs. Consequently, I will formulate and test the hypotheses in relation to both the English and the Chinese of these bilinguals. In each case, I will take into account both the nature and the directionality of interlinguistic influence, as presented above, in terms of the different manifestations of interlinguistic influence (i.e. acceleration, delay and transfer) as well as the different issues that can determine interlinguistic influence (i.e. maturational effects, input ambiguity, dominance and verb type).

3.1.1 Interlinguistic Influence from Chinese into English

The possible overproduction of null DOs in child bilingual English due to influence from the null DO characteristic in Chinese has been and continues to be investigated. To this date, though such interlinguitic influence has been reported in previous literature (Yip and Matthews 2005, c.f. chapter 2, subsection 2.2.2.2), there are still some unsolved questions concerning the issue, such as the role played by verb type and the possible effect of the simultaneous acquisition of two languages.

Thus, if there is interlinguistic influence from Chinese into English, I would like to formulate Hypothesis #1 as in (152).

(152) HYPOTHESIS #1.
DELAY: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH
(quantitative difference between bilinguals and monolinguals)
CHINESE ⟶ ENGLISH ⟵- - - - - - - - - - - - SPANISH

Overt DOs	**Overt DOs**	**Overt DOs**
(specific, individuated/ non-specific, non-individuated)	(specific, individuated/ non-specific, non-individuated)	(specific, individuated/ non-specific, non-individuated)
Null DOs	**Null DOs**	**Null DOs**
(specific, individuated/ non-specific, non-individuated)	(non-specific, non-individuated)	(non-specific, non-individuated)

According to this hypothesis, delay may occur in C-E bilinguals' English DO acquisition due to the influence of Chinese, since the realization of DOs in Chinese and English satisfies the conditions of Hulk and Müller's (2000) Interference Hypothesis and Hsin's (2012) STH (c.f. chapter 2, subsection 2.2.1) for delay, namely, (i) the realization of the DO is an issue which involves semantic, syntactic and pragmatic factors (c.f. chapter 1), and (ii) both Chinese and English have overt and null DOs but their distribution is constrained by different discourse conditions (i.e. discourse-pragmatic constraints in the two languages conflict) (c.f. chapter 2). This means that the English of C-E bilingual children would contain more null DOs, especially at the onset of bilingual acquisition, than the English of monolingual children, and that the null object period of C-E bilinguals would be longer than that of monolinguals. Such delay would not be expected in S-E bilinguals' English production because of the similar DO realization mechanism in the two languages.

However, if delay occurs in the DO acquisition of C-E bilinguals, apart from being the consequence of interlinguistic influence from Chinese, it could also be the result of the so-called

bilingual effect. In the latter case, the effect would manifest itself in the English of both C-E bilinguals and S-E bilinguals. That is, both C-E and S-E bilingual children would produce more English null DOs at the early stages of language acquisition and both groups of bilingual children may experience a longer null DO period when compared to their E monolingual peers.

Apart from delay, interlinguistic influence also includes other two manifestations, namely, acceleration and transfer. According to the theoretical accounts addressed in chapter 1 and the empirical studies concerning the issue in chapter 2, no acceleration would be expected in C-E bilinguals' English in the domain of DOs as Chinese is the superset language and English is the subset one. That is, Chinese provides two sets of options in terms of DO production regardless of the referentiality and individuality of referents of DOs, namely, the one with overt DOs and the one with null DOs. While English also provides the same two sets of options in this domain, the null option only applies to non-referential and non-individuated referents (c.f. chapter 1, sections 1.3 and 1.4).

In contrast, acceleration could occur in the S-E bilinguals' English in the domain of DOs as the DO realization mechanism in the Spanish and English overlap, which is in line with the condition for acceleration proposed by Hsin (2012) (c.f. chapter 2, subsection 2.2.1). If acceleration occurs in the S-E bilinguals' English, the S-E bilinguals would produce less non-adult-like null DOs than the E monolinguals.

Taking a look at Hsin's (2012) STH for transfer, the DO realization mechanism in Chinese and that in English do satisfy the required condition, namely, the existence of a conflicting parameter setting (c.f. chapter 2, subsection 2.2.1). Therefore, I would like to formulate Hypothesis #2 as in (153).

(153) HYPOTHESIS #2
TRANSFER: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH
(qualitative different between bilinguals and monolinguals)

CHINESE ——————→ **ENGLISH** ◄- - - - -✕- - - - - **SPANISH**

| [+ null object] | [- null object] | [- null object] |
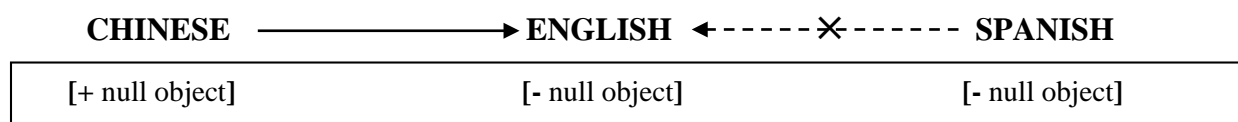
This hypothesis states that, since C-E bilinguals would produce null English DOs in a way that neither monolinguals nor adults are found to produce due to the influence from Chinese, such production would not be expected in S-E bilinguals' English data because English and Spanish have the same parameter setting in the domain of DOs. Acceleration may occur in S-E bilinguals' English in that the exceptional status of null DOs would be reinforced by Spanish, a condition which is in line with that in Hsin's (2012) proposal for facilitation (c.f. chapter 2, subsection 2.2.1).

In order to identify the role played by factors such as maturational schedule in each language, input ambiguity, language dominance and verb type that are considered to be related to interlinguistic influence and, in some cases, to determine the directionality of the influence (c.f. chapter 2), I would like to formulate the following four hypotheses.

(154) HYPOTHESIS #3
INTERFERENCE AND MATURATIONAL SCHEDULES: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ——————→ **ENGLISH**

| in line with default universal structure
earlier maturation | divergent from default universal structure
later maturation |
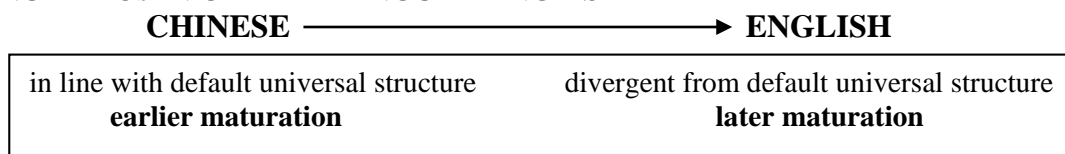
What this hypothesis states is that interlinguistic influence would occur from Chinese into English in C-E bilinguals (regardless of their dominant language) since Chinese is expected to mature earlier than English. This assumption is made based on the account that Chinese null DOs

are all-purpose, which is in line with children's initial default option, while English DOs are divergent from it (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, chapter 3, section 3.1); therefore, children do not have to experience the period of convergence in Chinese while they have to do so in English. As a result, the English of C-E bilinguals would contain more null DOs than that of E monolinguals. This directionality of influence would, consequently, lead to delay, as discussed above.

(155) HYPOTHESIS #4
INTERFERENCE AND INPUT AMBIGUITY TRIGGERED BY THE NATURE OF VERBS: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ⟶ ENGLISH

all transitive verbs (overt DOs/ null DOs)	pure transitive verbs (overt DOs)
	mixed verbs (overt DOs/ null DOs)
no ambiguity	**ambiguity**

All transitive verbs can take both overt and null DOs in Chinese. However, not all transitive verbs in English can take both overt and null DOs: pure transitive verbs can virtually only take overt DOs while mixed verbs in English can take both overt and null DOs. In other words, while all verbs behave the same in Chinese in the domain of DO, no all verbs behave the same in English. As a result, while there is no ambiguity in Chinese DO realization, ambiguity occurs in English in this respect. Therefore, what this hypothesis states is that interference from Chinese to English may be reinforced in C-E bilinguals (regardless of their dominant language) due to input ambiguity in English in that bilinguals will overextend the unambiguous system (i.e. that of Chinese).

Apart from the different maturational schedules of the two languages in bilinguals and input ambiguity, language dominance has also been considered a factor affecting interlinguistic influence (Paradis and Genesee 1996, Gawlitzek-Maiwald and Tracy 1996, Hulk and van der

Linden 1996, Dopke 1997, Yip and Matthews 2000, 2006, Liceras, Spradlin and Fernández

Fuertes (2005), and Liceras et al. (2008), among others, c.f. chapter 2, section 2.2). Therefore,

Hypothesis #5 is formulated, as in (156).

(156) HYPOTHESIS #5
INTERFERENCE AND LANGUAGE DOMINANCE
a. EXTERNAL VIEW ON LANGUAGE DOMINANCE
   CHINESE-DOMINANT C-E BILINGUALS
   INTERFERENCE: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ⟶	**ENGLISH**
dominant L1	non-dominant L1

   ENGLISH-DOMINANT C-E BILINGUALS
   NO/LESS INTERFERENCE: NO/LESS OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ⤏	**ENGLISH**
non-dominant L1	dominant L1

b. INTERNAL VIEW ON LANGUAGE DOMIANNCE
   INTERFERENCE: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ⟶	**ENGLISH**
OVERT DOs	OVERT DOs
[+/- individuated]	[+/- individuated]
NULL DOs	NULL DOs
[+/- individuated]	[- individuated]

This double hypothesis captures the two different views on language dominance: the

external view (Hypothesis #5a) and the internal view (Hypothesis #5b). Based on the traditional

view on language dominance (i.e. the external view) proposed by Petersen 1988, Lanza 1997,

and Nicoladis and Genesee 1998, among others (c.f. chapter 2, subsection 2.2.1.4), what

Hypothesis #5a refers to is that, if language dominance (i.e. the overall higher proficiency in one

of the L1 than in the other) is important, interlinguistic influence would occur from Chinese into

English in Chinese-dominant C-E bilinguals. Therefore, such bilinguals may overproduce null DOs in English in a way that is quantitatively and/or qualitatively different from monolinguals. On the other hand, English-dominant C-E bilinguals may not experience such influence or may be affected less by it. Thus, such bilinguals would produce DOs in a more comparable way to E monolinguals than Chinese-dominant C-E bilinguals since the influence from Chinese on English-dominant bilinguals is expected to be weaker.

However, based on the reinterpretation of language dominance (i.e. the internal view on language dominance) proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), what Hypothesis #5b refers to is that the C-E bilinguals' preference may be the Chinese DO realization system rather than the English one, regardless of their proficiency in the two L1s, since the Chinese DO system provides more transparent and higher computational valued functional features (c.f. chapter 3, section 3.1). In this case, C-E bilinguals (regardless of their "external" dominant language) would produce more non-adult-like null DOs when compared to the E monolinguals as Chinese will actually be guiding their English DO production, and no difference would appear between the E-dominant and the C-dominant C-E bilinguals. The actual effect of this (overproduction or not) would be part of Hypothesis #1.

What is more, some previous studies on DO realization in child language have suggested that verb type (i.e. whether the transitive verb is pure transitive or mixed) may play a role in children's null DO overproduction. Both monolingual and bilingual children overproduce null DOs and this is so and in a higher proportion with mixed verbs than with pure transitive verbs (c.f. chapter 2, subsections 2.1.1 and 2.2.2), since children are sensitive to the fact that some

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verbs (i.e. mixed verbs) can take null DOs. Therefore, I would like to formulate Hypothesis #6, as in (157).

(157) HYPOTHESIS #6
INTERFERENCE AND VERB TYPE: MORE OVERPRODUCTION OF NULL DOs WITH MIXED VERBS THAN WITH PURE TRANSITIVE VERBS

CHINESE ⟶ **ENGLISH** ◄ - - - - - ✳ - - - - - - **SPANISH**

All transitive verbs	**mixed verbs**	**mixed verbs**
(overt/null DOs)	(overt/null DOs)	(overt/null DOs)
	pure transitive verbs	**pure transitive verbs**
	(overt DOs)	(overt DOs)

What this hypothesis refers to is that mixed verbs would be more difficult to acquire since they do not always show the same pattern and are, therefore, less transparent than pure transitive verbs. This difference in terms of verb type in English would be seen across all groups of participants (bilinguals and monolinguals alike). However, a quantitative difference would appear between C-E bilinguals, on the one hand, and S-E bilinguals and E monolinguals, on the other, given the prominent nature of null DOs in Chinese: that is, C-E bilinguals would produce more null DOs with mixed verbs in English compared to their S-E bilingual and E monolingual peers (as suggested in Hypothesis #1).

In sum, I contemplate two main scenarios in the case of bilingual English: one where Chinese null DOs may cause **INTERFERENCE** and one where Chinese would have **NO INTERFERENCE** into English in the domain of DOs. In the following subsection, I will deal with the other potential directionality of influence (i.e. from English into Chinese).

3.1.2 Interlinguistic Influence from English into Chinese

In the case of bilingual Chinese, I will contemplate two main scenarios: one where English may cause **INTERFERENCE** into Chinese in the domain of DOs and one where overt DOs would have a **FACILITATION** effect into Chinese.

If interference occurs from English into Chinese, there will be two different demonstrations, as shown in Hypotheses #7 and #8 in (158) and (159).

(158) HYPOTHESIS #7
      DELAY: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL CHINESE

ENGLISH ⟶	**CHINESE**
Overt DOs (specific, individuated/ non-specific, non-individuated)	**Overt DOs** (specific, individuated/ non-specific, non-individuated)
Null DOs (non-specific, non-individuated)	**Null DOs** (specific, individuated/ (non-specific, non-individuated)

As seen in Hypothesis #7 in (158), delay may occur in C-E bilinguals' Chinese DO acquisition due to the influence of English, since the realization of DOs in Chinese and English satisfy the conditions of Hulk and Müller's (2000) Interference Hypothesis and Hsin's (2012) STH (c.f. chapter 2, subsection 2.2.1), as addressed in subsection 3.1.1. In this case, C-E bilinguals may produce more non-appropriate null DOs in Chinese, if compared to C monolinguals: that is, if compared to C monolinguals, bilinguals produce more null DOs whose referent cannot be recovered in discourse contexts due to the fact that they are not generic and their referents are not the topic in a TC.

The DO realization mechanism in Chinese and that in English also satisfy Hsin's (2012) STH for transfer, namely, a conflicting parameter setting (c.f. chapter 2, subsection 2.2.1), as addressed in subsection 3.1.1. Therefore, I would like to formulate Hypothesis #8 as in (159).

(159) HYPOTHESIS #8
TRANSFER: OVERPRODUCTION OF OVERT DOs IN CHILD BILINGUAL CHINESE
ENGLISH ⟶ CHINESE

[- null object]	[+ null object]

What this hypothesis states is that, if English overt DOs are transferred into Chinese, it can be assumed that C-E bilingual children would produce more overt DOs when compared to their C monolingual counterparts. This difference should be quantitative and not qualitative since Chinese null DO constructions are structurally assimilated to topicalization in English, but with phonetically null topic(s) instead of overt ones due to its TC properties (Huang 1982, 1984, c.f. chapter 1, subsection 1.3.2, examples in (25)). Thus, transfer will only affect the quantity of overt DOs.

However, as discussed previously in the present subsection, in the domain of DOs, Chinese is the superset language and English is the subset one. That is, Chinese and English provide the same two sets of options in terms of DO production but with different referential and individual value, Chinese being the more inclusive one and English the more exclusive one (c.f. chapter 1, sections 1.3 and 1.4; chapter 3, section 3.1), as shown in Table 32. On the one hand, in the traditional view on the Subset Principle (Berwick 1985, Atkinson 1992), the subset option (i.e. overt DOs) is normally considered the unmarked option. However, in this specific case, within the two options which are available in Chinese, null DOs are considered to be less marked than overt DOs. This means that influence from English leading to a preference for overt DOs

should not be strong because the unmarked option (i.e. null DOs) will have more weight. On the

other hand, the fact that English also provides the null DO option may reinforce the null value of

Chinese null DOs. Based on this analysis, Hypothesis #9 is formulated as in (160).

(160) HYPOTHESIS #9
    NO INTERFERENCE/FACILITATION: NO OVERPRODUCTION OF OVERT OR
    NULL DOs IN CHILD BILINGUAL CHINESE

      ENGLISH `---------✗----------▶` **CHINESE**

subset	superset
overt DOs (unmarked)	overt DOs (unmarked by definition)
null DOs (marked)	null DOs (marked by definition but *unmarked d*ue to the nature of null DOs in Chinese)

What this hypothesis states is that cross-linguistic influence should not favor the

reinforcement of the marked option (i.e. overt DOs) in Chinese in the C-E bilinguals' Chinese

output because the unmarked option (i.e. null DOs in this particular case) have more weight.

In order to further identify the role played by other factors that are considered to be

related to interlinguistic influence (i.e. maturational schedule in each language, input ambiguity,

language dominance) (c.f. chapter 2), I would like to formulate the following three hypotheses.

(161) HYPOTHESIS #10
    INTERFERENCE AND MATURATIONAL SCHEDULES: NO INTERFERENCE IN
    CHILD BILINGUAL CHINESE IN THE DOMAIN OF DOs.

      ENGLISH `---------✗----------▶` **CHINESE**

divergent from default universal structure	in line with default universal structure
later maturation	**earlier maturation**

What this hypothesis states is that interference would not be expected to occur from

English into Chinese in C-E bilinguals (regardless of their dominant language) since Chinese is

expected to mature earlier than English in the domain of DOs. Therefore, C-E bilinguals'

performance would be comparable to that of C monolinguals. Potentially, it could also be the

case that English later maturation could slow down the earlier maturation in Chinese but this

would rather be attributed to dominance, as a latter (Hypothesis #12) suggests, and, in particular,

to English dominance.

(162) HYPOTHESIS #11
     INTERFERENCE AND INPUT AMBIGUITY: NO INTERFERENCE IN CHILD
     BILINGUAL CHINESE IN THE DOMAIN OF DOs

ENGLISH ----------✕----------▶ **CHINESE**

| pure transitive verbs (overt DOs)
mixed verbs (overt DOs/ null DOs)
ambiguity | all transitive verbs (overt DOs/ null DOs)
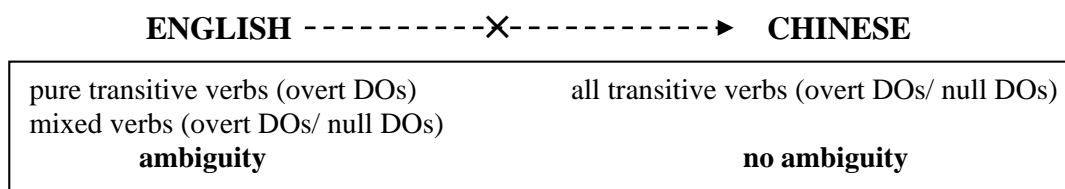
no ambiguity |

What this hypothesis states is that interference from English into Chinese would not be

expected since there is no ambiguity in the DO realization in Chinese (all transitive verbs can

take both overt and null DOs) while in English pure transitive verbs can only take overt DOs and

only mixed verbs can take both overt and null DOs, and therefore, it could count as ambiguous

input for children. Consequently, C-E bilinguals' performance would be comparable to that of C

monolinguals.

In terms of language dominance, Hypothesis #12 is formulated as in (163).

(163) HYPOTHESIS #12
     INTERFERENCE AND LANGUAGE DOMINANCE:
     a. EXTERNAL VIEW ON LANGUAGE DOMINANCE
         CHINESE-DOMINANT C-E BILINGUALS
         WEAK/NO INTERFERENCE: NO SIGNIFICANT OVERPRODUCTION OF
         OVERT DOs IN CHILD BILINGUAL CHINESE

ENGLISH--------------------▶**CHINESE**

| non-dominant L1 | dominant L1 |

ENGLISH-DOMINANT C-E BILINGUALS
INTERFERENCE: OVERPRODUCTION OF OVERT DOs IN CHILD BILINGUAL CHINESE

ENGLISH ⟶ **CHINESE**

dominant L1	non-dominant L1
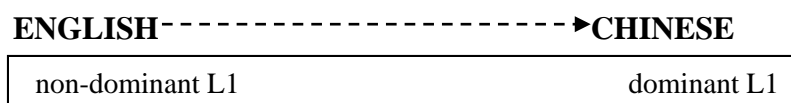
b. INTERNAL VIEW ON LANGUAGE DOMIANNCE

ENGLISH --------✕--------▶ **CHINESE**

OVERT DOs	**OVERT DOs**
[+/- individuated]	[+/- individuated]
NULL DOs	**NULL DOs**
[- individuated]	[+/- individuated]
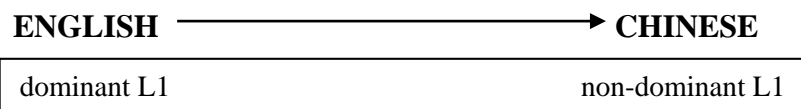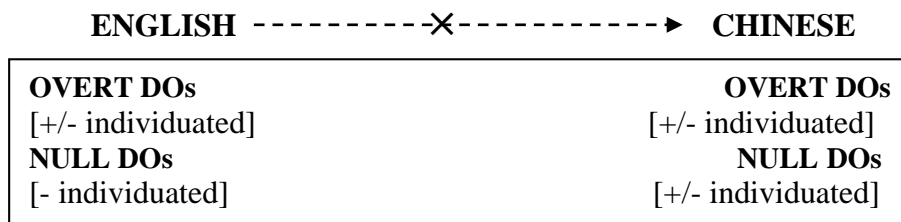
This double hypothesis captures the two different views on language dominance: the external view (Hypothesis #12a) and the internal view (Hypothesis #12b). Based on the traditional view on language dominance (i.e. the external view) proposed by Petersen 1988, Lanza 1997, and Nicoladis and Genesee 1998, among others (c.f. chapter 2, subsection 2.2.1.4), what Hypothesis #12a refers to is that, if the external language dominance is important, no strong interference would be expected to occur from English into Chinese in Chinese-dominant C-E bilinguals. In contrast, English-dominant C-E bilinguals may overproduce overt Chinese DOs due to the influence from English.

On the other hand, however, based on the reinterpretation of language dominance (i.e. the internal view on language dominance) proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), what Hypothesis #12b refers to is that the C-E bilinguals' preference may be the Chinese DO realization system rather than the English regardless of their proficiency in the two L1s since the Chinese DO system provides more transparent and higher computational valued functional features (c.f. chapter 3, section

3.1). In this case, no interference from English into Chinese would be expected, and the performances of Chinese-dominant and English-dominant C-E bilinguals would be comparable.

Given the objective and hypotheses above, the outcomes of the present study will shed light on the following two main issues: (i) the acquisition of two languages from birth as in the Interdependent Development Hypothesis (Cummins 1979, 1991, Bernhardt and Kamil 1995, Van Gelderen et al. 2004, among others); that is, it will provide new evidence for the proposal that bilingual children have, from the onset of acquisition, two separated language systems which interact with each other along language development; and (ii) the nature of interlinguistic influence between the two languages of the bilinguals (Müller 1998, among others); to be specific, the study will provide empirical evidence for the three potential manifestations of interlinguistic influence and for other factors that affect the nature and directionality of influence.

3.2 Participants

The data used in the present study are taken from different corpora in CHILDES (Child Language Data Exchange System) (MacWhinney 2000). None of the participants in the corpora selected has been reported to have any hearing or language impairment. The target group is a set of five C-E bilingual children in Hong Kong (Yip-Matthews corpus). In order to address the issues presented in the objective section (c.f. section 3.1), three more groups of participants have been selected: two S-E bilinguals in Salamanca, Spain (FerFuLice corpus), three E monolinguals in the United States (Sachs corpus, Bloom 70 corpus, Demetras Trevor corpus), and three Chinese monolinguals (LeeWongLeung corpus). In total the production of thirteen participants is investigated in the two target languages: English and Chinese. The informants involved in the study of the English production are the five C-E bilinguals, the two S-E bilinguals and the three

E monolinguals. The five C-E bilinguals and the three Chinese monolinguals are involved in the study of the Chinese production. Table 40 provides a summary of the participants' profiles.

Table 40. Participants' Profiles in the Present Study

Corpus	Participant	Language(s)	Language(s) studied
Yip-Matthews	Timmy	Chinese-English	Bilingual Chinese Bilingual English
	Sophie		
	Alicia		
	Llywelyn		
	Charlotte		
FerFuLice	Leo	Spanish-English	Bilingual English
	Simon		
Sachs	Naomi	English	Monolingual English
Bloom 70	Peter		
Demetras Trevor	Trevor		
LeeWongLeung	Chunyat	Chinese	Monolingual Chinese
	Gakei		
	Kingtsun		

More information about each of these participants appears below and in all cases it has been taken from the details provided by the researchers themselves as it appears in the manuals section in CHILDES.

The C-E bilingual participants in the present study (Timmy, Sophie, Alicia, Llywelyn, and Charlotte) were born in Hong Kong to families in which their respective fathers are native British English speakers and their respective mothers, native Chinese speakers. All the fathers are university professors. All participants' exposure to Chinese and English began from birth. Their parents followed the one parent-one language principle when addressing the children. The language of the community is Chinese. At early ages, all the five participants were cared for by Filipino domestic helpers who spoke fluent English and some Chinese.

Timmy, Sophie and Alicia are three siblings whose parents are both professors of linguistics at different universities in Hong Kong. Timmy is the first-born of the three siblings,

born in May, 1993. Sophie, his first sister, was born when he was 2;09 and Alicia, his second sister, was born when he was 7;00. The language spoken between the parents was mainly Chinese with a great deal of English mixed in though they applied the one parent-one language principle when they addressed the children. The quantity of input from the two languages was not balanced. Apart from the language of the community being Chinese, the extended family (maternal grandmother and relatives) also spoke Chinese. In Timmy's case, his father took a sabbatical leave in the USA when he was three months old, during which time English tapes were played to the child. The primary caretakers in this period were Timmy's maternal grandmother, his mother and a Chinese-speaking domestic helper. His parents took him to Los Angeles from 0;07 to 1;00. He then spent the summer of 1994 in Canada, the UK and briefly in France. By the time regular audio recordings started, live-in Filipino domestic helpers were employed by the family. A trip to Australia was made at 3;01 and Timmy visited his paternal relatives in England for three weeks at 3;02. On the whole, Timmy had more Chinese than English input in his first three years. Apart from the regular English input from his father and the domestic helper, the child's additional contact with English was provided by occasional visits by English-speaking relatives. In a number of recording sessions, Timmy showed a preference for using Chinese even when the research assistants tried to induce him to speak in English.

Timmy's first younger sister Sophie lived in Hong Kong continuously throughout the period of recording. Her caretakers were her maternal grandmother who spoke Chinese and a Filipino domestic helper. Apart from parental input, interaction with her brother took place in both Chinese and English. She started attending a local Chinese kindergarten at 2;06 in the morning and, in addition, an English-speaking kindergarten in the afternoon from 3;02. She continued to attend both schools until 5;01. The kindergartens were each monolingual in the

respective language. Being cared for primarily by her grandmother and staying in Hong Kong exclusively during her preschool years means that the predominance of Chinese input in Sophie's case was even greater that in Timmy's.

In the case of Alicia, the youngest sister in the family, apart from parental input, interaction with her brother and sister took place in both Chinese and English. While there was the possibility of non-target English input from the siblings, by this time they were both attending an English primary school and speaking increasingly standard British English. Alicia began attending a local Chinese kindergarten in the morning at 2;03, and an English-speaking kindergarten in the afternoon from 3;03. The kindergartens were each monolingual in the respective language, apart from basic English lessons at the Chinese kindergarten. As with Timmy and Sophie, Alicia's input in the two languages was unbalanced since she was exposed to a higher amount of input in Chinese.

Llywelyn is the younger child of the two children in the family. His mother is an accountant. Due to professional reasons, the father was on frequent conference trips and was occasionally absent from home during the child's early years, which includes six months' sabbatical leave in Australia when the child was 1;06 to 2;01, one absence of a month when the child was 2;01 and of a week when the child was 2;06. So in terms of the amount of exposure to the two languages, Llywelyn was more exposed to Chinese, the native language of his mother.

Charlotte is the younger sister of the two children in the family. Her elder sister Claire is two years and nine months older. Charlotte's mother is a teacher. The child was born in New Zealand when her father was on sabbatical leave. At 0;04, the child moved to Hong Kong and was cared for by a Filipino domestic helper. Charlotte is the only participant who could be considered English-dominant among the five participants during the investigation period. This

judgment is made based on her MLU values in both languages and the fact that she was often reluctant to speak Chinese during the recordings.

The S-E bilinguals, Leo and Simon, are identical twins born into a middle-class family in Salamanca, Spain. This means that the twins' English-Spanish 2L1 acquisition occurred in a monolingual-Spanish social context. Their father is a native speaker of Peninsular Spanish and their mother, a native speaker of American English. The parents also followed the one parent-one language principle when addressing the children. The parents generally communicated in Spanish with each other except on summers when they travelled to the United States for approximately two months or when a monolingual English speaker was present. The mother was the primary caretaker during the first year since the children were born. The father was present all day on weekends and less on workdays. At the age of 1;10, the twins started to go to day care for three hours per day on weekdays where the language used by the staff and by other children was Spanish. Apart from the mother, additional contact with English was provided by occasional visits by the maternal grandparents and during the two-month visits to the United States each summer.

All the three E monolingual participants, Naomi, Peter and Trevor, were born and raised in monolingual English families in the United States. Naomi's mother is a university professor and also the investigator who compiled the corpus. Peter is an upper-middle class white child with college-educated parents. He was a first-born child living in a university community in New York City. Trevor's parents are both university professors in Arizona who were the ones who compiled the corpus.

The three Chinese monolingual children are Chunyat, Gakei and Kingtsun. Chunyat is the only son in the family. He was born in Hong Kong and his family spoke Chinese. His father is a

merchant and his mother teaches English in a secondary school. The family lived with the child's maternal grandparents. The child had not started going to nursery during the period of data collection. Despite the fact that the child's mother is not Chinese monolingual but an L2 English speaker, the parents always addressed the child in Chinese.

Gakei was raised in a monolingual Chinese-speaking working class family. Her father is a technician in an electronic company and her mother, a housewife. The family lived with the child's grandmother. Gakei's parents were both born in Hong Kong. The child was not yet enrolled in a nursery during the whole period of data collection and was taken cared of entirely by her mother.

Kingtsun was the only son of a Chinese-speaking family in Hong Kong. His father is a Census and Survey Officer working in the government and his mother, a secondary school teacher teaching Chinese and Religious Studies. Since his birth, the child has been living in his maternal grandparents' house during weekdays and was taken care of by his grandmother. His parents visited him occasionally during the weekday evenings and took him back home on Friday nights to stay over the weekend. The family communicated in Chinese though the mother is not Chinese monolingual but an L2 English speaker. The child started attending a nursery at 2;01.

3.3 Data Selection

All the recordings of the thirteen participants presented above involved interactions between the children, the investigators and the family members and were made in naturalistic settings, usually at home, and thus recorded spontaneous production data. The children were mostly engaged in normal play activities with the interlocutor(s). All the corpora are transcribed

following the CHAT conventions. The data are transcribed orthographically except for some
child forms for which a broad phonetic transcription is provided together with the corresponding
adult target. A summary of the data selection in each corpus for each child appears in Table 41.

Table 41. Summary of the Data Selected

Participant	Language	Age range available	Age range selected	MLU	No. of utterances
Timmy	English	2;00-3;06	2;00-2;11	2.3-4.0	4305
	Chinese		2;01-3;00	3.0-4.1	6581
Sophie	English	1;06-3;00	2;01-3;00	1.6-3.0	4650
	Chinese		2;01-3;00	2.4-3.4	7568
Alicia	English	1;03-3;00	2;01-3;00	1.6-2.5	2358
	Chinese		2;01-3;00	2.4-3.8	3835
Llywelyn	English	2;00-3;04	2;01-3;00	1.7-3.5	3182
	Chinese		2;01-3;00	1.8-3.4	3404
Charlotte	English	1;08-3;00	2;00-2;10	2.2-3.3	3135
	Chinese		2;00-2;10	1.7-3.1	1454
Leo	English	1;01-6;11	2;05-3;04	1.5-4.1	3782
Simon		1;01-6;11	2;05-3;04	1.5-4.1	3864
Naomi		1;02-4;09	1;10-2;09	2.1-3.6	9995
Peter		1;09-3;01	1;10-2;09	1.9-4.2	18187
Trevor		2;00-3;11	2;00-2;11	2.5-3.7	4250
Chunyat	Chinese	1;11-2;09	1;11-2;09	1.7-2.8	9256
Gakei		1;11-2;08	1;11-2;08	2.1-3.7	4837
Kingtsun		1;10-2;07	1;10-2;07	1.6-2.6	10522

Using the corpora in Table 40, the present study deals with a selection of each of these
corpora, as it appears in Table 41. The selection is made based on the following two criteria so
that, given the data available, comparisons across children and across languages could be done:
(i) spontaneous data from a period of (approximately) one year is selected for each child in order
to have enough data to reflect the child's development into the adult grammar; and (ii) given that
there appears to be a turning point in development at the age of 2;03 when the child's MLU
value reaches approximately 2.4 (Rispoli 1992), the selected age range is from 2;00 to 3;00 with
small fluctuations and taking into account the individual child's MLU values. Additionally, since

Chinese and English are the languages under analysis, only Chinese data and English data are analyzed, which means that, in the case of the S-E bilingual children, only their English data are included in the study.

3.4 Data Classification Criteria

The present section deals with the criteria that have guided the classification of the data involved in the present study. Subsection 3.4.1 addresses the classification of DOs while subsection 3.4.2 deals with the criteria used to divide the data in developmental stages.

3.4.1 Classification Criteria: DO Production

The investigation of DO realization in child language is carried out in environments where the adult grammar may accept or sanction the form of the DOs (i.e. overt or null). Therefore, all the transitive verbs (including simple verbs and phrasal verbs) produced by the participants in the accredited utterances are considered, regardless of their nature (i.e. overt or null) and of their adherence to the adult norm (i.e. adult-like or non-adult-like).

As discussed in chapter 1, syntactic transitivity is a notion with clear boundaries: if a verb (whether simple or phrasal) is transitive, it must have at least one DO, as in (164).

(164) a. I keep the ball.
       b. I pick up the ball.

Conversely, if a verb is intransitive, it must have no DO(s), as in (165a). For this reason, passive and ergative constructions, as in (165b) and (165c), are not considered in the present study since there is no DO after the verbs in such constructions.

(165) a. I run.
         b. The problem was solved.
         c. The vase broke.

Therefore, and following the description of DOs in chapter 1, the different transitive constructions are classified following the criteria below for each of the two languages. These criteria classify transitive constructions at two different levels: the first group of criteria takes into consideration the entire transitive construction and the nature of the DOs in this transitive context; while the second group of criteria classify the status of the DO as such. This is in line with the account on transitive constructions offered in chapter 1 and it, therefore, captures the complex nature of transitive constructions and how it interacts with the nature of DOs.

In the case of English, the nature of the DOs of the different transitive constructions produced by the children are then divided into four categories and codified accordingly: (i) adult-like overt DOs, (ii) adult-like null DOs, (iii) non-adult-like overt DOs, and (iv) non-adult-like null DOs.

English adult-like overt DOs appear when children produce overt DOs that are obligatorily overt according to the adult grammar, as in (166a). Given that English is a [-null object] language, this category involves the highest percentage of DO cases in an adult grammar. Adult-like null DOs are those that are licensed according to the adult grammar (i.e. when the referent is generic and non-individuated, as discussed in chapter 1), as in (166b). Non-adult-like overt DOs appear when children produce overt DOs in discourse contexts where null DOs should be used according to adult grammar (i.e. when the referent is generic and non-individuated), as in (166c). Non-adult-like null DOs are those null DOs in discourse contexts where overt DOs should appear according to adult grammar (i.e. when the DO is referential), as in (166d).

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(166)   a. I like *it*.
      b. I'm going to eat *e*.
      c. A: Do you want to eat?
         B: *I don't want to eat *it*.
      d. A: Do you like this picture?
         B: *I don't like *e*.

DOs are then classified regarding their status as overt or null. In terms of overt DOs, there are two types, namely, adult-like, as in (166a), and non-adult-like, as in (166c). Additionally, the form of DOs is also considered and so overt DOs can adopt the form of a DP, as in (167a), a pronoun, as in (167b), or a CP either finite, as in (167c), or non-finite, as in (167d), (167e) and (167f). Transitive verbs that take a null DO are, therefore, only classified in terms of whether the null DO is adult-like (166b) or non-adult-like (166d).

(167)   a. I want **the book**.
      b. I want **it**.
      c. I want **that you give me the book**.
      d. I want **to go**.
      e. I wait **for you to come**.
      f. He stops **asking questions**.

Since the aim of the data classification is to codify the nature and the status of DOs produced by the participants (i.e. adult-like *versus* non- adult-like; overt *versus* null), some non-standard forms are disregarded and the classification is made in terms of the DO. These non-standard forms include infinitive marker *to* omission, as in (168a), article/determiner omission, as in (168b), gerund marker omission, as in (168c), preposition *for* omission, as in (168d), finite CP marker (*that* and *wh*-words) omission, as in (168e), disagreement between the referent and its pronoun(s) in terms of number, as in (168f), case, as in (168g), or gender, as in (168h)[15].

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[15] These omission and commission errors are characteristic of child grammars and have been well documented in both L1 and 2L1 acquisition studies (e.g. *to*-omission: Roberts 1997, Norris 2000; article/determiner-

(168) a. I don't want *go to school*.   (c.f. I don't want **to go to school**.)
      b. I have *apple*.   (c.f. I have **an apple**)
      c. I like *cook*.   (c.f. I like **cooking**)
      d. I wait *him to explain*.   (c.f. I wait **for him to explain**)
      e. I heard *you heard*.   (c.f. I heard **what you heard**.)
      f. A: Do you want the apples?
         B: I don't want *it*.   (c.f. I don't want **them**.)
      g. I don't want to see *he*.   (c.f. I don't want to see **him**.)
      h. A: Do you want to see mom?
         B: I don't want to see *him*.   (c.f. I don't want to see **her**.)

Similar categories have been used to classify the Chinese data in terms of the grammaticality of the DO nature, although the outcome is different: given that Chinese is a [+ null object] language, most DO cases would fit in the null category. However, an overt option is always grammatically correct (i.e. adult-like) and thus no ungrammatical (non-adult-like) overt DOs will be found. Therefore, such category (i.e. non-adult-like overt DO) is absent and the DOs in the children's Chinese transcripts are divided into the following three categories: (i) adult-like overt DOs, (ii) adult-like null DOs, and (iii) non-adult-like null DOs.

Chinese adult-like overt DOs are those produced under discourse conditions where they are necessary, as in (169a), and these involve mainly the following two: when the use of null DOs may cause miscommunication or when emphasis is being used. Adult-like null DOs are those produced under discourse conditions where their respective referents are spelt out and there is no need for emphasis and no miscommunication can happen, as in (169b). Finally, non-adult-like null DOs are those produced under discourse conditions where their respective referents cannot be recovered and thus cause miscommunication, as in (169c).

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omission: Chierchia, Guasti, and Gualmini 1999, Lleó and Demuth 1999, Guasti et al. 2004; *wh*-omission: Roberge and Nelleke 2014, among many others).

(169) a. A: nei5 jiu3 mat1je5 aa3?
        You   want what
        "What do you want?"
    B: ngo5 jiu3 **ngau4naai5**.
        I   want milk
        "I want milk."

  b. A: nei5 zung1 m4 zung1ji3 ping4gwo2 aa3?
        You   like   not like   apples
      "Do you like apples?"
    B: ngo5 zung1ji3 *e*.
        I   like
        "I like them."

  c. [Without previous context and without adopting any non-linguistic strategies.]
    *ngo5 jiu3 *e*.
      I   want
      "I want it."

However, the grammaticality of the overt DOs in Chinese does not guarantee their appropriateness. According to Tsao (1979), the Chinese language has the rule of Topic DP Deletion (c.f. chapter 1, subsection 1.3.2) which operates across discourse to phonetically delete the topic of a sentence under identity with the discourse topic. Consequently, overt DOs that are produced under discourse conditions which violate such rule where they sound redundant are considered inadequate, as in (170b). In these discourse contexts, null DOs will be preferred in an adult-to-adult conversation setting instead. Overt DOs that do not violated such rule are considered adequate (170a).

(170) a. A: nei5 jiu3 mat1je5 aa3?
        You   want what
        "What do you want?"
    B: ngo5 jiu3 **ngau4naai5**.
        I   want milk
        "I want milk."

  b. A: nei5 zung1 m4 zung1ji3 ping4gwo2 aa3?
        You   like   not like   apples
      "Do you like apples?"
    B: *ngo5 zung1ji3 **ping4gwo2**.
        I   like   apples
        "I like apples."

As in the case of the English data, the form of DOs is also considered and so overt DOs can adopt the form of a DP, as in (171a), a pronoun, as in (171b), a VP, as in (171c), or a CP, as in (171d). Transitive verbs that take a null DO are, therefore, only classified in terms of whether the null DO is adult-like (169b) or non-adult-like (169c).

> (171) a. Ngo5 jiu1 *syu1*.
>   I   want book
>   "I want the book."
>   b. Ngo5 jiu1 *ne1go3*.
>   I   want this
>   "I want this."
>   c. Ngo5 zung1ji3 sik6 zyu1gu1lik1.
>   I   like   eat   chocolate
>   "I like eating chocolate."
>   d. Ngo5 jiu1 *nei5 bei2 ngo5 go3bun2 syu1*.
>   I   want you give   me   that   book
>   "I want the book that you gave me."

As in the codification of the English data, some non-standard forms such as determiner omission and disagreement in number between the referent and its pronoun(s) are disregarded as such and the DO is classified following the criteria explained above[16].

In order to provide the most conservative analysis, some utterances are excluded from the count and, therefore, from the subsequent analysis in both languages. These include different types, as the English examples in (172) illustrate.

> (172) a. FAT: that one's red.   (Alicia 2;02)
>   CHI: this one red.
>   b. CHI: xxx (.) Timmy has [?]   (Alicia 2;02)
>   c. SIM: the other +/.   (Simon 3;03)
>   d. LEO: [^ singing] take him away take him away take him away +....
>   (Leo 3;02)

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[16] In Chinese, verbs do not change in form (i.e. infinitive marker, gerund marker, and tense marker, etc. do not exist). Chinese pronouns do not take any case markers (c.f. chapter 1, subsection 1.3.2). There is no CP marker, either. Therefore, as opposed to English, the non-standard forms for Chinese do not include these issues.

      e. CHI: <I get a witch to> [/] I get a witch to come here.   (Timmy 2;09)
      f. CHI: I sip.   (Naomi 2;01)
        CHI: I sip.
      g. CHI: not &g is for giraffe. It's only for giraffe.   (Timmy 2;11)

Imitations of one of the previous five utterances of the interlocutor(s), as in (172a), are not considered; neither are partially unintelligible utterances, as in (172b), incomplete utterances, as in (172c), and routines such as counting, songs and nursery rhymes, as in (172d). In the case of immediate self-repetitions within a single utterance, as in (172e), and self-repetitions of the same sentence over a sequence of utterances, as in (172f), only one occurrence is counted. In the case of self-repetition with self-correction within a single utterance, as in (172g), the one that is counted is always the last instance.

3.4.2 Classification Criteria: Developmental Stages

The selected data, as shown in Table 41 (c.f. section 3.3), are divided into three different developmental stages based on the children's MLU values in each language. This MLU matching is preferred to matching done on the bases of chronological age because it reflects children's language abilities in a more accurate way when compared with the chronological age matching (Brown 1973, c.f. chapter 2, subsection 2.1.1). In fact, language development may vary from child to child even if they are within the same (or similar) chronological age. When considering bilinguals and, in particular, when comparing bilinguals and monolinguals in the early stages of acquisition, as the present study aims at, age-match may be problematic. Some studies have, in fact, suggested that bilinguals may have a slight initial delay in language milestones when compared to monolinguals, a delay that is soon overcome (Kehoe 2002, Kehoe, Lleó and Rakow 2004, Bosch and Sebastián-Gallés 2003, Sundara, Polka, and Genesee 2006,

among others). So MLU-match comparisons across participants and, in particular between bilinguals and monolinguals, can ensure that the participants are compared when they are at the same linguistic age.

The three developmental stages are established following Rispoli's (1992) proposal that the MLU value of 2.4 at approximately the age of 2;03 appears to be a turning point in the acquisition of DO. Therefore, the first developmental stage (Stage I) is when the child produces utterances with MLU values below 2.4; the second developmental stage (Stage II) is when the child produces utterances with MLU values between 2.4 and 3.5; and the third developmental stage (Stage III) is when the child produces utterances with MLU values higher than 3.5.

Taking into account that children's MLU may fluctuate along language development from one recording to the next, once the child's MLU values reach the threshold of the next developmental stage, his/her subsequent data will be classified into that developmental stage though his/her MLU value in some of the subsequent sessions may be lower than the threshold. Table 42 shows the results of the classification of the English data and the corresponding MLU range and chronological age range.

Table 42. Stages, MLU and Age of the Participants in English

Developmental stage	Participant	MLU range	Age range
Stage I (MLU <2.4)	Llywelyn	1.7	2;01
	Sophie	1.6-2.1	2;01-2;04
	Alicia	1.6-2.3	2;01-2;08
	Charlotte	2.2	2;00
	Leo	1.5-2.2	2;05-2;07
	Simon	1.5-2.2	2;05-2;08
	Naomi	2.1	1;10
	Peter	1.9	1;10-1;11
Stage II (2.4≤MLU≤3.5)	Timmy	2.3-3.4	2;00-2;08
	Llywelyn	2.2-3.5	2;02-3;00
	Sophie	2.1-3.0	2;05-3;00
	Alicia	2.1-2.5	2;09-3;00
	Charlotte	2.1-3.3	2;01-2;10
	Leo	2.5-2.6	2;08-2;11
	Simon	2.6-3.5	2;09-3;00
	Naomi	2.3-3.5	1;11-2;08
	Peter	2.5-3.4	2;00-2;01
	Trevor	2.5-3.4	2;00-2;07
Stage III (MLU >3.5)	Timmy	3.5-4.0	2;09-2;11
	Leo	3.2-4.6	3;00-3;04
	Simon	3.9-4.8	3;01-3;04
	Naomi	3.6	2;09
	Peter	2.9-4.2	2;02-2;09
	Trevor	3.6-3.7	2;08-2;11

By comparing MLU and age ranges in Table 42 it can be noticed that E monolingual children's English development is slightly ahead overall when compared with their bilingual peers. This is seen in that the monolinguals reach the bilinguals' MLU values at a younger age if compared to the bilinguals. Among the C-E bilingual participants, the language development of Timmy, Llywelyn and Charlotte is a bit more advanced than Sophie and Alicia, while Alicia develops at a relatively slower pace with MLU values ranging from 1.6-2.5 at the ages between 2;01 to 3;00. Moreover, there appears to be a noticeable delay in the acquisition of English in the S-E bilingual twins during the onset stage as they reach similar MLU values to those of the other bilinguals but some months later.

In terms of the Chinese data, the results of the classification are shown in Table 43.

Table 43. Stages, MLU and Age of the Participants in Chinese

Developmental stage	Participant	MLU range	Age range
Stage I (MLU <2.4)	Llywelyn	1.8-2.1	2;01-2;03
	Charlotte	1.7-2.3	2;00-2;02
	Chunyat	1.7-2.2	1;11-2;04
	Gakei	2.1	1;11
	Kingtsun	1.6-2.2	1;10-2;05
Stage II (2.4≤MLU≤3.5)	Timmy	3.0-3.4	2;01-2;03
	Sophie	2.4-3.4	2;01-3;00
	Alicia	2.4-2.9	2;01-2;05
	Llywelyn	2.4-3.4	2;04-3;00
	Charlotte	1.9-3.1	2;03-2;10
	Chunyat	2.3-2.8	2;05-2;09
	Gakei	2.4-3.3	2;00-2;03
	Kingtsun	2.4-2.6	2;06-2;07
Stage III (MLU >3.5)	Timmy	3.2-4.1	2;04-3;00
	Alicia	2.8-3.8	2;06-3;00
	Gakei	3.2-3.7	2;04-2;08

Table 43 shows that the acquisition of Chinese of Sophie, Llywelyn and Charlotte develops at a similar pace; that of Timmy and Gakei is a bit ahead when compared with other participants; that of Chunyat is slightly delayed. The bilingual children do not show any noticeable delay in their language acquisition when compared to their monolingual counterparts, not even in the case of Charlotte for whom Chinese is reported to be the non-dominant L1.

3.5 Summary: Main Methodological Facts

Chapter 3 has been devoted to the description of the methodology that has been adopted in the present study. To be more specific, the present chapter has been concerned with (i) the research objectives and hypotheses, (ii) the participants' profile, (iii) the data selection process, and (iv) the criteria for data classification.

With regards to the research objectives, as mentioned in section 3.1, the present study aims at providing new evidence for the Interdependent Development Hypothesis (Cummins 1979, 1991, Bernhardt and Kamil 1995, Van Gelderen et al. 2004, among others) which suggests bilingual children have, from the onset of acquisition, two separated language systems which interact with each other along language development. The present study also attempts to explore the nature of interlinguistic influence between the bilinguals' two L1s by providing empirical evidence for the three potential manifestations of interlinguistic influence (Paradis and Genesee 1996), namely, (i) facilitation/acceleration, (ii) delay and (iii) transfer, as well as for other factors that may take effect in the nature and directionality of influence.

In order to achieve the two objectives, twelve hypotheses have been formulated, six of which deal with interlinguistic influence from Chinese into English (c.f. subsection 3.1.1) and the other six with interlinguistic influence from English into Chinese (c.f. subsection 3.1.2). In terms of interlinguistic influence from Chinese into English, two scenarios have been contemplated: one where Chinese null DO properties may cause interference and one where Chinese would have no interference into English in the domain of DOs. In terms of interlinguistic influence from English into Chinese, another two scenarios have been contemplated: one where English may cause interference into Chinese in the domain of DOs and one where overt DOs would have a facilitation effect into Chinese. Moreover, factors that may contribute to the nature and the directionality of interlinguistic influence such as maturational schedule, input ambiguity, language dominance and verb types have also been taken into account.

Regarding the participants (c.f. section 3.2), the target group of the present study consists of a set of five C-E bilingual children in Hong Kong (Yip-Matthews corpus), four of whom are

considered Chinese-dominant and the other one, English-dominant. Furthermore, in order to address the issues presented in the objectives and hypotheses (c.f. section 3.1), three more groups of participants have been selected: two S-E bilinguals in Salamanca, Spain (FerFuLice corpus), three E monolinguals in the United States (Sachs corpus, Bloom 70 corpus, Demetras Trevor corpus), and three C monolinguals (LeeWongLeung corpus). There are two target languages in the present study: English and Chinese. In the study of the English production, the five C-E bilinguals, the two S-E bilinguals and the three E monolinguals are involved, while in the study of the Chinese production, the five C-E bilinguals and the three C monolinguals are involved.

Based on the available data in each participant' corpus, spontaneous data from a period of (approximately) one year has been selected (c.f. section 3.3). Providing that there appears to be a turning point in development at the age of 2;03 when the child's MLU value reaches approximately 2.4 (Rispoli 1992), the selected age range is from 2;00 to 3;00 with small fluctuations and taking into account the individual child's MLU values.

Furthermore, the selected data are classified based on the adult grammar (c.f. subsection 3.4.1), that is, in environments where the adult grammar accepts or sanctions (i.e. adult-like or non-adult-like) the form of the DOs (i.e. overt or null). In addition, in order to be able to carry out further qualitative analyses, on the one hand, the transitive verbs in the English data are also classified as pure transitive verbs or mixed verbs; on the other hand, in the Chinese data, overt DOs are further classified according to their adequacy (i.e. adequate or inadequate).

What is more, the selected data are divided into three different developmental stages based on the children's MLU values in each language instead of on chronological age since the former is considered to reflect children's language abilities in a more accurate way (Brown 1973, c.f. chapter 2, subsection 2.1.1). The three developmental stages are established following

Rispoli's (1992) proposal (c.f. chapter 2, subsection 2.1.1) that the MLU value of 2.4 at approximately the age of 2;03 appears to be a turning point in the acquisition of DOs. Therefore, Stage I covers the period when the child produces utterances with MLU values below 2.4; Stage II covers the period when the child produces utterances with MLU values between 2.4 and 3.5; and Stage III covers the period when the child produces utterances with MLU values higher than 3.5.

Chapter 4. The Analysis of DOs in Language Acquisition Data

This chapter offers a detailed analysis of the data involved in the present study. It aims to explore the difference in the nature of DOs among the production of the four groups of participants, namely, C-E bilinguals, E monolinguals, S-E bilinguals, and C monolinguals. Specifically, section 4.1 deals with the English data and thus English data produced by the C-E bilinguals, the S-E bilinguals and the E monolinguals are discussed and compared. Section 4.2 deals with the Chinese data and, therefore, the Chinese data produced by the C-E bilinguals and the C monolinguals are discussed and compared. Section 4.3 offers a detailed analysis of the role played by language dominance in interlinguistic influence based on both the English and the Chinese data; both the external view and the internal view on language dominance are taken into account. In the light of these previous comparisons, section 4.4 offers an account of the hypotheses proposed in chapter 3 (c.f. section 3.1).

4.1 The Nature of DOs: the English Data

The distribution of DOs in the English data in terms of the nature and the status of DOs are shown in Tables 44 for an overall view, and in Table 45 from developmental aspect as well as in Tables 46 and 47 for a more detailed account based on the verb type. This division corresponds to a quantitative analysis and a qualitative analysis respectively.

4.1.1 Quantitative Analysis

4.1.1.1 Comparison among the Three Language Groups

Table 44 reflects the distribution of DOs in the selected data in terms of their nature and their status (i.e. adult-like *versus* non-adult-like; overt *versus* null).

Table 44. Overall Distribution of DOs in the Target Children's English Data

Participant	Language(s)	Total tokens	Overt	*Overt	*Overt%	Null	*Null	*Null%
Timmy	C-E	909	706	0	0%	49	154	16.94%
Sophie	C-E	773	495	0	0%	77	201	26%
Alicia	C-E	359	256	0	0%	9	94	26.18%
Llywelyn	C-E	570	372	0	0%	27	171	30%
Charlotte	C-E	932	779	0	0%	49	104	11.16%
Leo	S-E	867	757	0	0%	66	44	5.07%
Simon	S-E	808	722	0	0%	57	29	3.59%
Naomi	E	1657	1452	0	0%	62	143	8.63%
Peter	E	4877	4284	0	0%	284	309	6.34%
Trevor	E	850	782	0	0%	39	29	3.41%

The column "Language(s)" indicates the L1(s) of the participants involved. The column "Total tokens" refers to the total number of transitive verbs produced by the participants in the selected data. The columns "Overt", "*Overt", "Null" and "*Null" indicate the number of occurrences of adult-like overt DOs, non-adult-like overt DOs, adult-like null DOs and non-adult-like null DOs respectively. The columns "*Overt%" and "*Null%" show the rate of occurrences of non-adult-like overt and null DOs that have appeared in the target children's English transcriptions within the investigation period; both rates correspond to the overall DO production.

Although English is a [- null object] language, and adult English has very strict constraints on null DOs (c.f. chapter 1, section 1.3), the results of the present study as in Table 44 show that all ten participants produced non-adult-like null DOs in their English output, as it concurs with the results of various previous studies in different languages (monolingual French and monolingual English in Pérez-Leroux, Pirvulescu, and Roberge 2008, bilingual French in Müller and Hulk 2001, monolingual Italian in Guasti 1993/1994 and Schaeffer 2000, monolingual Spanish in Fujino and Sano 2002). Examples of these illicit null DOs are shown in (173).

(173)   a. French: Ivar répare *e*.
          Ivar repairs
          "Ivar repairs it."   (Müller and Hulk 2001: 8)

        b. Italian: No, pettina *e*!
          No   combs
          "No, she is combing it."   (Schaeffer 2000: 78)

Consequently, it is reasonable to believe that all children, regardless of their L1(s), go through a null object stage and that null DOs appear as a developmental feature of child language, a proposal that is in line with that of Pérez-Leroux, Pirvulescu, and Roberge (2008) (c.f. chapter 2). What is more, in all ten participants' data, no non-adult-like overt DO is found.

What is more, as in Table 41 (c.f. chapter 3, section 3.3), the participants' MLU values in the present study increase from approximately 1.5 to 4.2 across the investigation period. This increase in the MLU is inversely proportional to the decline in the null object stage: it can be argued that the target children go through a process from being insensitive to becoming sensitive to the relationship between undergoer omission and discourse context across the investigation period. This is in line with Rispoli's (1992) proposal (c.f. chapter 2, subsection 2.1.1). Therefore, it can be expected that the peak of non-adult-like DOs produced by the participants will be found in the first few months of the investigation period and then the figures will drop as the children's ability to relate DO realization to discourse contexts grow stronger.

From Table 44 it can be observed that the participants' performance in the present study is by no means equally distributed—the results demonstrate an obvious distinction in the percentage of non-adult-like null DOs across the participants' English production. As it is shown in Table 44, the rates of non-adult-like null DOs vary wildly depending on the participants and their L1(s): the average percentages of non-adult-like null DOs produced by the five C-E bilinguals are between 11.16% and 30% during the one-year investigation period; those of the

two S-E bilinguals are 5.07% and 3.59%; and those of the three E monolinguals range from 3.41%

to 8.63%. These numbers indicate that the non-adult-like null DO rates of the C-E bilinguals are

much higher than those of the five participants in the other two groups. What is more, the

percentages of non-adult-like DOs produced by the S-E bilinguals are slightly lower than that of

the E monolinguals. Such observation is supported by the results of a Welch Analysis of

Variance (ANOVA): the three language groups are compared using an unequal variance F-test

and found to be significantly different ($F(2, 4.353)=10.995$, $p=.020$) in terms of non-adult-like

null DO production. Furthermore, the results of a Games-Howell post-hoc test show there is a

significant difference in non-adult-like null DO rates between the C-E bilingual participants and

the S-E bilingual participants ($p=0.013$), as well as between the C-E bilingual participants and

the E monolingual participants ($p=0.017$). However, there is no significant difference between

the performance of the S-E bilinguals and E monolinguals ($p=0.596$).

Table 45 presents the rates of non-adult-like overt and null DOs produced by the ten

participants when dividing the one-year investigation period into different developmental stages

according to the participants' MLU values (c.f. chapter 3, subsection 3.4.2), which allows us to

take a developmental view on the data.

Table 45. Frequency of *Null DOs Corresponding to Different Developmental Stages

Participant	Stage I (MLU <2.4)			Stage II (2.4≤MLU≤3.5)			Stage III (MLU >3.5)		
	Total tokens	*Null%	*Overt%	Total tokens	*Null%	*Overt%	Total tokens	*Null%	*Overt%
Timmy	-	-	-	483	18.63%	0%	426	15.02%	0%
Sophie	127	22.83%	0%	646	26.63%	0%	-	-	-
Alicia	165	22.42%	0%	194	29.38%	0%	-	-	-
Llywelyn	8	37.50%	0%	562	29.89%	0%	-	-	-
Charlotte	41	9.76%	0%	891	11.22%	0%	-	-	-
Leo	152	15.13%	0%	117	3.42%	0%	598	2.84%	0%
Simon	106	7.55%	0%	94	2.13%	0%	608	3.13%	0%
Naomi	199	12.56%	0%	1392	8.19%	0%	66	6.06%	0%
Peter	285	43.86%	0%	619	12.76%	0%	3978	2.64%	0%
Trevor	-	-	-	396	4.29%	0%	454	2.64%	0%

The break-down data in Table 45 show, on the one hand, that all the S-E bilingual and E monolingual participants' data witness an acute drop in the average percentages of non-adult-like null DOs from Stage I to Stage II as their MLU value increases, which accords with the expectation derived from Rispoli's (1992) theory (c.f. chapter 2, subsection 2.1.1). Furthermore, the rates of non-adult-like null DOs of the E monolinguals and the S-E bilinguals are in general similar, especially in Stage III (four out of the five participants produce non-adult-like null DOs at rates of around 3%) when the children's sensitivity to the relationship between DO realization and discourse context is believed to be more developed than in Stage I and Stage II.

On the other hand, the data of the C-E bilinguals show a different developmental pattern. In addition to the fact that the non-adult-like null DO rates in three (Sophie, Alicia and Llywelyn) out of the four participants' data available in Stage I are much higher than the participants in the other two groups, three out of the four participants (Sophie, Alicia and Charlotte) produce even higher non-adult-like null DO rates in Stage II than in Stage I, ranging from 11.22% to 29.38%. Since the total number of DOs produced by Llywelyn in Stage I in the available transcript is very small (eight tokens), I consider his non-adult-like DO rate in this stage not robust enough to reach a conclusion. In other words, in general, the C-E bilinguals' non-adult-like DO rates increase in Stage II, which is contrary to what is found in the S-E bilinguals' and E monolinguals' data.

Figure 8 is a developmental graph of the participants' non-adult-like null DO performance.

Figure 8. Developmental Graph of the Participants' Performance of *Null DOs
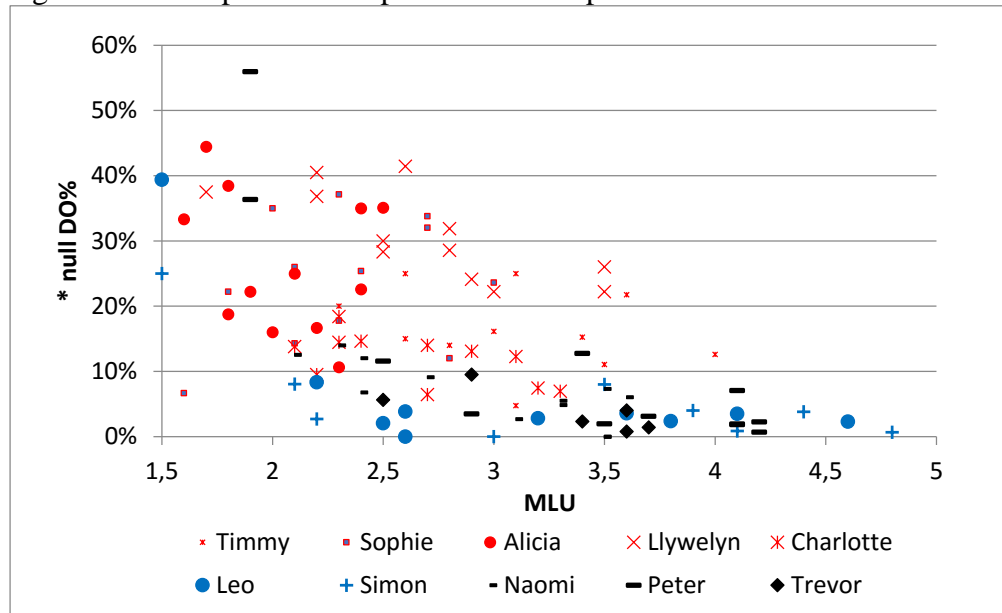
Figure 8 shows that, regardless of the C-E bilinguals' (in red) dominant language, a factor that could affect the bilinguals' non-adult-like null DO production that will be discussed later, the non-adult-like DO rates in their English production remain consistently high even in the latter stages when compared to the participants' in the other two language groups (S-E bilinguals in blue, E monolinguals in black).

In contrast, the monthly non-adult-like null DO rates of the participants in the other two language groups are consistently below 14% in Stage II (Leo 0%-3.85%, Simon 0%-8%, Naomi 0%-14.01%, Peter 11.59%-12.75%, Trevor 2.33%-9.52%) and below 7% in Stage III (Leo 2.29%-3.57%, Simon 0.67%-4%, Naomi 6.06%, Peter 0.68%-7.06%, Trevor 0.77%-4.02%). These figures suggest almost-adult-like language performances.

The results of statistical tests show that at Stage I, there is no statistically significant difference among the participants' performances in the three language groups ($F(2, 19)=1.565$, $p=.235$). At Stage II, a statistically significant difference is found among the participants' performances in the three language groups (Welch $F(2, 20.954)=52.377$, $p<.001$). A Games-

Howell post hoc test demonstrates that there is the C-E bilinguals produce non-adult-like null DOs with statistically significantly higher frequency when compared to the E monolinguals and the S-E bilinguals ($p<.001$); moreover, the S-E bilinguals produce non-adult-like null DOs with statistically significantly low frequency when compared to the E monolinguals at this stage ($p=.049$). At Stage III, no statistically significant difference between the C-E bilinguals' performances and those of the S-E bilinguals ($p=.112$), between the C-E bilinguals' performances and those of the E monolinguals ($p=.114$) and between the S-E bilinguals' performances and those of the E monolinguals ($p=.958$).

These results further confirm Rispoli's (1992) proposal that before their MLU values reach 2.4, children are not able to related DO realization with discourse context. Since this applies to all children regardless of their L1(s), at Stage I, no statistically significant difference is found among the participants in the three language groups. At Stage II, the C-E bilinguals produce significantly higher non-adult-like null DO rates than the S-E bilinguals and E monolinguals. This may be the consequence of the negative influence from Chinese on the C-E bilinguals' English production since this is the main distinction between the C-E bilinguals and the participants in the other two language groups. Such influence may delay the C-E bilingual children's English development in this particular area of grammar. At Stage III, as the bilinguals MLU values in English increase, the interlinguistic influence from Chinese reduces and the difference between the C-E bilinguals and the participants in the other two language groups becomes statistically not significant. Therefore, Hypothesis #1 regarding delay due to language interference in bilingual acquisition is confirmed.

The reason for such a negative influence from Chinese into English may be the result of different maturational schedules in the acquisition of DOs in the two languages. It has been

discussed previously (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, chapter 3, section 3.1) that all children go through a null object stage regardless of whether the target language allows them because all children start out with an all-purpose null object N (Pérez-Leroux, Pirvulescu, and Roberge 2008). In Chinese, the DO realization mechanism in line with children's initial default option, while the one in English is divergent from it; therefore, children do not have to experience the period of convergence in Chinese while they have to do so in English. Consequently, monolingual Chinese children are expected to reach adult-like performance at an earlier age in the domain of DOs when compared to their E monolingual counterparts; and this should be so in C-E bilinguals' language production in both languages. In other words, C-E bilinguals' early Chinese production should be more adult-like than their early English production in the parallel period, which satisfies the condition proposed by Paradis and Genesee (1996) for language interference (c.f. chapter 2, section 2.3). Such interference will continue to occur until the C-E bilinguals become mature in their English DO performance.

The results of the statistical analysis as shown above have shown evidence for such interference. Since there is no available data at Stage I in Timmy's corpus and at Stage III in Sophie's, Alicia's, Llywelyn's and Charlotte's corpora, an overall view at the five C-E bilinguals' data is taken. It is found that the C-E bilinguals produce non-adult-like null DOs with statistically significantly higher frequency when compared to the E monolinguals and S-E bilinguals at Stages II but not at Stage III. This indicates delay in the C-E bilinguals' English DO production. That is, the English DO realization mechanism in the C-E bilinguals mature later (when their MLU values reach 3.5) when compared to their S-E bilingual and E monolingual counterparts (when their MLU values reach 2.4) and it is likely that it is due to the influence from Chinese into English. Therefore, Hypothesis #3 regarding the relation between language interference and

maturational schedule of the two languages in bilingual children is also confirmed. It is also found that the so-called bilingual effect is not responsible for the C-E bilinguals' higher non-adult-like null DO rates since the S-E bilinguals' performance in this grammatical domain is comparable to that of the E monolinguals.

4.1.1.2 Comparison within the C-E Bilingual Group

However, taking a look at the non-adult-like null DO rates produced by the five C-E bilingual participants, they are not indiscriminate: Timmy's and Charlotte's performance is believed to be more adult-like in terms of DO realization compared to the other three C-E bilinguals (i.e. Llywelyn, Sophie and Alicia) due to their lower non-adult-like DO rates. This is probably the consequence of an unbalanced development between English and Chinese in the latter three children, which may be caused by the unbalanced amount of input the children are exposed to in the two languages. In Llywelyn's case, during his early years, his father (the one providing English input) was occasionally absent from home for a week up to half a year (c.f. chapter 3, section 3.2), which indicated that the child's English input has been significantly reduced if compared to his Chinese input. In the case of Sophie and Alicia, living in the same family, their language ecology can be considered to be very similar. Besides the fact that the language between their parents and the community language is Chinese and that, unlike their elder brother Timmy, they have been continuously living in Hong Kong during the investigation period suggests an even bigger gap between the amount of Chinese and English input they received compared to that of Timmy's. In addition, in Timmy's case, he was visited occasionally by his English-speaking relatives and also took several trips to English-speaking countries at his early age during which the child was exposed to more English than Chinese (c.f. chapter 3,

section 3.2). As a result, although being reported to be C-dominant, the difference of development between the two languages in Timmy's production is not as big as it is in the case of his two younger sisters. This can be demonstrated in MLU differentials between the two languages in these children, as it will be shown below.

Yip and Matthews (2006) point out that the MLU value provides a relatively comparable measure of complexity across languages. Despite the fact that in English there are person and tense markers which do not exist in Chinese, which might inflate the MLU value in the English production, in the participants' English in the present study, inflectional morphology is not yet fully developed. In addition, Chinese has sentence-final particles as pointed out by Lee (2000) (c.f. chapter 2, subsection 2.1.2). This could somehow compensate for the inflationary factor affecting the MLU values in English *versus* Chinese. To conclude, it is still possible to use MLU differentials between a bilingual's two languages to compare bilingual children's two languages as well as among different bilingual children and to chart changes in dominance patterns over time.

Figures 9 to 13 below illustrate the development of both English and Chinese MLU values along the study period for the five C-E bilinguals. To the extent that the measures for the two languages concerned are comparable, the patterns in Figures 9 to 13 allow us for a number of interpretations: the MLU values for Chinese in Timmy, Sophie, Alicia and Llywelyn are higher than the MLU values for English during most of investigation period, during which Charlotte produces higher MLU values for English than for Chinese in most of the cases.

Figure 9. Timmy's MLU in English and Chinese
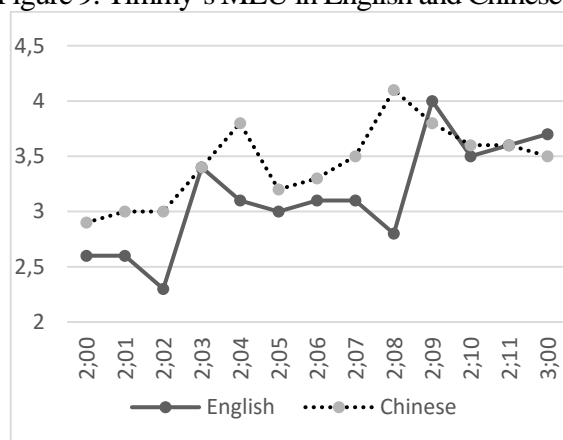
Figure 10. Llywelyn's MLU in English and Chinese
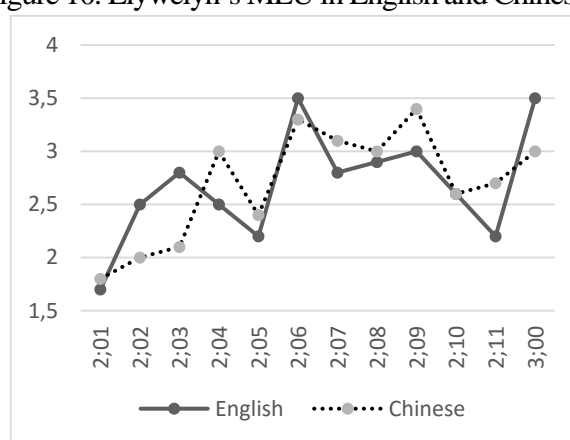
Figure 9 shows that Timmy's Chinese develops faster than his English in the period from 2;01 to 2;08 whereas after the age of 2;09, the MLU values of Timmy's two languages are closely matched. Such a pattern is somehow similar to Llywelyn's MLU differentials between the two languages, as in Figures 10. Figure 10 shows that Llywelyn's MLU values for Chinese and English are quite close to each other. During most of the investigation period, the participant's Chinese MLU values are slightly higher than the English ones. By the end of the investigation period, the gap between MLU values for the two languages remains small.

In contrast, Timmy's two younger sisters, Sophie and Alicia, show a more consistent pattern in terms of the MLU differentials between the two languages, as in Figures 11 and 12.

Figure 11. Sophie's MLU in English and Chinese
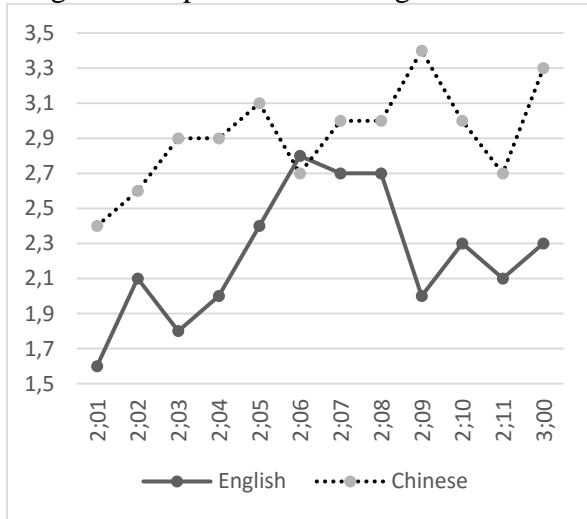
Figure 12. Alicia's MLU in English and Chinese
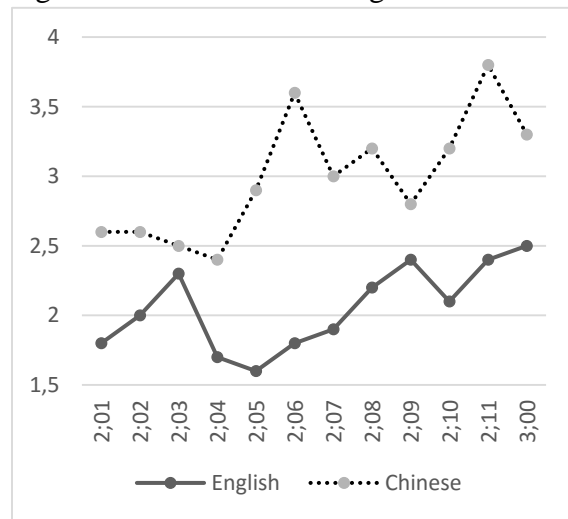
Figures 11 and 12 show that throughout the one-year investigation period, in Sophie's and Alicia's data, the MLU values are higher for Chinese than for English with only one exception at the age of 2;06 when Sophie's MLU for Chinese (2.7) is slightly lower than that for English (2.8). The gap between the MLU values for the two languages in the two sisters is much bigger than that in the other three C-E bilinguals. Furthermore, Sophie's and Alicia's MLU differentials between the two languages is by no means reducing even in Stage II (Sophie 2;05-3;00, Alicia 2;09-3;00).

Figure 13 shows the MLU differentials between the two languages in the E-dominant C-E bilingual participant's data.

Figure 13. Charlotte's MLU in English and Chinese
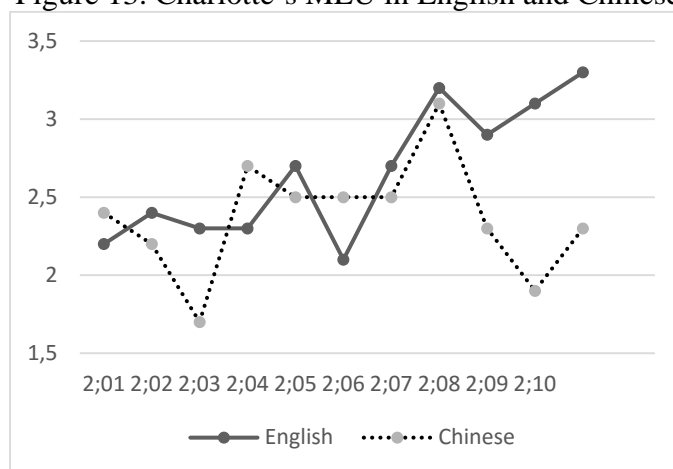
Figures 13 shows that overall Charlotte's MLU values for Chinese and for English match closely before 2;08 whereas after 2;09, the gap enlarges. During most of the investigation period, the participant's English MLU values are higher than her Chinese MLU values, which distinguished Charlotte from the other four C-E bilingual participants in the present study.

A closer look comparing the non-adult-like null DO rates (c.f. Figures 14 to18 below) and the MLU differentials between their two L1s (Figures 9 to 13 above) shows that both trends of the C-E bilingual participants generally match. This suggests that language dominance, which is measured mainly by comparing the MLU values of the two languages in the bilingual participants (c.f. chapter 3, section 3.1), may have a significant influence on these bilinguals' language production. The role played by language dominance will be further explored in subsection 4.1.3 below.

Figure 14. Timmy's Non-adult-like Null DO Rates and MLU Differentials
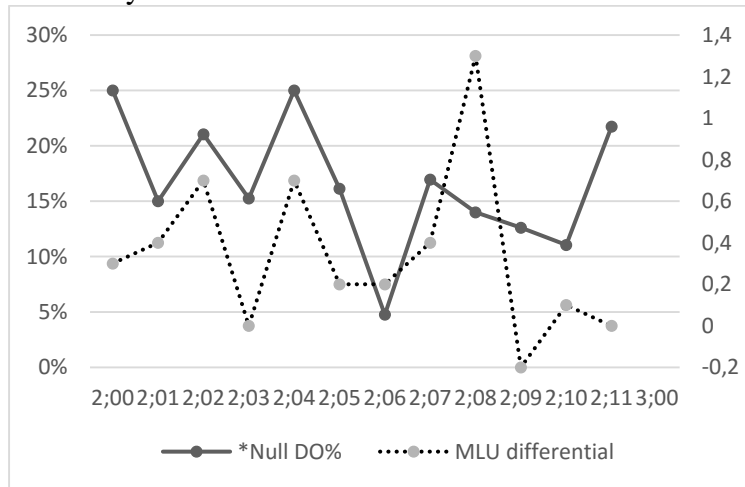
Figure 14 shows that Timmy's MLU differentials between Chinese and English are relatively small in comparison with his two C-E bilingual sisters (c.f. Figures 15, 16). The trend of the production of non-adult-like null DO matches that of his MLU differentials: that is, when the gap between Timmy's MLU values in Chinese and in English becomes bigger, the child produces non-adult like null DO with higher frequency. The results of a Pearson Product-moment Correlation show that there is none of very weak, positive correlation between Timmy's MLU differentials and his non-adult-like null DO production ($r=.024$, $n=12$, $p=.940$), but the correlation does not reach statistical significance.

Figure 15. Sophie's Non-adult-like Null DO Rates and MLU Differentials
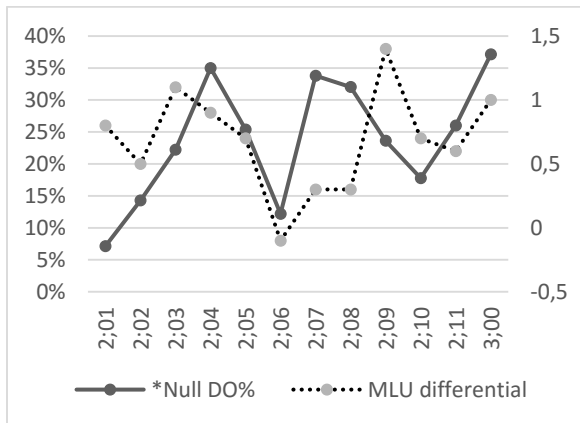
Figure 16. Alicia's Non-adult-like Null DO Rate and MLU Differentials
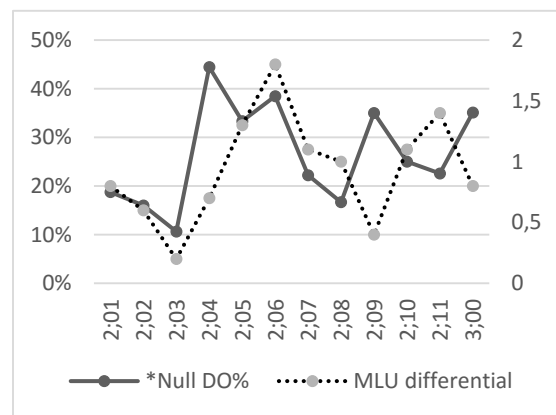
Figures 15 and 16 show that the gaps between Chinese MLU and English MLU in Sophie and Alicia are overall bigger that Timmy's, and the two sisters produce non-adult-like null DOs with higher frequency than Timmy. Similar to Timmy's case, the trend of the production of non-adult-like null DO in the two sisters' data matches that of their MLU differentials. The result of a Pearson Product-moment Correlation show that there is a weak, positive correlation between Sophie's MLU differentials and her non-adult-like null DO production ($r=.175$, $n=12$, $p=.586$), but the correlation does not reach statistical significance. What is more, there is none or very weak positive correlation between Alicia's MLU differentials and her non-adult-like null DO production ($r=.076$, $n=12$, $p=.813$) but such a result is not statistically significant, either.

Figure 17. Llywelyn's Non-adult-like Null DO Rates and MLU Differentials
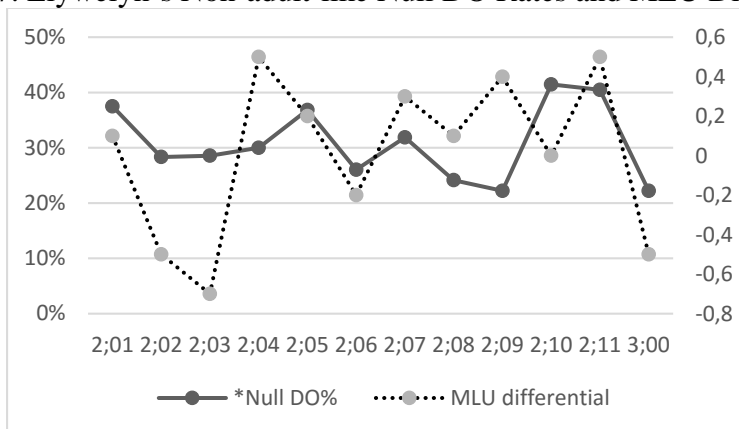
Figure 17 shows that the gap between Llywelyn's Chinese MLU and English MLU is not as big as that in Timmy, Sophie and Alicia. However, the child produces non-adult-like null DOs with high frequency. This could be explained by the fact that MLU is an important but not the only criterion to measure a child's language competence and dominance. The input conditions and the child's language preference are also criteria that should be taken into account (c.f. chapter 3, section 3.1). As referred to in chapter 3 (c.f. section 3.2), during Llywelyn's early life, his father was occasionally absent from home. In other words, the child received much more

Chinese input than English input, and as a result, Chinese was Llywelyn's dominant language. This would explain the reason why the child frequently produces non-adult-like null DOs in English during the investigation period. What is more, as in Timmy's, Sophie's and Alicia's cases, the trend of the production of non-adult-like null DO in Llywelyn's data in general appears to match that of his MLU differentials. A Pearson Product-moment Correlation shows that there is a moderate, positive correlation between Llywelyn's MLU differentials and his non-adult-like null DO rates ($r=.344$, $n=12$, $p=.274$), but such correlation is not statistically significant.

Figure 18. Charlotte's Non-adult-like Null DO Rates and MLU Differentials
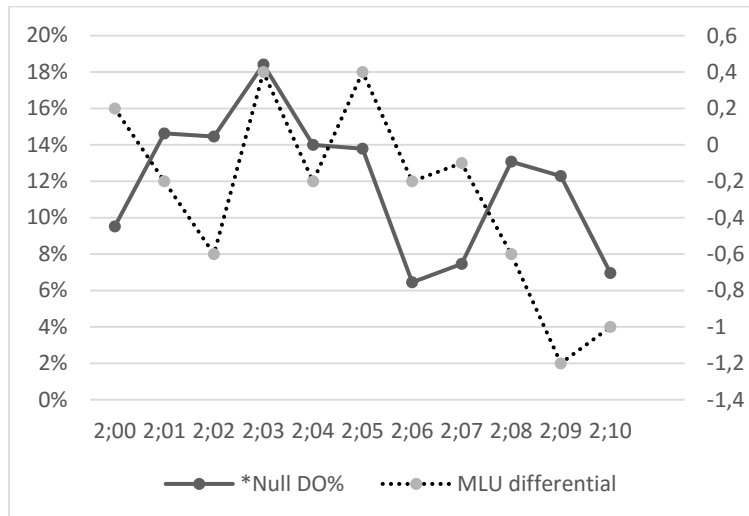
As the only E-dominant C-E bilingual in the present study, Charlotte's MLU in English is higher than her MLU in Chinese during most of the investigation period, as shown in Figure 13. Figure 18 reflects that the child produces non-adult-like null DOs with much lower frequency than the other four C-dominant C-E bilinguals do. What is found similar to the other four C-E bilinguals is that the trend of the production of non-adult-like null DO in Charlotte's data also matches that of her MLU differentials. The results of a Pearson Product-moment Correlation show that there is a weak positive correlation between the participant' MLU differentials and her

non-adult-like null DO production (r=.285, n=11, p=.396) but this result does not reach statistical significance.

As seen above, overall in the five C-E bilinguals' data, (potential) positive correlations can be found between their MLU differentials and their non-adult-like null DO production though none of them reaches statistical significance. However, this could be the result of the fact that there are not many instances in each child's data (11 or 12) and that such small numbers of instances do not reach significance. Therefore, another Pearson Product-moment Correlation test on the collapsed data of all the five C-E bilinguals is run and a weak positive correlation between the participants' MLU differentials and their non-adult-like null DO production is found in the results (r=.253, n=59, p=.054); however, such correlation does not reach statistical significance, either. It is observed that in Alicia's data there are more discrepancies than in the other four participants' data. This may be the result of insufficient monthly data: the number of transitive verbs produced by Alicia monthly in the data ranges from 6 to 62, which indicates that her monthly tokens are much fewer than those of the other four C-E bilingual participants: the number of transitive verbs produced by Timmy ranges from 20 to 181, that of Sophie from 14 to 128, that of Llywelyn from 8 to 138 and that of Charlotte from 29 to 179.

The results of a Welch ANOVA on the C-E bilingual participants' overall data indicate that there is a statistically significant difference in the performance of DO realization within the Chinese-English bilingual group (Welch F(4, 26.377)=19.297, p<.001). The results of a Games-Howell post-hoc test show that Timmy's performance in DO realization is statistically significantly different from Llywelyn's, but not from that of the other three C-E bilinguals'; Sophie's performance is statistically significantly different from Charlotte's but not from that of the other three C-E bilinguals'; Alicia's performance is statistically significantly different from

Charlotte's but not from that of the other three C-E bilinguals'; Llywelyn's performance is statistically significantly different from Timmy's and Charlotte's but not from Sophie's and Alicia's; Charlotte's performance is not statistically significantly different from Timmy's but it is so from that of the other three C-E bilinguals'. A visual summary of the statistically significant differences among the five C-E bilingual participants appears in Diagram 1.

Diagram 1. Difference in Performance in DO Realization among the C-E Bilinguals
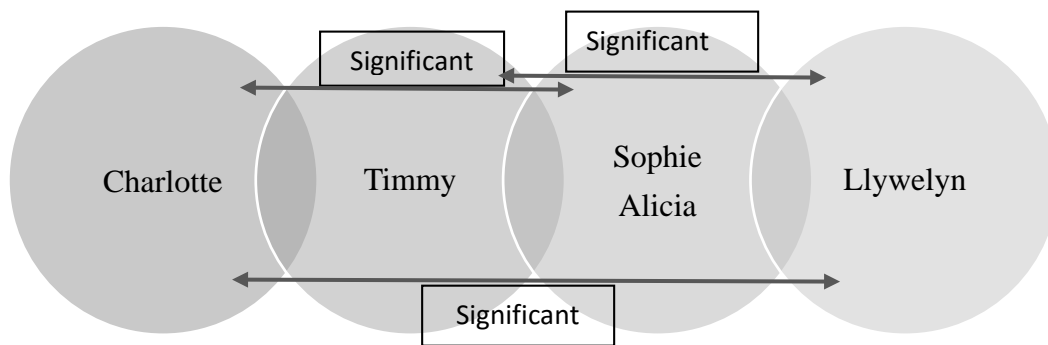
The intersections in Diagram 1 represent differences with no statistical significance and the arrows represent differences with statistical significance. In other words, Charlotte, the only C-E bilingual child that is reported to be E-dominant in the present study, performs statistically significantly differently in comparison to Sophie, Alicia and Llywelyn; that is, she produces non-adult-like null DOs with statistically significantly lower frequency than the other three children; Charlotte's performance is not statistically significantly different from Timmy's. At the same time, Timmy's performance is in between; that is, he produces non-adult-like null DOs with higher frequency than Charlotte but with lower frequency than Sophie, Alicia; both differences do not reach statistical significance; but the difference between Timmy's performance and Llywelyn's performance reaches statistically significant difference. What is more, Llywelyn is

found to produce non-adult-like null DOs with the highest frequency among the five C-E bilinguals; the difference between him and Charlotte and between him and Timmy is found statistically significantly different but the difference between him and Sophie and Alicia does not reach statistical significance.

Since the range of the participants' MLU values varies during the investigation period, in order to further investigate if the participants' overall language proficiency plays a role in their adult-like overt DO production, statistical tests are run based on the developmental data. The results indicate at Stage I, there is statistical significant difference among the four participants' (i.e. Sophie, Alicia, Llywelyn and Charlotte) performance in terms of non-adult-like null DO production Welch F(3, 5.122)=4141180.575, $p<.001$). The results of a Games-Howell post hoc test show that Sophie's performance is comparable to those of the other three participants (Alicia $p=.880$, Llywelyn $p=.162$, Charlotte $p=.453$); Alicia's performance is statistically significantly different from Charlotte's ($p=.034$) but comparable to Sophie's ($p=.880$) and Llywelyn's ($p=.086$); Llywelyn's performance is statistically significantly different to Charlotte's ($p<.001$) but comparable to Sophie's ($p=.162$) and Alicia's ($p=.086$); Charlotte's performance is comparable to Sophie's ($p=.453$) but different from Alicia's ($p=.034$) and Llywelyn's ($p<.001$).

At Stage II, the results of a One-way ANOVA show that there is statistically significant difference among the five C-E bilinguals performances (F(4, 37)=13.752, $p<.001$). A Tukey post hoc test shows that Timmy's performance is different from Sophie's ($p=.050$), Alicia's ($p=.022$) and Llywelyn's ($p=.001$) but comparable to and Charlotte's ($p=.480$); Sophie's performance is comparable to Alicia's ($p=.906$) and Llywelyn's ($p=.628$) but different from Timmy's ($p=.50$) and Charlotte's ($p=.001$); similarly, Alicia's performance is comparable to Sophie's ($p=.906$) and Llywelyn's ($p=1$) but different from Timmy's ($p=.022$) and Charlotte's ($p=.001$); Llywlyn's

performance is different from Timmy's (p=.001) and Charlotte's but comparable to Sophie's (p=.628) and Alicia's (p=1); Charlotte's performance is comparable to Timmy's (p=.480) but different from the other three C-E participants.

The results of the data analysis above indicates that the C-E bilinguals' DO production may not be affected by the difference of the overall proficiency between the bilinguals' two L1s (i.e. the external view on language dominance) in a very strong way since no correlation is found between the MLU differentials and their non-adult-like null DO production. Furthermore, in general the "externally" E-dominant bilingual's (i.e. Charlotte) performance is not found statistically significantly different from that of Timmy's who is considered C-dominant. The same result is also found based on the developmental data: at Stage I, Charlotte's performance is not statistically significantly different from Sophie's while at Stage II, Charlotte's performance is comparable to Timmy's. Taking into account that these results are concluded based on a small pool of data (i.e. five participants), the fact that Charlotte's performance is not significantly different from all the four C-dominant C-E bilingual participants indicates that "external language dominance" may not be a determinant factor for the directionality of interlinguistic influence. These results do not support Hypothesis #12a regarding the role played by "externally" language dominant in interlinguistic influence.

4.1.1.3 Comparison within the S-E Bilingual Group

The identical S-E bilingual twins' English develops in a similar way. This may result from the fact that since they were born and raised in the same family, their language environment (linguistic input and communicative interaction), which plays a very important role in children's language acquisition as previous studies suggest (Piaget 1955, 1971, Slobin 1977, Bates,

Bretherton and Synder 1988, among others), can be regarded as identical. An Independent-Samples T-Test on the overall data also reveals that there is no significant difference in terms of their DO realization in English within the S-E bilingual group ($t(48)=-.664$, $p=.510$). In terms of the developmental data, statistical tests reveal that no statistically significant different exists in any of the three developmental stages between the two S-E bilinguals' data (Stage I $t(3)=.825$, $p=.470$); Stage II ($t(4)=-.243$, $p=.820$); Stage III ($t(3.539)=.614$, $p=.576$).

Tables 44, 45 and Figure 8 show that the S-E bilingual twins' performance in DO production in English is comparable to that of the E monolinguals. This is further confirmed by the results of a Games-Howell post-hoc test: neither Leo's performance nor Simon's performance in DO realization is statistically significantly different from that of any of the three E monolinguals. When comparing the S-E bilinguals' figures in Stage I and those in Stage II, the second period witnesses a sharp drop (Leo from 15.03% to 1.71%, Simon from 7.48% to 2.13%). Their performance in Stage II is statistically significantly different from that of the E monolinguals' ($F(1, 39.887)=7.388$, $p=.010$), which means that the S-E bilingual participants' performance is even more adult-like than that of the E monolinguals'. This could suggest acceleration in the domain of DO realization due to the influence from Spanish into English.

4.1.1.4 Comparison within the E Monolingual Group

In the case of the three E monolinguals, the overall percentages of non-adult-like null DOs are low across the one-year investigation period. As in the case of the S-E bilingual participants, in the E monolingual participants' data, there is an obvious decrease from Stage I to Stage II (Naomi: from 12.56% to 8.19%, Peter: from 43.86% to 12.76%) and a further decrease from Stage II to Stage III (Naomi: from 8.19% to 6.06%, Peter: from 12.76% to 2.64%, Trevor:

from 4.29% to 2.64%) (c.f. Tables 44 and 45, Figure 8). At Stage II, the three E monolinguals appear to have higher non-adult-like null DO rates when compared to their S-E bilingual counterparts, but at Stage III, their figures remain constantly below 7% and become more comparable to those of the S-E bilinguals'.

Although Naomi seems to produce non-adult-like null DOs with a higher frequency than the other two E monolinguals, a Welch ANOVA on the overall data confirms that the difference is not statistically significant (Welch $F(2, 16.407)=1.802$, $p=.196$). In terms of the developmental data, the results of statistical tests reveal that at Stage I, no statistically significant difference is found between Naomi's and Peter's performances in terms of non-adult-like null DO production ($t(2)=-3.429$, $p=.076$); at Stage II, no statistically significant difference is found among the three E monolinguals' data, either ($F(2, 13)=.379$, $p=.692$); the same result is found at Stage III at which no statistically difference is found among the three E monolinguals' data ($F(2, 10)=3.381$, $p=.076$). These results indicate that the E monolingual participants' performances are comparable to each other through the investigation period.

To sum up, the results of the quantitative analysis of the English data in the present study suggest that the C-dominant C-E bilinguals' performance is statistically significantly different from their E-dominant C-E bilingual counterpart as well as from the participants in the other language groups. The S-E bilinguals are comparable to the E monolinguals in their performance of DO realization across the one-year investigation period and the S-E bilinguals are found even more adult-like than the E monolinguals at Stage II in terms of DO acquisition when looking at the break-down data. Therefore, Hypothesis #1 regarding delay due to language interference in the C-E bilingual acquisition of English DOs and regarding acceleration due to influence from Spanish into English in the S-E bilingual acquisition of English DOs is confirmed. Hypothesis

#3 regarding the relation between language interference and maturational schedule of the two languages in bilingual children is also confirmed.

Besides, no statistically significant difference is found in terms of performance of DO realization within the S-E bilingual group and within the E monolingual group. However, such difference is found within the C-E bilingual group between the C-dominant bilinguals and the E-dominant bilinguals. This suggests that language dominance could play a significant role in bilingual acquisition, an issue that will be discussed in subsection 4.1.3 below.

4.1.2 Qualitative Analysis

Apart from the identified quantitative differences that have been addressed in the previous subsection, qualitative differences are also observed from the results of the data analyses and they are explored in the subsequent subsections. These qualitative differences refer to (i) the different extent of the overproduction of non-adult-like null DOs with mixed verbs and with pure transitive verbs across all the participants' data and (ii) the overproduction of non-adult-like null DOs that is only found in the C-E bilinguals' data but no in the S-E bilinguals' and the E monolinguals' data.

4.1.2.1 Comparison among the Three Language Groups

Based on the theoretical description of verbal transitivity in English provided in chapter 1, (c.f. sections 1.1 and 1.2), verbs can be divided into three categories according to their transitivity: pure transitive, pure intransitive and mixed, which respectively refer to those verbs which can only take an overt DO, those which cannot take a DO, and those which can take an overt or a null DO. In the present study, only transitive verbs (both pure transitive and mixed) are

investigated. Therefore, the transitive verbs in the data are then further classified as pure transitive verbs and mixed verbs based on the Open American National Corpus (Reppen, Ide, and Keith Suderman 2005). Table 46 presents an overall view on the non-adult-like null DO rates of pure transitive verbs and mixed verbs produced by the ten participants and Table 47 shows the non-adult-like null DO rates of the two verb types as they are distributed across the participants' different developmental stages.

Table 46. Overall Non-adult-like Null DO Rates Produced by the Participants

L1(s)	Participant	*Pure%	Tokens	*Mixed%	Tokens
C-E	Timmy	16.67%	88/528	17.32%	66/381
C-E	Sophie	24.66%	109/442	27.79%	92/331
C-E	Alicia	24.80%	62/250	29.36%	32/109
C-E	Llywelyn	30.97%	105/339	28.57%	66/231
C-E	Charlotte	9.63%	62/651	14.95%	42/281
S-E	Leo	4.29%	23/536	6.34%	21/331
S-E	Simon	2.65%	13/490	5.03%	16/318
E	Naomi	7.67%	90/1173	10.35%	53/512
E	Peter	7.92%	268/3383	2.74%	41/1494
E	Trevor	3.97%	24/605	2.04%	5/245
Total		**10.05%**	**844/8397**	**10.25%**	**434/4233**

The columns "*Pure%" and "*Mixed%" indicate the verb types and the percentage of non-adult-like null DOs each one has; both columns take as a reference the overall DO production (=100%). "Tokens" refers to the number of occurrences of each verb type followed by a non-adult-like null DO out of the total number of occurrences of such verbs in the participants' corpora. The data from all the participants are collapsed in the "Total" row.

From Table 46 it can be noted that overall the non-adult-like null DO rates of the pure transitive verbs are slightly lower than those of the mixed verbs across the ten participants' data, as suggested in the total row. When taking a look at the participants' data individually, this is so in seven out of the ten participants (i.e. Timmy, Sophie, Alicia, Llywelyn, Charlotte, Leo and Naomi). The statistical analysis shows that the five C-E bilinguals produce non-adult-like null

DOs with both verb types significantly more frequently than their S-E bilingual and E monolingual counterparts ($p=.15$ with pure transitive verbs and $p=.17$ with mixed verbs).

Table 47 shows the distribution of the non-adult-like null DO rates of the two verb types across the participants' different developmental stages.

Table 47. *Null DO Rates Produced by the Participants per Developmental Stages

L1(s)	Participant	Stage I (MLU <2.4)				Stage II (2.4≤MLU≤3.5)				Stage III (MLU >3.5)			
		*Pure%	Tokens	*Mixed%	Tokens	*Pure%	Tokens	*Mixed%	Tokens	*Pure%	Tokens	*Mixed%	Tokens
C-E	Timmy	-	-	-	-	20.34%	59/290	16.06%	31/193	12.18%	29/238	18.62%	35/188
C-E	Sophie	25.33%	19/75	19.23%	10/52	24.52%	90/367	29.39%	82/279	-	-	-	-
C-E	Alicia	19.83%	24/121	29.55%	13/44	29.46%	38/129	29.23%	19/65	-	-	-	-
C-E	Llywelyn	0%	0/4	75%	3/4	31.34%	105/335	27.75%	63/227	-	-	-	-
C-E	Charlotte	0%	0/24	23.53%	4/17	9.89%	62/627	14.39%	38/364	-	-	-	-
S-E	Leo	14.94%	13/87	15.38%	10/65	2.63%	2/76	4.88%	2/41	2.14%	8/373	4%	9/225
S-E	Simon	3.08%	2/65	14.63%	6/41	1.82%	1/55	2.56%	1/39	2.70%	10/370	3.78%	9/238
E	Naomi	11.76%	18/153	15.22%	7/46	7.36%	69/937	9.89%	45/455	5.45%	3/55	9.09%	1/11
E	Peter	49.32%	108/219	25.76%	17/66	15.21%	73/480	4.32%	6/139	3.24%	87/2684	1.40%	18/1289
E	Trevor	-	-	-	-	5.02%	14/279	2.56%	3/117	3.07%	10/326	1.56%	2/128
Total		24.60%	184/748	20.90%	70/335	14.35%	513/3575	15.11%	290/1919	3.63%	147/4046	3.56%	74/2079

As Rispoli (1992) points out, on average, children are not able to establish the sensitivity to the relationship between DO realization and discourse context until their MLU reaches 2.4 and age reaches approximately 2;03 (c.f. chapter 2, subsection 2.1.1). This is to say, before they achieve the required MLU level, children will not be able to associate DO realization with discourse conditions. From Table 47 it can be seen that at Stage I, where the participants' MLU values are lower than 2.4, the percentages of their non-adult-like null DO production with both verb types are quite high regardless of their L1(s). However, at this stage, the overall percentage of non-adult-like null DOs is higher with pure transitive verbs (24.60%) than with mixed verbs (20.90%). This result is contrary to Ingham's (1993) analysis concerning the issue of input ambiguity and language transfer (c.f. chapter 2, subsection 2.1.1) which suggests that children will produce more non-adult-like null DOs with mixed verbs than with pure transitive verbs because pure transitive verbs do not demonstrate any ambiguity in terms of usage as they are

always followed by an overt DO, while mixed verbs are presented with two alternatives depending on the discourse context and so they are either followed by an overt DO or a null DO.

The results of a two-way ANOVA which examines the effect of L1(s) and verb type on the production of non-adult-like null DOs show that, at Stage I, there is no significant interaction between the effects of both factors on the frequency of non-adult-like null DOs ($F(2, 10)$)=1.325, p=.309). Moreover, at this stage, there is no statistically significant difference in non-adult-like null DO production among the three different language groups (p=.309). Furthermore, the difference in non-adult-like null DO rates with pure transitive verbs and with mixed verbs is found statistically insignificant (p=.475). A simple main effects analysis also confirms that there is no difference in the performance of non-adult-like null DO production with both verb types among the three language groups at this stage (C-E: p=.077, S-E: p=.750, E: p=.595).

Stage II witnesses a sharp drop in the percentage of non-adult-like null DO production in the S-E bilingual group as well as in the E monolingual group. This finding is in line with Rispoli's (1992) theory (c.f. chapter 2, subsection 2.1.1). However, this decrease is not found in the C-E bilingual group. In fact, at Stage II, the three C-dominant C-E bilingual participants (i.e. Sophie, Alicia and Llywelyn) whose data are available at Stage I, even produce non-adult-like null DOs with higher frequency than at Stage I. Timmy, the other C-dominant C-E bilingual, produces non-adult-like null DOs with both verb types with noticeably higher frequency when compared to the participants in the other two language groups. Charlotte, the only E-dominant C-E bilingual, produces non-adult-like null DOs with both verb types at rates that are slightly higher when compared to the participants in the other two language groups. The overall non-adult-like null DO rate with pure transitive verbs (14.35%) is slightly lower than that with mixed verbs (15.11%). The results of a two-way ANOVA show that at this stage there is no significant

interaction between the effects of L1(s) and verb type on the percentage of non-adult-like null DO production (F(2, 14)=.228, p=.799) either. What is more, the difference in figure between the non-adult-like null DO rates with both verb types does not reach statistical significance (p=.847), but there are significant differences between L1(s) (p<.001): the C-E bilinguals behave significantly different from the S-E bilinguals (p<.001) as well as from the E monolinguals (p=.001); the S-E bilinguals and the E monolinguals behave similarly (p=.564). A simple main effects analysis shows that there is no statistically significant difference in the performance of non-adult-like null DO production with both verb types across the three language groups (C-E: p=.952, S-E: p=.823, E: p=.513) though. This suggests that although differences across languages do exist in the performance of DO realization, they are not translated into differences between the two verb types.

At Stage III, the percentage of non-adult-like null DOs continues to decrease in the participants' data, but the C-E bilinguals' non-adult-like null DO rates with both verb types remain high while all the five participants in the other two language groups produce non-adult-like null DO rates below 10%. The non-adult-like null DO rates with pure transitive verbs and with mixed verbs are very close to each other (3.63% *versus* 3.56%). The results of a two-way ANOVA show that at this stage, there is no significant interaction between the effects of L1(s) and verb type on the frequency of non-adult-like null DOs (F(2, 6))=1.072, p=.400). What is more, there are statistically significant differences in non-adult-like null DO production among the three different language groups (p=.004): the C-E bilinguals behave statistically significantly differently from the S-E bilinguals (p=.004) as well as from the E monolinguals (p=.005) while the S-E bilinguals' and the E monolinguals' performances are comparable (p=.886). Similar to what is found at Stage II, the differences performance across the different language groups are

not translate into difference between the two verb types (*p*=.166). A simple main effects analysis shows that there is no difference in the performance of non-adult-like null DO production with both verb types among the three language groups at this stage either (C-E: *p*=.137, S-E: *p*=.600, E: *p*=.966). These results are similar to what has been found at Stage II. That is, there is a statistically significant difference in the performance of DO realization among the three language groups; however, no statistically significant difference is found between DO realization with pure transitive verbs and with mixed verbs. This means that verb type may not be a factor that affects children's DO realization.

The results provide positive evidence for Hypothesis #4 regarding the relation between language interference and input ambiguity. That is, since all transitive verbs can take either an overt DO or a null DO in Chinese while, in English, only mixed verbs have this characteristic and pure transitive verbs should always be followed by an overt DO, the ambiguity caused by the two types of verbs in English would trigger interference from Chinese which provides no ambiguity in terms of DO realization, and, as a result, the C-E bilingual participants produce non-adult-like null DOs significantly more frequently than the children in the other two language groups due to interference from Chinese.

What is more, the results above do not support Hypothesis #6 regarding the relation between language interference and verb type. Despite the fact that the non-adult-like null DO rates are found higher with mixed verbs than with pure transitive verbs in seven out of the ten participants' data as shown in Tables 43 and 44, the overall non-adult-like null DO rates of the total of the ten participants' data do not always show the same patterns: when looking at the break-down data, the non-adult-like null DOs rates with pure transitive verbs are higher than those with mixed verbs at two of the three developmental stages (i.e. Stage I and Stage III).

Statistical analyses have shown that the differences in the non-adult-like null DO rates with the two verb types have not reached statistical significance across the three language groups. These results suggest that although verb type has been found to be a factor that affects children's DO realization in some previous studies (e.g. Ingham (1993) (c.f. chapter 2, subsection 2.1.1)), it does not appear to be a significant factor in the present study. In other words, the participants in the present study are no found as faithful as the participants in Ingham's study to the language input; that is, they do not avoid producing transitive structures that they cannot trace in the input.

A further classification of the ten participants' data has been done which allows us to carry out more detailed qualitative analyses of the data on the topic under investigation. The classification of the data in these cases has been carried out not only in terms of verb type (pure transitive *versus* mixed verbs) but also in terms of verbal lexicon, that is, in terms of the specific individual verbs used by the children. This provides us with a more detailed account of each target child's English production. Table 48 shows the five most frequent pure transitive verbs that are found across most of the ten participants' data.

Table 48. Frequency of Non-adult-like Null DOs with Pure Transitive Verbs in English

L1(s)	participant	Get		Like		Put		Take		Want	
		*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens
C-E	Timmy	7.89%	6/76	4.48%	3/67	42%	21/50	23.53%	4/17	4.94%	4/81
C-E	Sophie	32.82%	7/22	15.91%	7/44	63.16%	12/19	53.13%	17/32	16.75%	35/209
C-E	Alicia	-	-	12.12%	8/66	53.85%	7/13	-	-	21.30%	23/108
C-E	Llywelyn	3.70%	1/27	6.45%	2/31	53.76%	50/93	-	-	1.85%	1/54
C-E	Charlotte	2.94%	1/34	-	-	18.18%	14/77	11.54%	3/26	4.95%	10/202
S-E	Leo	0%	0/17	0%	0/23	0%	0/52	5.56%	1/18	0.63%	1/159
S-E	Simon	-	-	0%	0/34	3.33%	1/30	3.23%	1/31	0%	0/185
E	Naomi	12.15%	13/107	8.33%	6/72	15.58%	12/77	8%	4/50	2.35%	6/255
E	Peter	1.89%	9/475	0%	0/16	14.87%	80/538	9.51%	25/263	0.21%	1/481
E	Trevor	2.26%	3/133	-	-	10.39%	8/77	5.56%	1/18	0%	0/67
Total		**4.49%**	**40/891**	**7.37%**	**26/353**	**19.98%**	**205/1026**	**12.31%**	**56/455**	**4.50%**	**81/1801**

The column "*Null DO%" indicates the percentage of non-adult-like null DOs taken by each verb. "Tokens" refers to the occurrences of each verb that is followed by a non-adult-like null DO out of its total number of occurrences in the available data.

From Table 48 it can be found that the four C-dominant C-E bilingual participants overall produce higher non-adult-like null DO rates when compared to the E-dominant bilingual participants as well as to the participants in the other two language groups. Apart from this, in their data, among the verbs that take non-adult-like null DOs most frequently, the verb *put* stands out as having a fairly high non-adult-like null DO rate (from 42% to 63%) whereas other verbs vary a lot in their frequency in this respect. The non-adult-like usage of the verb *put* produced by these four C-E bilingual children is illustrated in (174).

(174)   a.*Put *e* here.   (Timmy 2;04)
        b.*Put *e* in there.   (Sophie 2;08)
        c.*I'll put *e* here.   (Alicia 3;00)
        d.*I put *e* here.   (Llywelyn 2;11)
                                                                                  (Yip-Matthews corpus, CHILDES)

The sentential pattern of examples in (174), whereby the verb *put* is directly followed by a locative as an obligatory complement, is very similar to the structure in Chinese, as shown in the two examples in (175):

(175)   a. Baai2 (hai2) *e* li1dou6.   (Yip and Matthews 2005: 2426)
              put   here
           "Put Ø (it) here."

        b. Ngo5 fong3 *e* (hai2) soeng6min6.
            I   put   top
           "I put Ø (it) on Ø (the) top."

Such null-object structures are very common in Chinese and can be found abundantly in the C-E bilinguals' Chinese production within a parallel time frame (i.e. between 2;00 and 3;00), as in the four examples in (176):

(176) a. Baai2 *e* li1dou6.   (Timmy 2;04)
     put   here
    "Put it here."

     b.Ngo5 baai2 *e* hai1 dou6 sin1.   (Sophie 2;09)
      I   put   here   first
     "I put it here first."

     c. Baai2 *e* hai1 nei1dou6.   (Alicia 3;00)
      Put   at   here
     "I put it here."

     d. Baai2 *e* nei1dou6 aa3.   (Llywelyn 2;11)
     put   here
     "Put it here."

                   (Yip-Matthews corpus, CHILDES)

Contrarily, in the E-dominant C-E bilingual participant's corpus (i.e. Charlotte), while the verb *put* still takes non-adult-like null DOs quite frequently, its figure does not stand out among the other verbs.

In the case of the two S-E bilingual participants, there is not a particular verb whose percentage of non-adult-like null DOs stands out in their data, as all the verbs vary in their frequency of taking non-adult-like null DOs. This lack of consistency suggests that the usage of these verbs with regards to DO realization in Spanish, which is very similar to that in English, may not have a significant influence on the two S-E bilingual participants' English production.

As for the three E monolingual participants, there is no common verb that distinguishes itself as taking non-adult-like null DOs with higher frequency in their data, either, a result that is similar to what is found in the S-E bilingual participants' data.

Table 49 shows the five most frequent mixed verbs that are found across most of the ten participants' data.

Table 49. Frequency of Non-adult-like Null DOs with Mixed Verbs in English

L1(1)	Participant	Play		Eat		See		Buy		Say	
		*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens	*Null DO%	Tokens
C-E	Timmy	33.33%	6/18	13.85%	9/65	10%	1/10	10%	1/10	10%	1/10
C-E	Sophie	-	-	37.33%	28/75	35%	14/40	55%	11/20	-	-
C-E	Alicia	-	-	52.63%	10/19	33.33%	6/18	-	-	-	-
C-E	Llywelyn	-	-	29.27%	12/41	33.33%	11/33	-	-	-	-
C-E	Charlotte	7.14%	1/14	23.08%	3/13	26.67%	4/15	10%	1/10	-	-
S-E	Leo	0%	0/14	2.56%	1/39	13.85%	9/65	-	-	0%	0/13
S-E	Simon	-	-	0%	0/20	17.11%	13/76	-	-	0%	0/11
E	Naomi	5.56%	1/18	9.23%	6/65	6.90%	4/58	-	-	-	-
E	Peter	1.18%	1/85	0%	0/54	1.24%	3/242	0%	0/13	0%	0/25
E	Trevor	-	-	6.52%	3/46	0%	0/25	-	-	6.25%	1/16
Total		6.04%	9/149	16.48%	72/437	11.17%	65/582	24.53%	13/53	1.33%	2/75

Table 49 shows that, despite the fact that all the C-E bilingual produce higher non-adult-like null DO rates than the participants from the other two language groups, no verbs stand out as taking non-adult-like null DOs most frequently across the participants' data.

When analyzing the data by means of a developmental approach with the division of the one-year investigation period into three stages according to the children's MLU values, the results are found similar to those with the overall data. That is, no verb stands out as taking non-adult-like null DOs with higher frequency in the two S-E bilingual participants' data in any of the stages. Neither does this show in the three E monolingual participants' data nor in the E-dominant C-E participant's data. Meanwhile, the verb *put* in the four C-dominant C-E bilingual participants' data distinguishes itself in all the three stages by appearing to have a high rate of non-adult-like null DOs.

To sum up, it is found that there are some common characteristics across the C-dominant C-E bilinguals' data; that is, the verb *put* stands out as taking non-adult-like null DOs with high frequency; such characteristics are not shared by the data of the E-dominant C-E bilingual participant not by the participants from the other two language groups.

The following three subsections (i.e. subsections 4.1.2.2-4.1.2.4) provide a more detailed comparison in terms of verb types as well as verbal lexicon within the three language groups.

4.1.2.2 Comparison within the C-E Bilingual Group

Considering the five C-E bilinguals' data, it can be found that the participants produce a higher rate of non-adult-like null DOs with mixed verbs than with pure transitive verbs in a general term. Tables 50-54 below deal with the five C-E participants' data individually.

Table 50. Frequency of *Null DOs in Timmy's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	16.67%	88/528	Average across the period	17.32%	66/381
Find	42.11%	8/19	Cut	54.55%	6/11
Put	42%	21/50	Play	33.33%	6/18
Open	35.29%	6/17	Bite	21.43%	6/28
Give	26.67%32	4/15	Save	14.29%	2/14
Take	23.53%	4/17	Eat	13.85%	9/65
Do	20%	3/15	Draw	12%	3/25
Make	16.67%	3/18	See	10%	1/10
Have	10.34%	6/58	Buy	10%	1/10
Fight with	9.09%	1/11	Say	10%	1/10
Get	7.89%	6/76	Shoot	8.33%	2/24
Want	4.94%	4/81			
Like	4.48%	3/67			

Those verbs that have appeared less than 10 times in total in the available data across the investigation period are not included in the table, for I consider them quantitatively insufficient to be analyzed individually.

As shown in Table 50, Timmy's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 16.67% and that with mixed verbs is 17.32%. Among the pure transitive verbs which Timmy uses with non-adult-like null DOs, the frequency varies between 4% for *like* and *want* and 42% for *find* and *put*. Among the mixed verbs used by the

participant with non-adult-like null DOs, the frequency varies between 8% for *shoot* and 54% for *cut*.

Table 51. Frequency of *Null DOs in Sophie's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	24.66%	109/442	Average across the period	27.79%	92/331
Put	63.16%	12/19	Buy	55%	11/20
Take	53.13%	17/32	Drink	45%	9/20
Open	50%	5/10	Eat	37.33%	28/75
Give	34.62%	9/26	Tell	36.36%	4/11
Get	32.82%	7/22	See	35%	14/40
Want	16.75%	35/209	Draw	30%	3/10
Like	15.91%	7/44	Know	3.17%	2/63
Have	6.25%	1/16	Kill	0%	0/10

As in Table 51, Sophie's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 24.66% and that with mixed verbs is 27.79%. Among the pure transitive verbs which the participant uses with non-adult-like null DOs, the frequency varies between 6% for *have* and 63% for *put*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *kill* and 55% for *buy*.

Table 52. Frequency of *Null DOs in Alicia's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	24.80%	62/250	Average across the period	29.36%	32/109
Put	53.85%	7/13	Eat	52.63%	10/19
Open	41.67%	5/12	See	33.33%	6/18
Have	29.17%	7/24	Write	14.29%	2/14
Want	21.30%	23/108	Wash	12.50%	2/16
Like	12.12%	8/66			

Table 52 shows that Alicia's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 24.80% and that with mixed verbs is 29.36%. Among the pure transitive verbs which the participant uses with non-adult-like null DOs, the frequency varies between 12% for *like* and 53% for *put*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 12% for *wash* and 52% for *eat*.

Table 53. Frequency of *Null DOs in Llywelyn's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	30.97%	105/339	Average across the period	28.57%	66/231
Open	76.19%	16/21	See	33.33%	11/33
Put	53.76%	50/93	Eat	29.27%	12/41
Close	52.94%	9/17	Read	0%	0/10
Give	45.45%	5/11			
Make	42.86%	6/14			
Let	6.67%	1/15			
Like	6.45%	2/31			
Get	3.70%	1/27			
Want	1.85%	1/54			

Llywelyn's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 30.97% and that with mixed verbs is 28.57%, as shown in Table 50. Among the pure transitive verbs which the participant uses with non-adult-like null DOs, the frequency varies between 1% for *want* and 76% for *open*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *read* and 33% for *see*.

Table 54. Frequency of *Null DOs in Charlotte's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	9.63%	62/651	Average across the period	14.95%	42/281
Color	42.86%	6/14	Try	36.36%	4/11
Open	18.75%	3/16	See	26.67%	4/15
Put	18.18%	14/77	Finish	25%	3/12
Give	16.67%	3/18	Eat	23.08%	3/13
Take	11.54%	3/26	Know	18.18%	2/11
Do	9.52%	2/21	Draw	15.79%	9/57
Wear	7.69%	3/39	Buy	10%	1/10
Look at	6.67%	1/15	Play	7.14%	1/14
Have	5%	2/40	Wash	7.14%	1/14
Want	4.95%	10/202	Help	0%	0/15
Make	4.17%	1/24			
Get	2.94%	1/34			
Need	0%	0/13			
Find	0%	0/16			
Let	0%	0/23			

From Table 54 it can be noted that, as the only E-dominant C-E bilingual in the present study, Charlotte's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 9.63% and that with mixed verbs is 14.95%. The figures are much lower than those produced by the C-dominant C-E bilinguals. Among the pure transitive verbs which the participant uses with non-adult-like null DOs, the frequency varies between 0% for *find* and *need*, and 42% for *color*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *help* and *need* and 36% for *try*.

All the non-adult-like null DO structures in English that have been presented in Tables 50-54 can find their parallel structures in Chinese in which they find themselves legitimate according to the Chinese adult grammar, as the following English-Chinese pairs in (177)-(183) show:

(177) a.*Take *e* out.   (Timmy 2;04)
       b. Lo1 *e* ceot1lai4.
         Take   out
        "Take it out."

(178) a.*I didn't find *e*.   (Timmy 2;04)
       b. Ngo5 wan2 m4 dou3 *e*.
         I   find not
        "I didn't find it."

(179) a.*I cut *e*.   (Llywelyn 2;10)
       b. Ngo5 cit3.
         I   cut
        "I cut it."

(180) a.*You cannot eat *e*.   (Llywelyn 2;10)
       b. Nei5 m4 ho2ji5 sik6 *e*.
         You not can   eat
        "You cannot eat it."

(181) a.*Put *e* here.   (Charlotte 2;10)
       b. Fong3 *e* hai6 nei1dou6
         put   at   here
        "Put it here."

(182) a.*You like *e*? (Sophie 2;09)
       b.Nei5 zung1ji3 *e* aa3?
          You   like
         "Do you like it?"

(183) a.*I want *e*. (Alicia 2;09)
       b.Ngo5 jiu1 *e*.
          I   want
         "I want it."

                                     (Yip-Matthews corpus, CHILDES)

In examples (177)-(183), sentences in (a) are taken from the Yip-Matthews corpus in CHILDES while sentences in (b) are the Chinese equivalences of sentences in (a). All the seven sentences in (a) are non-adult-like due to the absence of an obligatorily overt DO given the discourse context established between the participants and the interlocutor(s). However, it is observed that the structure of sentences in (a) is considered adult-like in Chinese. Therefore, when sentences in (a) are translated into Chinese, preserving the original structure, as shown in sentences in (b), they are regarded to be adult-like. Furthermore, these examples, among others, are extracted from the data produced by the target C-E bilingual children when they were older than 2;03 and their MLU values surpassed 2.4, the landmarks proposed by Rispoli (1992) regarding when children start to establish the sensitivity to the relationship between DO realization and discourse context (c.f. chapter 2, subsection 2.1.1). Therefore, it will be reasonable to assume that the frequent production of non-adult-like null DOs by the five C-E bilinguals is not the result of insensitivity to the relationship between DO realization and discourse context, but of interference from Chinese into English.

However, there is a noticeable difference between the performance of the four C-dominant bilinguals and the E-dominant bilingual: the C-dominant bilinguals produce non-adult-like null DOs with a much higher frequency with both pure transitive verbs and mixed verbs when compared to the E-dominant bilingual; the verb *put* stands out across the C-dominant

bilinguals' data as taking non-adult-like null DOs most frequently; the same verb does not distinguish itself in the E-dominant participant's data. This result is parallel to that found in the S-E bilinguals' and the E monolinguals' data. In other words, the E-dominant participant's performance is more similar to the participants' in the other two language groups when compared to her C-dominant C-E counterparts from a qualitative perspective.

4.1.2.3 Comparison within the S-E Bilingual Group

From Tables 46 and 47 above it can be noted that qualitatively there is no noticeable difference between the performances of the two S-E bilingual participants: the non-adult-like null DO rates are higher with mixed verbs than with pure transitive verbs overall and during all the three developmental stages when breaking down the data. The data from the two S-E bilingual children are further classified in terms of verbal lexicon, as shown in Tables 55 and 56.

Table 55. Frequency of *Null DOs in Leo's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	4.29%	23/536	Average across the period	6.34%	21/331
Close	20%	3/15	Throw	27.27%	3/11
Make	18.18%	2/11	See	13.85%	9/65
Find	13.33%	2/15	Read	10%	1/10
Give	8.33%	1/12	Tell	8.33%	1/12
Have	5.56%	3/54	Eat	2.56%	1/39
Take	5.56%	1/18	Say	0%	0/13
Want	0.63%	1/159	Play	0%	0/14
Put	0%	0/52	Know	0%	0/42
Need	0%	0/13	Help	0%	0/11
Look at	0%	0/22			
Like	0%	0/23			
Do	0%	0/50			
Get	0%	0/17			
Let	0%	0/27			

As shown in Table 55, Leo's average of non-adult-like null DO rate with pure transitive verbs over the investigation period is 4.29% and that with mixed verbs is 6.34%. Among the pure transitive verbs which he uses with non-adult-like null DOs, the frequency varies between 0% for *let*, *get*, *do*, *like*, *look at*, *need*, *put* and *want*, and 20% for *close*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *help*, *know*, *play*, and *say*, and 27% for *throw*.

Table 56. Frequency of *Null DOs in Simon's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	2.65%	13/490	Average across the period	5.03%	16/381
Make	6.25%	1/16	See	17.11%	13/76
Do	4.55%	2/44	Say	0%	0/11
Put	3.33%	1/30	Tell	0%	0/12
Take	3.23%	1/31	Know	0%	0/28
Like	0%	0/34	Help	0%	0/10
Have	0%	0/32	Eat	0%	0/20
Want	0%	0/185	Read	0%	0/18
Let	0%	0/36			

Table 56 shows that Simon's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 2.65% and that with mixed verbs is 5.03%. The non-adult-like null DO rate with each verb (both pure transitive verbs and mixed verbs) is overall very low. Among the pure transitive verbs which he uses with non-adult-like null DOs, the frequency varies between 0% for *let, want*, *have* and *like*, and 6% for *make*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *read*, *eat*, *help*, *know*, *tell* and *say*, and 17% for *see*.

From Tables 55 and 56 it can be noted that there is not a particular verb whose percentage of non-adult-like null DO rate stands out in the two S-E participants' data, and that all the verbs vary in their frequency of taking non-adult-like null DOs. This lack of consistency is

very similar to what is found in the E monolinguals' data. What is more, the incidence of non-adult-like null DOs in the S-E bilinguals' data is found statistically similar to that in the E monolinguals' data (c.f. chapter 4, subsection 4.1.2.1). These results suggest that the usage of these verbs with regard to DO realization in Spanish, which is very similar to that in English (c.f. chapter 1, sections 1.3 and 1.4), may not have a significant influence on the two S-E bilingual participants' English production from a qualitative perspective.

4.1.2.4 Comparison within the E Monolingual Group

Tables 46 and 47 show that, on the one hand, Naomi produces higher non-adult-like null DO rates with mixed verbs than with pure transitive verbs; on the other hand, Peter and Trevor produce higher non-adult-like null DO rates with pure transitive verbs than with mixed verbs. However, the results of Independent-Samples T-tests across the three participants' data have shown that the difference between the non-adult-like null DO rates with pure transitive verbs and mixed verbs is not statistically significant across the three E monolinguals ($t(14)=.616$, $p=.548$). Tables 57, 58 and 58 provide a further classification of the E monolingual participants' data in terms of verbal lexicon.

Table 57. Frequency of *Null DOs in Naomi's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	7.67%	90/1173	**Average across the period**	10.35%	53/512
Fix	29.41%	5/17	**Throw**	20%	3/15
Open	28.57%	6/21	**Wash**	18.92%	7/37
Put	15.58%	12/77	**Draw**	18.75%	6/32
Get	12.15%	13/107	**Push**	16%	4/25
Drop	11.76%	2/17	**Drink**	11.76%	4/34
Let	10%	1/10	**Leave**	10%	1/10
Like	8.33%	6/72	**Cook**	10%	1/10
Take	8%	4/50	**Eat**	9.23%	6/65
Do	7.58%	3/66	**See**	6.90%	4/58
Change	6.67%	1/15	**Break**	6.67%	1/15
Spank	6.67%	1/15	**Play**	5.56%	1/18
Hold	6.25%	1/16	**Read**	0%	0/30
Make	5.56%	2/36	**Know**	0%	0/25
Have	4.69%	3/64			
Need	4.08%	2/49			
Find	3.57%	1/28			
Look at	3.57%	2/56			
Want	2.35%	6/255			

Table 57 shows that Naomi's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 7.67% and that with mixed verbs is 10.35%; such difference is not statistically significant ($F(1, 29)=.58$, $p=.812$). Among the pure transitive verbs which the participant uses with non-adult-like null DOs, the frequency varies between 2% for *want* and 29% for *fix*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *read* and *know*, and 20% for *throw*.

Table 58. Frequency of *Null DOs in Peter's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	7.92%	268/3383	Average across the period	2.74%	41/1494
Hit	50%	8/16	Push	22.73%	10/44
Open	38.36%	61/159	Throw	19.05%	4/21
Close	31.75%	20/63	Read	16.67%	2/12
Move	27.27%	6/22	Carry	9.09%	1/11
Dump	25%	3/12	Drink	6.67%	1/15
Put	14.87%	80/538	Draw	5%	1/20
Turn	14.71%	5/34	Ride	3.23%	2/62
Touch	13.64%	3/22	Show	2.38%	1/42
Fix	13.59%	14/103	See	1.24%	3/242
Take	9.51%	25/263	Play	1.18%	1/85
Screw	8.33%	1/12	Write	0.96%	2/209
Turn off	6.25%	1/16	Leave	0%	0/23
Put on	5.56%	1/18	Knock	0%	0/12
Do	2.91%	5/172	Catch	0%	0/11
Turn on	2.86%	1/35	Help	0%	0/26
Give	2.47%	2/81	Pull	0%	0/10
Find	2.44%	2/82	Eat	0%	0/54
Bring	2.27%	1/44	Drive	0%	0/21
Play with	2.27%	1/44	Try	0%	0/47
Make	2.20%	2/91	Break	0%	0/27
Use	2%	1/50	Hurt	0%	0/11
Get	1.89%	9/475	Watch	0%	0/21
Have	1.53%	2/131	Cut	0%	0/10
Look at	0.85%	1/117	Think	0%	0/12
Let	0.85%	2/236	Sing	0%	0/10
Want	0.21%	1/481	Hear	0%	0/13
Need	0%	0/53	Know	0%	0/38
Like	0%	0/16	Buy	0%	0/13
Wait for	0%	0/11	Say	0%	0/25
Lock	0%	0/20			

As Table 58 shows, Peter's average non-adult-like null DO rate with pure transitive verbs over the investigation period is 7.92% and that with mixed verbs is 2.74%. Though the non-adult-like null DO rates in his data appear higher with mixed verbs than with pure transitive verb, the result of an Independent-Samples T-test on his data show that such difference is not statistically significant ($t(4)=.766$, $p=.487$). Among the pure transitive verbs which he uses with

non-adult-like null DOs, the frequency varies between 0% for *need*, *like*, *wait for* and *lock*, and 50% for *hit*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *leave*, *knock*, *catch*, *help*, *pull*, *eat*, *drive*, *try*, *break*, *hurt*, *watch*, *cut*, *think*, *sing*, *hear*, *know*, *buy* and *say*, and 22% for *push*.

Table 59. Frequency of *Null DOs in Trevor's Data

Pure	*Null DO%	Tokens	Mixed	*Null DO%	Tokens
Average across the period	3.97%	24/605	Average across the period	2.04%	5/245
Make	13.04%	6/46	Eat	6.52%	3/46
Put	10.39%	8/77	Say	6.25%	1/16
Take	5.56%	1/18	Forget	5%	1/20
Give	4.76%	1/21	See	0%	0/25
Have	3.13%	1/32			
Get	2.26%	3/133			
Want	0%	0/67			
Do	0%	0/26			
Find	0%	0/16			
Need	0%	0/16			
Let	0%	0/37			

Table 59 shows that Trevor's average non-adult-like null DO rates are very low with pure transitive verbs (3.97%) if compared to mixed verbs (2.04%). Though such rates appears to be higher with mixed verbs than with pure transitive verbs, the results of an Independent-Samples T-test also confirms that the difference is not statistically significant ($t(2)=1.812$, $p=.212$). Among the pure transitive verbs which he uses with non-adult-like null DOs, the frequency varies between 0% for *want*, *do*, *find*, *need* and *let*, and 13% for *make*. Among the mixed verbs used by the participant with non-adult-like null DOs, the frequency varies between 0% for *see* and 6% for *eat* and *say*.

What can be concluded from Tables 57-59 is that there is not a particular verb which distinguishes itself by taking high non-adult-like null DO rates in all the three E monolingual

participants' data, and that all the verbs vary in their frequency of taking non-adult-like null DOs. These results are similar to what is found in the S-E bilingual participants' data. They suggest that although the null object stage exists in the language acquisition process of E monolinguals, which specific verbs tend to take non-adult-like null DOs more frequently than others may vary from individual to individual.

The qualitative analysis above indicates that, on the one hand, all the participants in the present study do not shown statistically significant differences in DO realization with mixed verbs and with pure transitive verbs regardless of their L1(s). In other words, the participants produce non-adult-like null DOs with mixed verbs and with pure transitive verbs to a statistically similar extent.

On the other hand, the C-E participants in the present study produce statistically significantly more non-adult-like null DOs with both pure transitive verbs and mixed verbs when compared to the S-E bilingual and E monolingual counterparts though such difference is not translated into a difference between the two verb types. This could be the result of language interference from Chinese to English, since in English transitive verbs can be divided into mixed verbs and pure transitive verbs while there is no such division in Chinese in which all transitive verbs behave as mixed verbs. Therefore, interference from Chinese to English may be reinforced in C-E bilinguals regardless of their dominant language due to input ambiguity in English in that the bilinguals will overextend the unambiguous Chinese system. These facts provide information related to Hypotheses #4 and #6: on the one hand, they provide positive evidence for Hypothesis #4 regarding the relation between language interference and input ambiguity; on the other hand,

this result does not support Hypothesis #6 regarding the relation between language interference and verb type.

What is more, the four C-dominant C-E bilinguals' non-adult-like null DO production shares some common characteristics in terms of verb type (i.e. the verb *put* stands out by taking high non-adult-like null DO rates in the four participants' data), while the production of the other participants in the present study shows no common verb type in this respect. What could be inferred from this is that the Chinese null DO pattern has a considerable impact on the C-dominant C-E bilinguals' English output also from the point of view of the specific lexicon used. This assumption could be further supported by the fact that the common and adult-like structures of the verb *put* in Chinese find their equivalent structures in the target C-E bilingual children's English in which they become non-adult-like according to the standard grammar of the English language, which makes the non-adult-like null DO rates of this verb stand out. At the same time, in the four C-dominant C-E bilingual participants' Chinese production during the parallel period, these structures are found to be abundant. On the contrary, similar results are found in the E-dominant C-E bilingual's, the S-E bilinguals' and the E monolingual participants' data. That is, no verb distinguishes itself by taking non-adult-like null DOs with high frequency. This result supports Hypothesis #2 regarding language transfer in bilingual acquisition. That is, the C-dominant C-E bilinguals produce non-adult-like null DOs qualitatively differently when compared to their E-dominant C-E bilingual, S-E bilingual and E monolingual counterparts.

What can be concluded from the quantitative and qualitative analyses of the English data is that it is very likely that, in the C-E bilinguals' language acquisition process, the null DO mechanism in the Chinese language serves as the basis for the object specification in English; that is, that there is interference from Chinese into English in this respect. The level of

interference is not decided by a single factor, but the result of several intervening factors. On the one hand, the different maturational schedules in Chinese and English may contribute significantly to interference since in the domain of DO, Chinese is expected to mature earlier than English since the DO realization mechanism in Chinese is in line with the initial default option while that in English is not. This means that children have to experience the period of convergence in English while they do not have to in Chinese. During this period of convergence, C-E bilinguals may experience influence from Chinese into English. On the other hand, language ambiguity may also play an important role. That is, in Chinese, all transitive verbs behave in the same way as being able to take overt or null DOs, while in English, transitive verbs can be divided into pure transitive verbs and mixed verbs. Consequently, while there is no ambiguity in Chinese DO realization, ambiguity may occur in English in this respect. Therefore, interference from Chinese to English may be reinforced in C-E bilinguals (regardless of their dominant language) due to input ambiguity in English in that bilinguals will overextend the unambiguous system (i.e. that of Chinese).

Moreover, verb type does not appear to be an important factor in interlingusitic influence in the present study since in all the participants' data regardless of their L1(s), no statistically significant difference is found between non-adult-like null DO rates taken by pure transitive verbs and those taken by mixed verbs.

In addition, overall language proficiency (i.e. the external view on language dominance) in interlinguistic influence is still unclear since the E-dominant C-E bilingual is not found completely different from the C-dominant C-E bilinguals: on the one hand, qualitatively, the verb *put* does not distinguish itself by taking very high non-adult-like null DO rate is Charlotte's data while this is found in all the four the C-dominant C-E bilinguals' data; on the other hand,

quantitatively, Charlotte's performance in terms of non-adult-like null DO rates is comparable to that of Timmy's throughout the investigation period and to that of Sophie's at Stage I. The influence of language dominance will be further explored in section 4.3.

4.2 The Nature of DOs: the Chinese Data

The distribution of DOs in the Chinese data in terms of the nature and the status of DOs are shown in Table 60 for an overall view, and in Table 61 for a developmental view, which correspond to a quantitative analysis. In Tables 62 and 63 a more detailed account based on the adequacy of the overt DOs produced by the participants in the two language groups is shown, which corresponds to a qualitative analysis.

4.2.1. Quantitative Analysis

4.2.1.1 Comparison between the Two Language Groups

Table 60 reflects the distribution of DOs in the Chinese selected data in terms of their nature and their status (i.e. adult-like *versus* non-adult-like; overt *versus* null). Since all overt DOs in Chinese are adult-like (i.e. grammatical) though not necessarily adequate, the distribution of non-adult-like overt DOs is absent.

Table 60. Overall Distribution of DOs in the Target Children's Chinese Data

Participant	Language(s)	Total tokens	Overt	Overt%	Null	*Null	Null%	*Null%
Timmy	C-E	2430	1610	66.26%	804	16	33.09%	0.66%
Sophie	C-E	2417	1296	53.62%	1084	37	44.85%	1.53%
Alicia	C-E	1298	660	50.85%	629	9	48.46%	0.69%
Llywelyn	C-E	949	541	57.01%	404	4	42.57%	0.42%
Charlotte	C-E	257	122	47.47%	126	9	49.03%	3.50%
Total	**C-E**	**7351**	**4229**	**57.53%**	**3047**	**75**	**41.45%**	**1.02%**
Chunyat	C	2399	944	39.35%	1423	32	59.32%	1.33%
Gakei	C	2152	1160	53.90%	984	8	45.72%	0.37%
Kingtsun	C	2276	949	41.70%	1296	31	56.94%	1.36%
Total	**C**	**6827**	**3053**	**44.72%**	**3703**	**71**	**54.24%**	**1.04%**

The column "Language(s)" indicates the L1(s) of the participants involved. The column "Total tokens" refers to the total number of transitive verbs produced by the participants in the selected data. The columns "Overt", "Null" and "*Null" indicate the number of occurrences of adult-like overt DOs, adult-like null DOs and non-adult-like null DOs respectively. The columns "Overt%", "Null%" and "*Null%" show the rate of adult-like overt DOS, adult-like null DOs and non-adult-like null DOs that have appeared in the target children's Chinese transcriptions within the investigation period; the three rates correspond to the overall DO production.

Being a [+ null object] language, null DOs are abundant in adult Chinese (c.f. chapter 1, section 1.3). In the case of child Chinese, and as the results in Table 60 show, all the eight participants produced adult-like null DOs in their Chinese output frequently (33.09%-59.32%), and the figures are higher when compared to the results of various previous studies in child Chinese (22.5% for monolinguals in Wang et al. (1992), 20%-30% in monolinguals in Wong (1998), 12.3%-35.8% in a bilingual child in Yip and Matthews (2005)). Examples of these adult-like null DOs are shown in (184) and (185).

(184)   INV: jau5 coeng1 ge3?
    "Is there any gun?
   CHI: go2dou6 jau5 *e* aa3.   (Timmy 2;07)
    There have
    "There is a gun there."

                  (Yip-Matthews corpus, CHILDES)

(185)   INV: nei5 zi1 m4zi1 nego3 me1lai4 gaa3?
    "Do you know what this is?"
   CHI: zi1 *e*.   (Gakei 2;08)
    know
    "I know what it is."

             (LeeWongLeung corpus, CHILDES)

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In (184) and (185), the utterances produced by the child are governed by a topic chain, in which the referent of the null element in the sentence can be recovered by the discourse topic (i.e. "a gun" in (184) and "what this is" in (185)).

Moreover, as shown in Table 60, overall the C monolinguals produce adult-like null DO rates that are higher than those of the C-E bilinguals though the difference is not as drastic as that found in the English data between the C-E bilinguals and the participants in the other two language groups in terms of non-adult-like null DOs (c.f. chapter 4, subsection 4.1.1.1). The average percentages produced by the five C-E bilinguals are between 33.09% and 49.03% during the one-year investigation period and those produced by the three C monolinguals are between 45.72% and 59.32%. Such difference is translated into C-E bilinguals' preferences for adult-like overt DOs: the adult-like overt DO rates produced by the C-E bilinguals (47.47%-66.26%) are found in general higher when compared to their C monolingual counterparts (39.35%-53.90%). As a point of reference, Wang et al. (1992) also found that, on the one hand, in adult-to-child conversational setting, the null DO rate produced by the Chinese adults was 10.3%, which means that the overt DO rate was 89.7%; on the other hand, in adult-to-adult conversational setting, the null DO rate reached 40.1% and the overt DO rate, 59.9%. The results of an Independent-Samples T-test indicate that the difference found between the C-E bilinguals and the C monolinguals in terms of adult-like overt DO performance is not statistically significant $t(6)=1.861$, $p=.112$. However, from Table 60 it can be seen that the C-E bilinguals produce an adult-like overt DO rate of 57.53% and an adult-like null DO rate of 41.45%, which are closer to the percentages found in adult-to-adult conversation settings in Wang et al.'s (1992) study[17]. In

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[17] This figure achieved in Wang et al's (1992) study is based on Mandarin adult Chinese while the figure found in the present study is based on Cantonese Chinese data.

the case of the C monolinguals the rate of adult-like overt DOs is 44.72% and of adult-like null DOs 54.24%. This indicates that the C-E bilinguals might be more adult-like in terms of DO realization in Chinese than the C monolinguals.

In terms of non-adult-like null DOs, the fact that Chinese is a [+ null object] language makes that most null DO cases fit in the adult-like null DO category, and that all the eight participants are found to produce non-adult-like null DOs at very low rates (0%-0.98%). Instances of such non-adult-like null DOs are shown in examples (186) and (187).

(186)   INV: jau5 di1 me1 tai2 gaa?
             "What is there?"
        CHI: *jau5 *e*.   (Llywelyn 2;02)
           have
           "There is a dog."

(187)   INV: zung6 jau5 mat1je5 aa1?
             "What else is there?"
        CHI: *jau5 *e*.   (Kingtsun 2;05)
           have
           "There is a bike."

                                                    (LeeWongLeung corpus, CHILDES)

In the two examples above, there was no previous context that indicates the referent of the null elements in the utterances; neither did the children adopt any non-linguistic strategies to help the interlocutor recover the value of the null elements, as reflected in the CHAT transcription. Therefore, the information failed to be delivered and the interlocutor did not understand what the children referred to.

Different from what has been found in the English data, in which the non-adult-like null DO rates produced by the participants are reported to decrease as their MLU values increase (c.f. chapter 4, subsection 4.1.1.1), in the Chinese data, no such decrease is found: the participants produced low non-adult-like rates even from the very beginning of the investigation period. Furthermore, no obvious difference is found between the participants in the two language groups

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in terms of non-adult-like null DO production. The results of an Independent-Samples T-test also confirm such observation: no statistically significantly difference is found between the performance of C-E bilinguals and the C monolinguals ($t(6)=.429$, $p=.683$) in terms of non-adult-like null DO production in Chinese.

Table 61 presents the rates of adult-like and non-adult-like DOs produced by the eight participants when dividing the one-year investigation period into three different developmental stages according to the participants' MLU values (c.f. chapter 3, subsection 3.4.2), which offers a developmental view on the data.

Table 61. Frequency of Null and *Null DOs Corresponding to the three Developmental Stages

Participant	L1(s)	Stage I (MLU <2.4)				Stage II (2.4≤MLU≤3.5)				Stage III (MLU >3.5)			
		Total tokens	Overt%	Null%	*Null%	Total tokens	Overt%	Null%	*Null%	Total tokens	Overt%	Null%	*Null%
Timmy	C-E	-	-	-	-	415	62.41%	36.87%	0.72%	2015	67.05%	32.31%	0.65%
Sophie	C-E	-	-	-	-	2417	53.62%	44.85%	1.53%	-	-	-	-
Alicia	C-E	-	-	-	-	370	45.68%	53.24%	1.08%	928	52.91%	46.55%	0.54%
Llywelyn	C-E	72	44.44%	51.39%	4.17%	877	58.04%	41.85%	0.11%	-	-	-	-
Charlotte	C-E	41	56.10%	41.46%	2.44%	216	45.83%	50.46%	3.70%	-	-	-	-
Total	**C-E**	**113**	**48.67%**	**47.79%**	**3.54%**	**4295**	**54.30%**	**44.47%**	**1.23%**	**2943**	**62.59%**	**36.80%**	**0.61%**
Chunyat	C	812	31.16%	67.36%	1.48%	1587	43.54%	55.20%	1.26	-		-	-
Gakei	C	145	37.24%	62.76%	0%	967	51.29%	48.29%	0.41%	1040	58.65%	40.96%	0.38%
Kingtsun	C	1867	38.24%	60.26%	1.50%	409	57.46%	41.81%	0.73%	-		-	-
Total	**C**	**2824**	**36.15%**	**62.43%**	**1.42%**	**2963**	**47.99%**	**51.10%**	**0.91%**	**1040**	**58.65%**	**40.96%**	**0.38%**

Regarding adult-like DO production, the break-down data in Table 61 show that, overall as the participants' MLU values increase, the adult-like null DO rates decrease though such decrease is slow. The E-dominant C-E bilingual (i.e. Charlotte) is the only exception as it is shown that her adult-like null DO rate increases from Stage I to Stage II. As in the case of the overall data, the decrease of the adult-like null DO rates produced by seven out of the eight participants is translated into the increase of their adult-like overt DO rates. At Stage III, the participants in both language groups produce adult-like overt DO rates (C-E bilinguals: 62.59%, C monolinguals: 58.65%) very close to that found in adult-to-adult conversational setting (59.9%,

Wang et al. 1992). What is more, it is also found that at Stage I, the C-E bilingual participants produce adult-like overt DOs with much higher frequency (12.5%) when compared to their C monolingual counterparts. The difference is reduced at Stage II (6.3%) and the gap further shrinks at Stage III (4%). This is demonstrated clearly in Figure 19, which is a developmental graph of the participants' adult-like overt DO production.

Figure 19. Developmental Graph of the Participants' Production of Overt DOs in Chinese
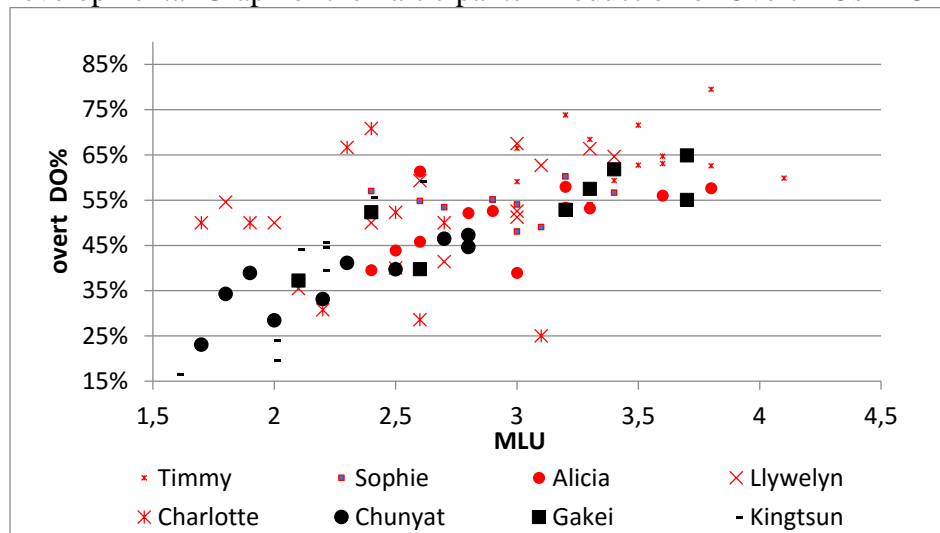
Since there is no available data at Stage I in Timmy's, Sophie's and Alicia's corpora and in Sophie's, Llywelyn's, Charlotte's, Chunyat's and Kingtsun's at Stage III (c.f. Table 59), an overall developmental view is taken by collapsing the participants' data based on their L1(s). Figure 19 shows that the three C monolinguals (in black) produce lower adult-like overt DO rates at the beginning of the investigation period (i.e. Stage I) when compared to the five C-E bilinguals (in red): when the children's MLU values are lower than 2.4, the monthly adult-like overt DO rates of the C monolinguals are consistently below 45% while those of the C-E bilinguals are in general above 50% with only two exceptions: Llywelyn produces 35.48% of adult-like overt DOs when his MLU value reaches 2.1 and Charlotte produces 30.77% of adult-like overt DOs when her MLU value is 2.3. The gap between the participants in the two language

groups then reduces as the participants' MLU values increase and the performances of the participants in the two language groups assimilate. This indicates that at Stage I, the C-E bilinguals produce percentages of adult-like overt DOs with frequency that approximates more to what is found in adult-to-adult settings when compared to the C monolinguals. However, at the latter two stages, the difference between the performances of the two language groups reduces.

The results of an Independent-Samples T-Test on the developmental data show that the difference in the performance of the participants in the two language groups in terms of adult-like overt DOs is statistically significant ($t(84)=4.651$, $p<.001$), and that the C-E bilinguals produce adult-like overt DOs with statistically significantly higher frequency.

A two-way ANOVA is also conducted that examines the effect of L1(s) and stage on adult-like overt DO production. The results show that there is no significant interaction between the effects of L1(s) and stage on adult-like null DO production ($F(2, 80)=2.095$, $p =.130$) while a statistically significant difference is found between the participants in the two language groups ($F(1, 80)=7.646$, $p=.007$) as well as the participants' performance at different stages ($F(2, 80)=13.522$, $p<.001$). A simple main effect analysis shows that at Stage I, the C monolinguals produce adult-like overt DOs with statistically significantly lower frequency ($p=.002$) when compared to their C-E bilingual counterparts; such difference becomes statistically non-significant from Stage II on ($p=.207$) and at Stage III, the difference between the participants' performance in terms of adult-like overt DOs maintains statistically non-significant ($p=.641$). These results confirm the observation above that the C-E bilinguals produce adult-like overt and null DOs at a rate that is statistically significantly more closer to that found in adult-to-adult conversation settings (Wang et al. 1991) at Stages I when compared to the C monolinguals, but such difference disappears at Stages II and III. Furthermore, the results of a simple main effect

analysis also show that, on the one hand, in the C-E bilinguals' data, no statistically significant difference is found between the adult-like overt DO rates at Stage I and at Stage II (p=.333), but a statistically significant difference is found between the rates at Stage I and Stage III (p=.010) and between the rates at Stage II and Stage III (p=.007); on the other hand, in the C monolinguals' data, a statistically significant difference is found between the rates at Stage I and Stage II (p<.001) and between Stage I and Stage III (p<.001) while no statistically significant difference is found between Stage II and Stage III (p=.085). This indicates that different developmental patterns in the C-E bilinguals' and the C monolinguals' data: the change point lies in the MLU value of 3.5 in the C-E bilinguals' data and in the MLU value of 2.4 in the C monolinguals' data.

In terms of non-adult-like null DOs, the break-down data in Table 61 show that overall there is a slow decrease in the participants' production from Stage I to Stage III, though all the participants produce low non-adult-like null DO rates (below 4.5%) from the very beginning of the investigation period; at Stage II, the participants consistently produce non-adult-like null DOs lower than 1.5% and at Stage III, the rates further reduce to be below 1%. Two exceptions are found in the participants' developmental path of non-adult-like null DO production: on the one hand, the E-dominant C-E bilingual (i.e. Charlotte) produces higher non-adult-like null DO rates at Stage II (3.70%) than at Stage I (2.44%); this could be the result from influence from the child's dominant language (i.e. English) which will be discussed latter (c.f. section 4.3). On the other hand, a C monolingual participant (i.e. Gakei) also produces a higher non-adult-like null DO rate at Stage II (0.41%) than at Stage I (0%); however, since she produces no non-adult-like null DOs at Stage I, and at Stage II the rate remains very low and at Stage III, the rate further reduces, her developmental path should not be considered as contrary to the expected pattern. Moreover, overall the C-E bilinguals produce higher non-adult-like null DO rates when

compared to their C monolingual counterparts though the difference is not as noticeable as that found in the English data. The biggest gap between the two language groups is found at Stage I and the gap reduces at the latter stages. Figure 20 is a developmental graph of the participants' non-adult-like null DO production.

Figure 20. Developmental Graph of the Participants' Production of *Null DOs
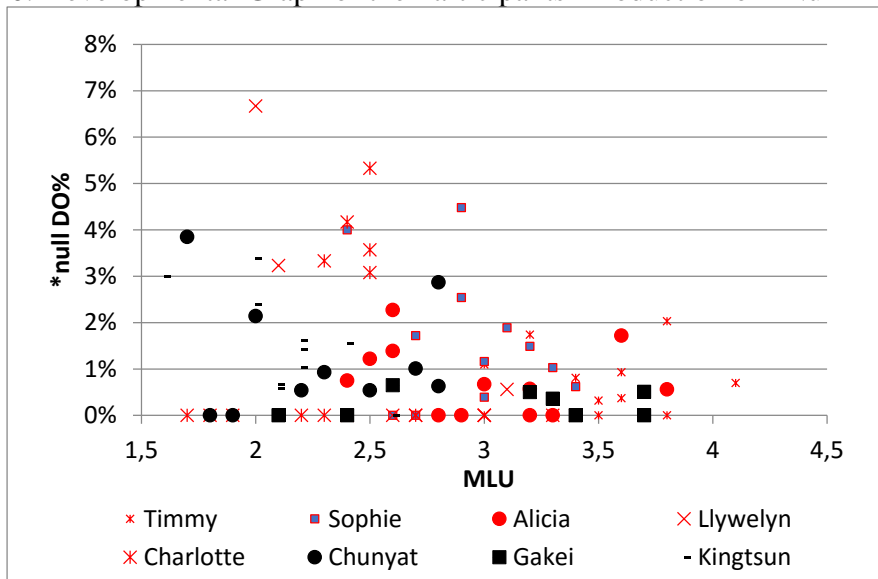
Figure 20 shows that, in general, the non-adult-like null DO rates of the C-E bilinguals (in red) are slightly higher than that of the C monolinguals (in black) during the one-year investigation period: at Stage I when the participants' MLU values are lower than 2.4, Llywelyn and Charlotte produce monthly non-adult-like null DO rates from 0% to 6.67% while those produced by the C monolingual participants range between 0% and 3.85%; at Stage II when the participants' MLU values are between 2.4 and 3.5, the difference between the participants in the two groups reduces but the monthly non-adult-like null DO rates produced by the C-E bilinguals range from 0% to 4.48% while those produced by the C monolinguals range from 0% to 2.87%; when the participants' MLU values are higher than 3.5, overall the participants in both groups produce very low non-adult-like null DO rates and the difference between the two language

groups remains small. However, the C-E bilinguals continue to produce higher non-adult-like null DO rates (0%-2.03%) when compared to the C monolinguals (0%-0.51%). The low percentages of non-adult-like null DOs in both groups suggest almost adult-like performance. In fact, the results of an Independent-Samples T-test show that the difference in the performance of the participants in the two language groups in terms of non-adult-like null DOs is not statistically significant ($t(84)$=.206, p=.837).

The participants' performances in the two language groups are also examined based on their developmental data. When taken the data from the two groups together, the results of statistical tests show that, on the one hand, no statistically significant difference is found at any of the three developmental stages (Stage I p=.494, Stage II p=.501, Stage III p=.340) in terms of the participants' non-adult-like null DO production; on the other hand, a two-way ANOVA that examines the effect of stage and L1(s) on non-adult-like null DO production shows that there is no significant interaction between the effects of stage and language(s) on non-adult-like null DO production ($F(2, 80)$=.230, p=.795); the effects of L1(s) on the participants' non-adult-like null DO production is not statistically significant (p=.174), but and that of stage on the participants' non-adult-like null DO production is statistically significant (p=.015).

Furthermore, in the C-E bilinguals' data, no statistically significant difference is found among the three stages (Welch $F(2, 12.415)$=2.674, p=.107). Nevertheless, in the C monolinguals' data, a statistically significantly difference is found among the three stages: while no significant difference is found between the rates at Stage I and Stage II (p=.353) and between Stage II and Stage III (p=.162), a statistically significant difference is found between the rates at Stage I and Stage III (p=.013). In other words, Stage II can be considered as a transitional period in terms of the C monolinguals' non-adult-like null DO production while such period is not

found in the C-E bilinguals' data. This, in fact, explains the difference between the performances of the two language groups: on the one hand, though the C monolinguals produce non-adult-like null DOs with low frequency at the beginning of the investigation period, at Stage III, they produce non-adult-like null DO rates that are close to 0%, which are found statistically significantly lower when compared to their performances at Stage I; on the other hand, the C-E bilinguals produce slightly higher non-adult-like null DO rates when compared to their C monolingual counterparts at Stage I; and then the figures reduce at the latter two stages; however, the decrease is smoother than what is found in the C monolinguals' data and their figures are still higher when compared to that of the participants in the other language group. Nevertheless, even the biggest gap found between the two groups (i.e. the one at Stage I) does not reach statistical significance.

Based on the results of the statistical tests in the present subsection, one the one hand, evidence is found to support Hypothesis #9 regarding facilitation due to interlinguistic influence from English into Chinese since the C-E bilinguals are found to produce adult-like overt DO rates that statistically significantly approximate more to the figure that is found in adult-to-adult conversation settings at Stage I when compared to the C monolinguals. This, in turn, rejects Hypothesis #8 since the C-E bilinguals are not found to overproduce overt DOs. On the other hand, the fact that the C-E bilinguals' non-adult-like null DO rates are comparable to those of the C monolinguals indicates that the C-E bilinguals' do not overproduce null DOs due to interference from English. Therefore, Hypothesis #7 is not supported.

Taking into account that the different maturational schedules of the two languages may be a factor that affects interlinguistic influence, and that, as previously discussed (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, chapter 3, section 3.1), Chinese is expected to mature

earlier than English in the domain of DOs, the C-E bilinguals are not expected to experience interference from English in their Chinese DO production. This is supported by the results of the statistical tests. Therefore, Hypothesis #10 is confirmed.

The results of the data analysis also show support for Hypothesis #11 regarding the relation between interference and input ambiguity. That is, on the one hand, since all transitive verbs can take either an overt DO or a null DO in Chinese, no ambiguity occurs; on the other hand, ambiguity exists in English in that only mixed verbs have this characteristic and pure transitive verbs should always be followed by an overt DO. As a result, no interference is expected from English into Chinese in the C-E bilinguals' Chinese DO production. The fact that the C-E bilinguals do not overproduce overt and null DOs when compared to their C monolingual counterparts has supported this observation.

4.2.1.2 Comparison within the C-E Bilingual Group

Taking a look at the adult-like overt DO rates as well as the non-adult-like null DO rates produced by the five C-E bilingual participants, it is found that, on the one hand, Timmy's overall adult-like overt DO rate (66.26%) is higher than those of the other four C-E participants (47.47%-57.01%), as shown in Table 58 above (c.f. subsection 4.2.1.1); on the other hand, while all the four C-dominant C-E bilingual participants produce non-adult-like null DO rates lower than 1.6%, the E-dominant bilingual participant's (i.e. Charlotte) non-adult-like null DO rate is higher (3.50%). However, despite of her higher non-adult-like null DO rates, Charlotte is still found to produce very few instances (9 instances) of non-adult-like null DOs.

Figures 21 to 25 below demonstrate the relation between the C-E participants' adult-like overt DO rates and non-adult-like null DO rates and the MLU differentials between their two L1s.

Figure 21. Timmy's Chinese Adult-like Overt DO Rates & Non-adult-like Null DO Rates and MLU Differentials
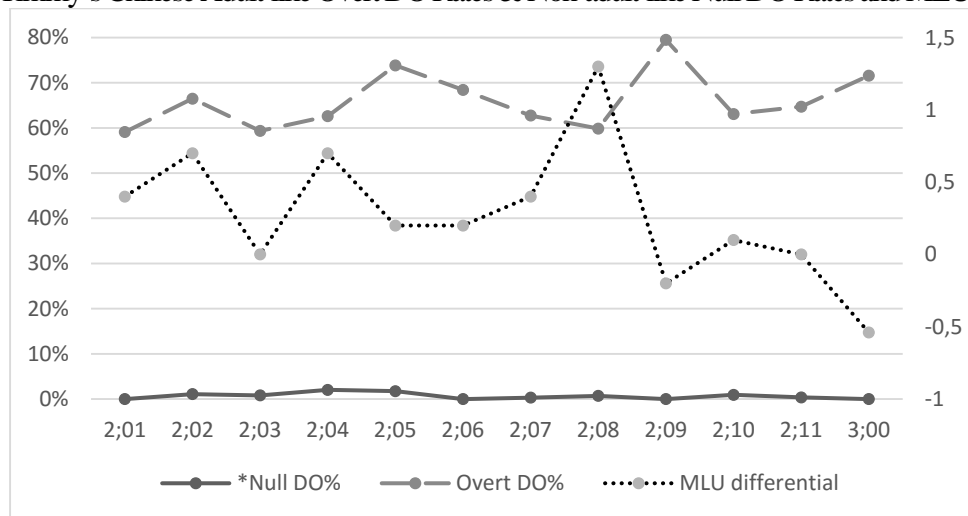
Figure 21 shows that after the age of 2;04, the trend of Timmy's adult-like null DO production contradicts that of his MLU differentials: that is, when the gap between his MLU values in Chinese and in English becomes bigger, the child produces adult-like overt DOs less frequently. That is, the more dominant Chinese is in the child, the less frequently he produces adult-like overt DOs, and, therefore, the less influence he experiences from English into Chinese since overt DOs are more salient in English than in Chinese. This indicates that language dominance might be a factor that accounts for more adult-like overt DO production. A Pearson Produce-Moment Correlation is run to determine the relation between the MLU differentials and the monthly adult-like overt DO rates in Timmy's data. The results show that there is a strong, negative correlation between the two factors, but it does not approach statistical significance (r=-.533, n=12, p=.074). In terms of non-adult like null DO rate, its trend seems to go with the MLU differentials between the participant' two L1s: though it maintains very low during the whole

investigation period, when MLU differentials increase, the child's non-adult-like null DO production also increases. This suggests that language dominance might be a factor that accounts for the child's non-adult-like null DO production, too. The results of a Pearson Produce-Moment Correlation show that there is a moderate, positive correlation between the MLU differentials and the monthly non-adult-like DO rates in the participant's data, but it is not statistically significant, either (r=.410, n=12, p=.186).

Figure 22. Sophie's Chinese Adult-like Overt DO Rates & Non-adult-like Null DO Rates and MLU Differentials
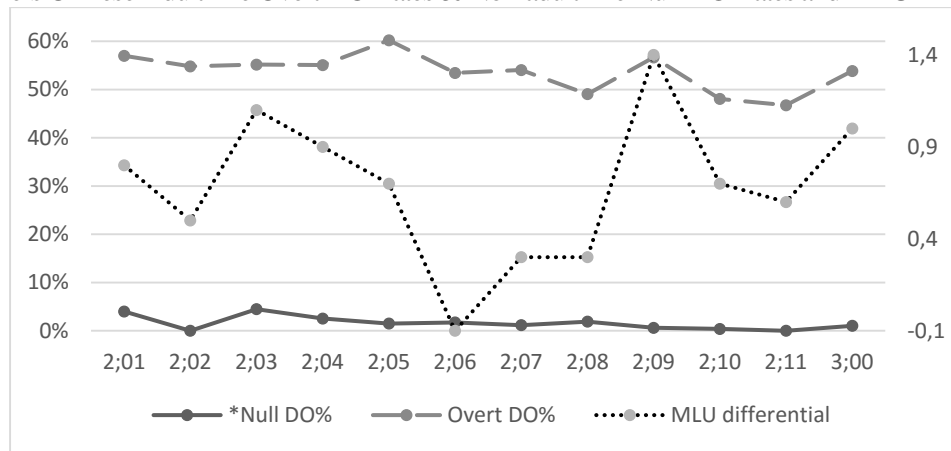
What Figure 22 shows is quite different from what is found in Timmy's data (Figure 21) in terms of adult-like overt DO production. In Sophie's data, the trend of her adult-like overt DO production and that of her MLU differentials does not appear to be as consistent as what is found in Timmy's data: between 2;4 and 2;8, when the gap between her MLU values in Chinese and in English becomes bigger, the child produces adult-like overt DOs less frequently; however, after 2;8, the pattern is the other way around: when the child's MLU differentials decrease, her adult-like overt DO production also decreases. The results of a Pearson Produce-Moment Correlation show that there is a moderate, positive correlation between the MLU differentials and the monthly adult-like overt DO rates in Sophie's data, but it is not statistically significant (r=.327, n=12, p=.300). In terms of non-adult-like null DO production, similar to what is found in

Timmy's data, though the participant's non-adult-like null DO rates maintain low during the investigation period, its trend matches the trend of the participant's MLU differentials. This suggests that language dominance might be a factor that affects the child's non-adult-like null DO production. A Pearson Produce-Moment Correlation shows that there is a weak, positive correlation between the MLU differentials and the monthly non-adult-like null DO rates in the participant's data but it does not reach statistical significance ($r=.181$, $n=12$, $p=.573$).

Figure 23. Alicia's Chinese Adult-like Overt DO Rates & Non-adult-like Null DO Rates and MLU Differentials
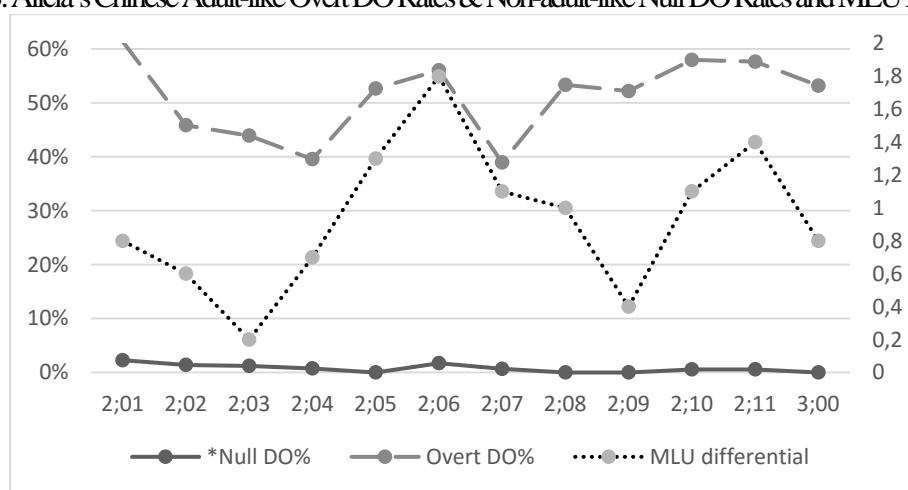
As shown in Figure 23, in terms of Alicia's adult-like overt DO production, similar to what is found in her sister Sophie's data, there is not a consistent pattern between the trend of the child's adult-like overt DO production and that of her MLU differentials: before 2;7, the trends of the two factors generally match; however, between 2;7 and 2;9, the trends show divergent patterns; after 2;9, the tends appear to match again. A Pearson Produce-Moment Correlation shows that there is none or very weak, negative correlation between the MLU differentials and the monthly adult-like overt DO rates ($r=-.073$, $n=12$, $p=.823$) but the result is not statistically significant. In terms of Alicia's non-adult-like null DO production, the pattern is different from what is found in her two siblings' data. Alicia's non-adult-like null DO production does not

appear to go along with her MLU differentials between the two languages: between 2;3 and 2;5 as well as between 2;10 and 2;11, when her MLU differentials increase, her non-adult-like null DO production decreases. The result of a Pearson Produce-Moment Correlation reveal a weak, negative correlation between the MLU differentials and the monthly non-adult like null DO production in Alicia's data (r=-.288, n=12, p=.365) but the result does not reach statistical significance.

Figure 24. Llywelyn's Chinese Adult-like Overt DO Rates & Non-adult-like Null DO Rates and MLU Differentials
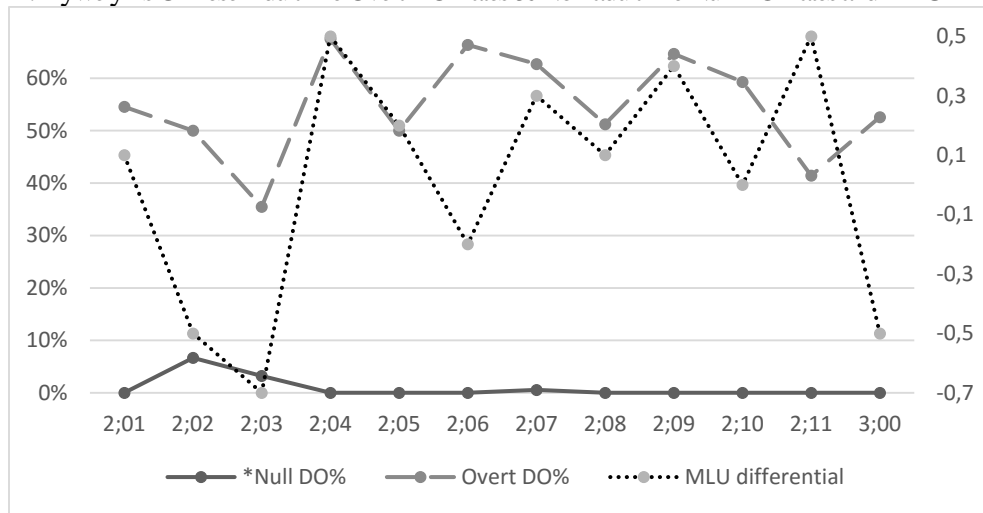
Figure 24 shows that, no consistent pattern is found between Llywelyn's adult-like overt DO production and his MLU differentials; neither is it found between the trend of Llywelyn's non-adult-like null DO production and that of his MLU differentials. In terms of the child's adult-like overt DO production, between 2;1 and 2;4, the trend of the MLU differentials and that of the child's adult-like overt DO production matches; however, between 2;5 and 2;7, the two patterns do not match; between 2;7 and 2;10, the trends converge again and then they diverge again after 2;10. In terms of the participant's non-adult-like null DO production, before 2;4, the trend of his non-adult-like null DO rates and his MLU differentials conflict; however, after 2;4, the participant does not produce any non-adult-like null DOs exception in one occasion (2;7). A

Pearson Produce-Moment Correlation shows that there is a moderate, positive correlation between Llywelyn's MLU differentials and his monthly adult-like overt DO rates (r=.433, n=12, p=.159) but this result is no statistically significant. Moreover, the results of a Kendall's tau-b Correlation find a moderate, negative correlation between the MLU differentials and the monthly non-adult like null DO production in Llywelyn's data (T_b=-.345, p=.170) but it is not statistically significant.

Figure 25. Charlotte's Chinese Adult-like Overt DO Rates & Non-adult-like Null DO Rates and MLU Differentials
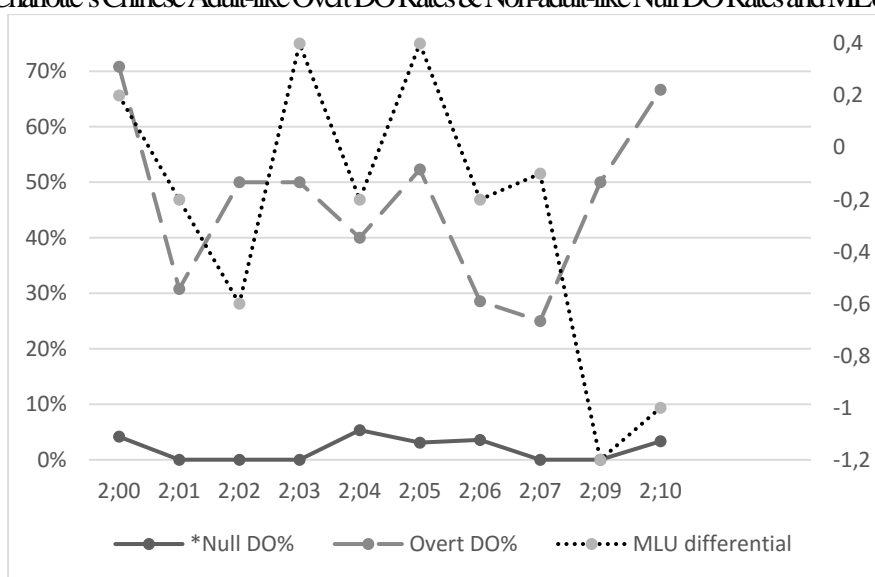
From Figure 25 it can be noted that no consistent patter can be found between the trend of Charlotte's adult-like overt DO production and her MLU differentials and between her non-adult-like null DO production and her MLU differentials. Between 2;3 and 2;6, Charlotte's adult-like overt DO production in general goes with her MLU differentials between the two languages. Nevertheless, after 2;6, the two trends conflict. Regarding non-adult-like null DO production, between 2;3 and 2;6, when the participant' MLU differentials increase, her non-adult-like null DO production decreases. However, after 2;6, the two trends go parallel. The results of a Pearson Produce-Moment Correlation show that, on the one hand, there is a weak, negative correlation

between the MLU differentials and the monthly adult-like overt DO rates ($r=-.105$, $n=10$, $p=.773$), but such correlation does not reach statistical significance; on the other hand, there is a weak, positive correlation between the MLU differentials and the monthly non-adult-like null DO rates ($r=.174$, $n=10$, $p=.630$) but it is not statistically significant either.

From Figures 21 to 25 it can be noted that in the five C-E bilinguals' data, different relationships between their adult-like overt DO production and their MLU differentials between the two L1s are found and no general agreement is achieved when considering their individual data; furthermore, no statistical significance has been reached regarding the relationship between the two factors in any of the children. However, this could be the result of the small size of data from each participant. For this reason, another Produce-Moment Correlation is run based on the five C-E bilinguals' collapsed data in an attempt to determine the relationship between the two factors. The results show that there is none or very weak, positive correlation between the C-E bilinguals' adult-like overt DO production and their MLU differentials ($r=.049$, $n=58$, $p=.713$) but such result is not statistically significant.

A similar result can be found regarding the C-E bilingual participants' scarce non-adult-like null DO production: no agreement has been reached regarding the relationship between the C-E bilinguals' non-adult-like null DO production and their MLU differentials in their individual data. A Kendall's tau-b Correlation is also run based on the five C-E bilinguals' collapsed data. The results find no correlation between the two factors ($T_b=.001$, $p=.989$) and no statistical significance is reached.

Therefore, it can be concluded that there is no correlation between the C-E bilingual participants' MLU differentials and their adult-like overt DO production and between their MLU differentials and their non-adult-like null DO production in Chinese.

The results of a Welch ANOVA show that the C-E bilinguals' monthly performances in terms of adult-like overt DOs are statistically significantly different (Welch $F(4, 24.679)=9.947$, $p<.001$). The results of a Games-Howell post-hoc test show that Timmy's performance is statistically significantly different from that of the other four C-E bilingual participants whose performances are not statistically significantly different from each other. Furthermore, the results of Independent Samples T Test show that when compared to the figure produced by the Chinese adults in Wang et al.'s (1992) study (i.e. 59.90%), the results of the statistical test show that Llywelyn's performance is statistically comparable to that of the Chinese adults ($t(11.002)=-1.809$, $p=.098$) while the other four C-E bilinguals' performances are not. Diagram 2 shows a visual summary of the statistically significant differences among the five C-E bilinguals.

Diagram 2. Difference in Performance in Chinese Adult-like Overt DO Realization among the C-E Bilinguals
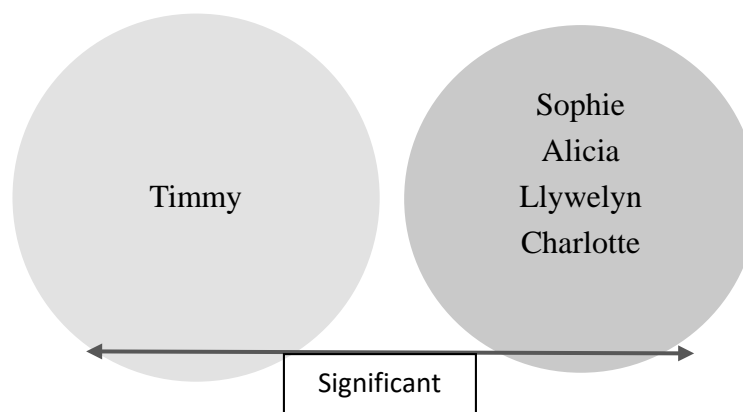
Diagram 2 shows that there is no intersection between Timmy's performance in terms of adult-like overt DO production and those of the other four C-E bilinguals in the present study, which indicates statistically significant differences between the two counterparts.

Since the range of the participants' MLU values varies during the investigation period, in order to further investigate if the participants' overall language proficiency plays a role in their adult-like overt DO production (i.e. if the difference found between Timmy and the other four C-

E bilinguals is the result of Timmy's higher MLU values), statistical tests are run based on the developmental data. The results indicate at Stage I, Llywelyn's and Charlotte's performances are comparable ($t(4)=-.299$, $p=.780$). Moreover, both of their performances are comparable to that of the Chinese adults found in Wang et al.'s study (1992) ($p=.149$ for Llywelyn, $p=.465$ for Charlotte).

At Stage II, the results of a Welch ANOVA show that there is no statistically significant difference among the five bilinguals in terms of adult-like overt DO production (Welch $F(4, 9.358)=3.225$, $p=.064$). This indicates that the five bilinguals' performances are comparable to each other. Furthermore, when compared to the Chinese adults' performance in Wang et al.'s (1992) study, it is found that, at this stage, Timmy's ($t(2)=.739$, $p=.537$) and Llywelyn's ($t(8.001)=-.854$, $p=.418$) performances are comparable to that of the adults while the other three bilinguals' performances are not.

At Stage III, Alicia's performance is statistically different from that of Timmy ($t(14)=4.481$, $p=.001$). However, at this stage, neither of the bilinguals' performances is statistically comparable to that of the Chinese adults (Timmy $p=.008$, Alicia $p=.028$).

In terms of non-adult-like null DO productions, it is found that all the C-E bilinguals produce very low non-adult-like null DO rates during the investigation period, although the E-dominant bilingual's figures are slightly higher when compared to her C-dominant bilingual counterparts (c.f. Tables 58 and 59, subsection 4.2.1.1). A Welch ANOVA shows that there is no statistically significant difference among the five C-E bilinguals (Welch $F(4, 24.783)=1.605$, $p=.204$). This suggests that this is a salient property of the Chinese grammar and as such it is very soon acquired and with a very low non-adult-like rate.

The results of the data analysis above indicate that the C-E bilinguals' DO production may not be affected by the difference of the overall proficiency between the bilinguals' two L1s (i.e. the external view on language dominance) since no correlation is found between the MLU differentials and their adult-like overt DO production and between the MLU differentials and their non-adult-like null DO production. Furthermore, in general the E-dominant bilingual's performance is not found statistically significantly different from the performances of her C-dominant counterparts. The same result is also found based on the developmental data. This indicates that the only significant difference found between one of the C-E bilinguals (i.e. Timmy) and the other four C-E bilinguals in terms of adult-like overt DO production in the present study is likely to be the result of individual differences. These results reject Hypothesis #12a since neither the "externally" C-dominant bilinguals nor the "externally" E-dominant bilingual is found to overproduce overt Chinese DOs and the C-dominant bilinguals and E-dominant bilingual are statistically comparable from a general perspective. Moreover, Hypothesis #12b is confirmed since the E-dominant bilingual's performance is comparable to those of the C-dominant bilinguals and no interference from English into Chinese has been found.

4.2.1.3 Comparison within the C Monolingual Group

In the case of the C monolinguals, from Tables 60 and 61 (c.f. subsection 4.2.1.1), it can be noted that their development follows a similar pattern to that of the C-E bilinguals described above. Overall the C monolinguals produce non-adult like null DOs at rates lower than 2% but a slow decrease can still be found from Stage I to Stage III. In terms of adult-like overt DO rates, there is a smooth increase from Stage I to Stage III. All the three C monolinguals start out by producing adult-like overt DOs with a mean rate of 36.15%; Stage II witnesses a moderate

increase at which the C monolingual participants' average adult-like null DO rates is 47.99%; the figure further increases at Stage III (58.65%).

The results of a one-way ANOVA which examines the C monolinguals' monthly performance in terms of adult-like overt DO production show that there is a statistically significant difference among the performance of the three C monolinguals ($F(2, 25)=4.729$, $p=.018$). Diagram 3 shows a visual summary of the results taken from a Tukey post-hoc test in terms of adult-like overt DO realization.

Diagram 3. Difference in Performance in Chinese Adult-like Overt DO Realization among the C Monolinguals
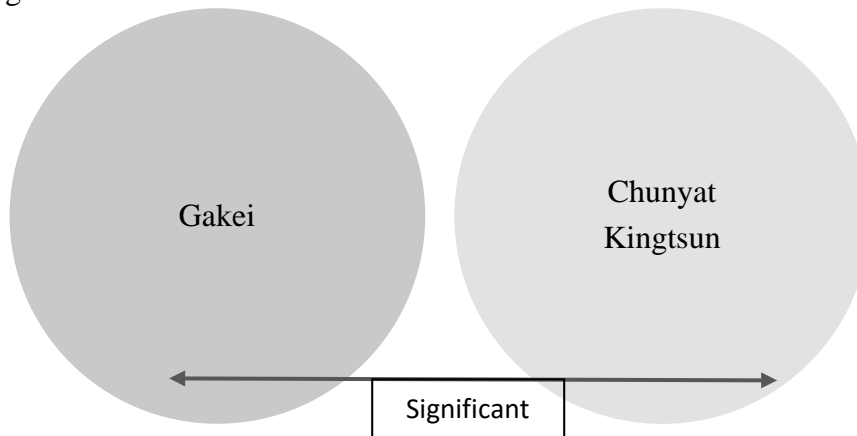
As shown in Diagram 3, Chunyat's and Kingtsun's performances in terms of adult-like overt DO production are comparable ($p=.979$) while Gakei's performance is statistically different from Chunyat's ($p=.025$) and Kintsun's ($p=.038$). When compared to the Chinese adults' performance in Wang et al.'s study, it is found that while Gakei's performance is statistically comparable to that of the Chinese adults ($t(7.007)=.2.507$, $p=.072$), it is not the case of Chunyat's ($t(9.002)=-8.831$, $p<.001$) and Kingtsun's ($t(9.001)=-4.855$, $p=.001$).

Regarding the non-adult-like null DO production, a Welch ANOVA shows that the performance of the three C monolinguals is statistically significantly different (Welch $F(2, 13.507)=8.655$, $p=.004$). The results of a Games-Howell post-hoc test, as represented in Diagram

4, show that Gakei's performance in terms of non-adult-like null DO production is statistically significantly different from Kingtsun's (*p*=.010) while Chunyat's performance is comparable to Gakei's (*p*=.088) and to Kingtsun's (*p*=.828).

Diagram 4. Difference in Performance in Chinese Non-Adult-like Null DO Realization among the C Monolinguals
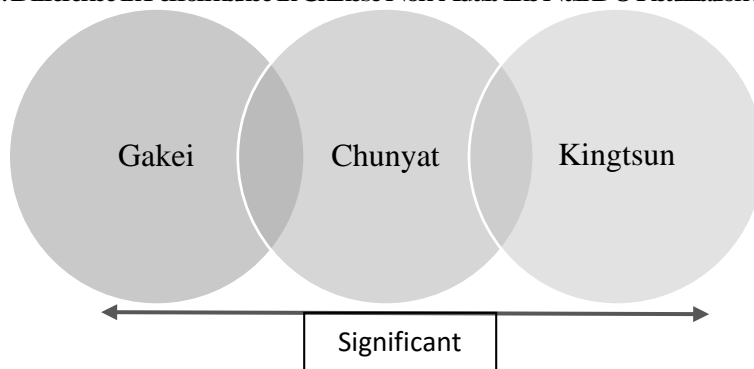
All these results point to the conclusion that Gakei's performance in terms of DO realization is more adult-like than those of the other two C monolinguals in the present study.

As in the case of the C-E bilinguals' data, in order to further investigate if the difference found among the C monolinguals' performance in terms of DO production is the result of the participants' different language proficiency, statistical tests are run based on the developmental data. The results show that at Stage I, in terms of adult-like overt DO production, there is no statistically significant difference among the three C monolinguals' performances (Welch *F*(2, 6.788)=2.271, *p*=.176). Furthermore, at this stage, none of the participants' performance is comparable to that of the Chinese adults (*p*<.001). In terms of non-adult-like null DO production, a statistically significant difference is found (Welch *F*(2, 6.789)=11.483, *p*=.007). The Games-Howell post hoc test shows that Chunyat's performance is comparable to the other two monolinguals (Gakei *p*=.298, Kingtsun *p*=.853) while Kinstun's and Gakei's performances are statistically significantly different (*p*=.005) which indicates that Gakei produces non-adult-like null DOs with statistically significantly lower frequency when compared to Kingtsun.

At Stage II, in terms of adult-like overt DOs, the results of a one-way ANOVA show no statistically significant difference among the three C monolinguals' performances ($F(2, 7)=4.377$, $p=.058$). When compared to the Chinese adults' performance in Wang et al.'s (1992) study, while Gakei's ($t(2)=-1.896$, $p=.198$) and Kingtsun's ($t(1)=-2.765$, $p=.381$) performances are comparable to that of the Chinese adults, Chunyat's performance is not ($t(4.002)=-10.818$, $p<.001$). In terms of non-adult-like null DOs, the results of a one-way ANOVA show that there is no statistically significant difference among the three C monolinguals' performances ($F(2, 7)=.966$, $p=.426$).

From the results of the data analysis above it can be noted that no statistically significant difference is found among the C monolinguals in terms of adult-like overt DO production at either Stage I or Stage II during which data from all the three monolinguals are available. In terms of non-adult-like null DOs, since Gakei does not produce any non-adult-like null DOs at Stage I (c.f. Table 61), a statistically significant difference is found between Gakei's and Kingtsun's performances; at Stage II, the difference between the two participants disappears and the three C monolinguals' performances are comparable. Considering these observations as well as the fact that only Gakei's data are available at Stage III, it is likely that the difference found between Gakei's monthly DO production rates and those of the other two C monolinguals is the results of Gakei's higher language proficiency. That is, the difference lies in Gakei's performance at Stage III while the other two participants do not reach such stage based on the data available. This means that, there might not be statistically significant differences among the three C monolinguals' performances in terms of DO production when they have the same level of language proficiency.

To sum up, the results of the quantitative analysis of the Chinese data in the present study suggest that, on the one hand, regarding adult-like overt DO production, the C-E bilinguals produce statistically significantly higher adult-like overt DO rates at Stage I when compared to their C monolingual counterparts; such difference disappears at Stage II and Stage III; on the one hand, in terms of non-adult-like null DO production, the performance of the C-E bilingual group and that of the C monolingual group are overall comparable. These results support Hypothesis #9 regarding facilitation due to interlinguistic influence from English into Chinese. This, in turn, rejects Hypothesis #8 since the C-E bilinguals are not found to overproduce overt DOs due to interference from English. Furthermore, Hypothesis #7 is not supported due to the fact that the C-E bilinguals' non-adult-like null DO rates are comparable to those of the C monolinguals and that the C-E bilinguals do not overproduce null DOs due to interference from English. This indicates that the C-E bilinguals do not experience a longer non-adult-like null object period in Chinese. Hypothesis #10 regarding the relation between language interference and maturational schedule of the two languages in bilingual children is also confirmed. That is, since Chinese is expected to mature earlier than English in the domain of DOs, no interference will, therefore, be expected from English into Chinese in the C-E bilinguals' production. This is supported by the fact that the C-E bilinguals' performances in terms of DO production are comparable or even more adult-like when compared to those of the C monolinguals. What is more, Hypothesis #11 regarding the relation between interference and input ambiguity is confirmed. That is, interference from English into Chinese is not expected since there is no ambiguity in DO realization in Chinese because all transitive verbs behave in the same way (i.e. they can all take both overt and null DOs), while in English pure transitive verbs and mixed verbs have different restrictions on DO realization. The difference between pure transitive verbs and mixed verbs

could count as ambiguous input for children. Consequently, C-E bilinguals' performance would be comparable to that of C monolinguals, which is in line with the results found in the data analysis above.

What is more, no statistically significant difference is found among the E-dominant C-E bilinguals and three out of the four C-dominant C-E bilinguals, and the difference found between one of the C-E bilinguals and the other four C-E bilinguals is likely to be the result of individual differences. These results reject Hypothesis #12a which in turn support Hypothesis #12b. That is, the E-dominant C-E bilingual does not experience stronger influence from English into Chinese when compared to her C-dominant counterparts since she does not overproduce non-adult-like overt or null DOs. This could suggest that the C-E bilinguals' preference may be the Chinese DO realization system rather than the English one regardless of their overall language proficiency in their two L1s since the Chinese DO system provides more transparent and higher computational valued functional features (c.f. chapter 3, section 3.1). The role played by language dominance will be further explored in section 4.3.

4.2.2 Qualitative Analysis

Apart from the identified quantitative differences that have been addressed in the previous subsection, qualitative differences are explored in the subsequent subsection. Despite the overall comparable performance of the participants in the two language groups in terms of adult-like overt DO production, the adequacy of these adult-like overt DOs is examined in the present subsection in order to further compare the participants' performances in the target domain of the present study.

4.2.2.1 Comparison among the Two Language Groups

As discussed in a previous chapter (c.f. chapter 1, subsection 1.3.3), discourse-oriented languages such as Chinese have a rule of Topic DP Deletion (Tsao 1979), which operates across discourse to delete the topic of a sentence under identity with a topic in a preceding sentence. This suggests that the adequacy of adult-like overt DOs depends on a pragmatic factor so that, given the discourse context, adult-like overt DOs are pragmatically inadequate (though grammatically correct) if the discourse context has a discourse topic. In this case null DOs could have been used instead as they are more adequate pragmatically speaking. Example (188) shows how the rule of Topic DP Deletion works and examples (189) and (190) show a comparison between adequate overt DOs and inadequate overt DOs.

(188)   INV: mou4 din6ci4 laa3 hai6maik1 aa?
            no have   battery   yes
            "It does not have any battery, does it?"
      CHI: mou5 *e*.   (Timmy 2;11)
            no have
            "It doesn't have any."
                                          (Yip-Matthews corpus, CHILDES)

(189)   INV: dou2 di1 me1 ceot1lei4 aa3?
            pour some what out
            "What do you pour out?"
      CHI: dou2 ce1 ceot1lei4 lo1   (Chunyat 2;08)
            pour car   out
            "I pour the cars out."
                                         (LeeWongLeung corpus, CHILDES)

(190)   INV: hai6 lak3, wan2 gaau2zi2 nim6. Bin1go3 nim6 *e* gaa3?
            Yes   find stick tape stick   who   stick
            "Yes. It was stuck with tape. Who stuck it?"
      CHI: maa2mi4 nim6 gaau2zi2.   (Gakei 2;02)
            mom   stick tape
            "Mom stuck the tape."

                                         (LeeWongLeung corpus, CHILDES)

In example (188), the utterance produced by the child is governed by a topic chain, in which the referent of the DO can be recovered by the discourse topic (i.e. *din6ci4* "battery"). Consequently, according to Tsao's (1979) rule of Topic DO Deletion, the DO in the utterance should be null since it satisfies the condition of the rule. In example (179), the topic of the child's utterance (i.e. "cars") is not under identity with a topic in the investigator's utterance, and, therefore, the DO in the utterance has to be overt, which is pragmatically adequate. However, in (190), the utterance produced by the child is governed by a topic chain, in which the referent of the DO in the sentence can be recovered by the discourse topic (i.e. "stick tape"). The overt DO in the child's utterance violates such rule and is, therefore, pragmatically inadequate.

Based on this criterion, in the present subsection, the adult-like overt DOs produced by the participants are then further classified as adequate overt DOs or inadequate overt DOs. Table 62 presents an overall view of their distribution in the eight participants' data and Table 63 provides the corresponding developmental view.

Table 62. Overall Adequate and Inadequate DO Rates in Chinese

L1(s)	Participant	Adequate%	Tokens	Inadequate%	Tokens
C-E	Timmy	90.06%	1450/1610	9.94%	160/1610
C-E	Sophie	91.20%	1182/1296	8.80%	114/1296
C-E	Alicia	97.58%	644/660	2.42%	16/660
C-E	Llywelyn	93.72%	507/541	6.28%	34/541
C-E	Charlotte	95.08%	116/122	4.92%	6/122
Total		**92.20%**	**3899/4229**	**7.80%**	**330/4229**
C	Chunyat	85.81%	810/944	14.19%	134/944
C	Gakei	91.81%	1065/1160	8.19%	95/1160
C	Kingtsun	79.66%	756/949	20.34%	193/949
Total		**86.18%**	**2631/3053**	**13.82%**	**422/3053**

The columns "Adequate%" and "Inadequate%" indicate the percentages of adequacy and inadequacy that the overt DOs produced by the participants take up respectively; both columns take as a reference the overall adult-like overt DO production (=100%). "Tokens" refers to the

number of occurrences of each type of adult-like overt DOs out of the total number of occurrences of overt DOs in the participants' corpora. The data from all the participants in each group are collapsed in the "Total" rows.

From Table 62 it can be noted that overall the C-E bilinguals produce more adequate DOs than the C monolinguals: all the five C-E bilinguals, regardless of their dominant language, produce adequate overt DOs above 90% while the C monolinguals' adequate overt DO rates range from 80% to 92%. The results of an Independent-T Test show that the difference between the C-E bilinguals and the C monolinguals in terms of the adequacy of overt DO production is statistically significant ($t(6)=2.483$, $p=.048$). This indicates that the C-E bilinguals produce statistically significantly higher percentages of adequate overt DOs in Chinese when compared to their C monolingual counterparts.

Table 63 presents the rates of adequate and inadequate overt DOs produced by the eight participants when dividing the one-year investigation period into three different developmental stages according to the participants' MLU values (c.f. chapter 3, subsection 3.4.2), which offers a developmental view on the data.

Table 63. Frequency of Null and *Null DOs Corresponding to the three Developmental Stages

Participant	L1(s)	Stage I (MLU <2.4)		Stage II (2.4≤MLU≤3.5)		Stage III (MLU >3.5)	
		Total tokens	Adequacy%	Total tokens	Adequacy%	Total tokens	Adequacy%
Timmy	C-E	-	-	211/259	81.47%	1239/1351	91.71%
Sophie	C-E	-	-	1182/1296	91.20%	-	-
Alicia	C-E	-	-	165/169	97.63%	479/491	97.56%
Llywelyn	C-E	30/32	93.75%	477/509	93.71%	-	-
Charlotte	C-E	23/23	100%	93/99	93.94%	-	-
Total	**C-E**	**53/55**	**96.36%**	**2128/2332**	**91.25%**	**1718/1842**	**93.27%**
Chunyat	C	220/253	86.96%	590/691	85.38%		
Gakei	C	42/54	77.78%	461/496	92.94%	562/610	92.13%
Kingtsun	C	558/714	78.15%	198/235	84.26%		
Total	**C**	**820/1021**	**80.31%**	**1249/1422**	**87.83%**	**562/610**	**92.13%**

From Table 63 it can be noted that only two out of the five C-E participants' data are available at Stages I and III while only one C monolingual' data is available at Stage III. Based on the available data, Table 63 shows that, on the one hand, the two C-E bilinguals produce adequate overt DOs with high frequency from the beginning of the investigation period and no noticeable increase from Stage I to Stage III is found. In fact, their average adequate overt DO rates are the highest at Stage I; however, this is likely due to the fact that one of the two C-E bilinguals (i.e. Charlotte) produces no inadequate overt DOs at this stage and thus her adequacy rate inflates the overall figure of the C-E bilingual group. On the other hand, in the C monolinguals' data, there is an increase in the monolinguals' adequate overt DO rates from Stage I to Stage III. The biggest gap between the two language groups is found at Stage I (96.36% *versus* 80.31%); the gap becomes smaller at the latter two stages: at Stage II, the difference between the two groups is 9.5% and at Stage II, the difference reduces to 1%.

The observation above is supported by the results of the statistical tests which show that at Stage I, a statistically significant difference is found between the participants' performances in the two language groups in terms of adequate overt DO production ($t(3)=3.521$, $p=.039$); at Stage II, the difference becomes statistically non-significant ($t(6)=.979$, $p=.365$); at Stage III, such difference remains statistically non-significant ($t(2)=1.174$, $p=.361$).

These results provide positive evidence for Hypothesis #9 regarding facilitation from English into Chinese in terms of overt DO production. That is, according to the Subset Principle (Berwick 1985, Atkinson 1992, Biberauer and Roberts 2009, among others), whenever there are two competing grammars generating languages of which one is a proper subset of the other, the learning strategy of the child is to select the more restricted one. This means that being the subset option in the domain of DO, children start out with the English grammar in Chinese; that is, they

might start out overproducing overt DOs. According to the traditional view on the Subset

Principle, the subset option (i.e. overt DOs) is normally considered the unmarked option.

However, in Chinese, within the two available options, null DOs are considered to be less

marked than overt DOs (marked). This means that influence from English overt DOs leading to a

preference for overt DOs should not be strong because the unmarked option in Chinese (i.e. null

DOs) will have more weight (that is, this option is so salient that the overt DO option will not

surpass it). However, the fact that English provides the null DO option, albeit being the marked

option, does reinforce its value in Chinese. That is the reason why in terms of adequacy, when

compared to C monolinguals, C-E bilinguals produce less inadequate (i.e. redundant) overt DOs.

A further classification of the eight participants' data has been done which allows us to

carry out more detailed qualitative analyses of the data on the topic under investigation. The

classification of the data in these cases has been carried out in terms of verbal lexicon, that is, in

terms of the specific individual verbs used by the children. This provides us with a more detailed

account of each target child's Chinese production. Table 64 shows the five most frequent

transitive verbs that are found across most of the ten participants' data as well as the distribution

of inadequate overt DOs and non-adult-like null DOs among the five verbs .

Table 64. Distribution of Inadequate Overt DOs and Non-adult-like Null DOs in Chinese

L1(s)		Jau5 ("to have")			Mou5 ("to not have")			Sik6 ("to eat")			Jiu3 ("to want")			Hoi1 ("to open")		
		Tokens	*Overt DO%	*Null DO%	Tokens	*Overt DO%	*Null DO%	Tokens	*Overt DO%	*Null DO%	Tokens	*Overt DO%	*Null DO%	Tokens	*Overt DO%	*Null DO%
C-E	Timmy	278	7.21%	0.72%	109	34.55%	1.83%	184	6.50%	0.54%	191	0.61%	0%	31	21.74%	0%
C-E	Sophie	140	16.46%	2.14%	105	35%	0.95%	198	11.69%	0.51%	241	1.74%	0.83%	38	0%	0%
C-E	Alicia	202	0%	0.50%	84	12.50%	0%	49	7.69%	0%	130	1.11%	0%	17	50%	0%
C-E	Llywelyn	90	5.36%	1.11%	63	5%	0%	40	0%	0%	78	0%	1.28%	16	0%	0%
C-E	Charlotte	4	0%	0%	35	36.36%	0%	17	14.29%	5.88%	11	12.50%	9.09%	6	0%	16.67%
E	Chunyat	170	20.83%	0.59%	232	27%	4.74%	180	9.84%	0.56%	170	0%	2.33%	64	13.33%	0%
E	Gakei	102	6.67%	0%	62	25%	0%	109	3.77%	0.92%	98	3.57%	1.02%	41	15.79%	0%
E	Kingtsun	185	25.81%	2.70%	156	61.54%	0.64%	72	3.03%	4.17%	96	20.69%	1.04%	221	4.71%	1.81%

The columns "*Overt DO%" and "*Null DO%" indicate respectively the percentages of pragmatically in adequate overt DOs and non-adult-like null DOs taken by each verb. "Tokens" refers to the total number of occurrences of each verb in the available data.

From Table 64 it can be noted that there is not a particular verb whose percentage of inadequate overt DOs or non-adult-like null DOs stands out in either the C-E bilinguals or the C monolingual data, as all the verbs vary in their frequency. This lack of consistency suggests that the use of these verbs in English may not have a significant influence on the C-E bilingual participants' Chinese production.

The results above do not favor Hypotheses #7 and #8 since no interference is found from English into Chinese in the C-E bilinguals' overt DO production in Chinese.

The following two subsections (i.e. subsections 4.2.2.2 and 4.2.2.3) provide a detailed comparison in terms of the adequacy of Chinese overt DO production within the two language groups.

4.2.2.2 Comparison within the C-E Bilingual Group

Looking at the C-E bilinguals' overall data as shown in Table 62 (c.f. subsection 4.2.2.1), it is found that all the five participants produce adequate overt DOs with high frequency (above 90%). Furthermore, no noticeable difference is found between the "externally" E-dominant C-E bilingual's (i.e. Charlotte's) performance and those of the four "externally" C-dominant C-E bilinguals.

In terms of the developmental data, as shown in Table 63 (c.f. subsection 4.2.2.1), it is found that all the C-E bilingual participants, regardless of their "externally" dominant language, produce adequate overt DO rates higher than 90% at all the developmental stages with only one

exception: Timmy's adequate overt DO rate at Stage II is 81.47%. This observation indicates that the E-dominant bilingual's performance regarding adequate overt DO production is comparable to those of the C-dominant bilinguals.

The results of the statistical tests show that at Stage I, at which only Llywelyn's and Charlotte's data are available, no statistically significant difference is found between the two participants' performance in terms of adequate overt DO production regardless of their different "externally" dominant language ($t(4)=-1.606$, $p=.184$).

At Stage II, a one-way ANOVA shows that there is a statistically significant difference among the participants' performances regarding adequate overt DO production ($F(4, 31)=3.783$, $p=.013$). The results of a Tukey post-hoc test indicates that Timmy's performance is parable to Sophie's ($p=.136$) but statistically significantly different from those of the other three participants in the C-E bilingual group; Sophie's performance is comparable to those of all the other four C-E bilinguals; Alicia's, Llywelyn's and Charlotte's performances are comparable to the other C-E bilinguals' performances except Timmy's. Diagram 5 illustrates a visual summary of the statistically significant differences among the five C-E bilinguals in terms of adequate overt DO production at this stage.

Diagram 5. Difference in Performance in Chinese Adequate Overt DO Production among the C-E Bilinguals at Stage II
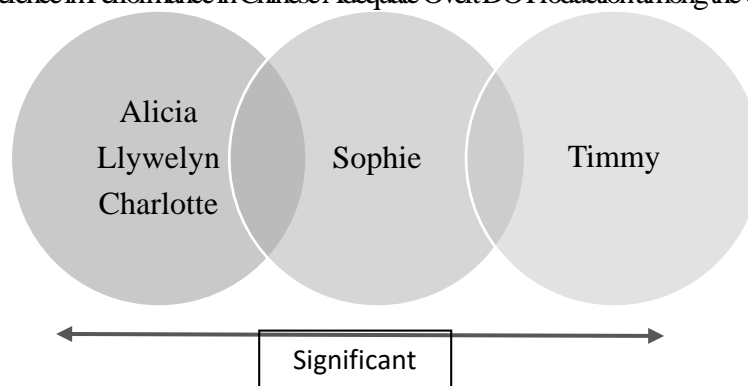
From Diagram 5 it can be noted that Alicia, Llywelyn and Charlotte produce statistically significantly higher adequate overt DO rates when compared to Timmy. Sophie can be regarded as an in-between case: she produces lower adequate overt DO rates when compared to Alicia, Llywelyn and Charlotte but higher adequate overt DO rates when compared to Timmy. But neither difference is found statistically significant.

At Stage III, based on the available data of the two participants (i.e. Timmy and Alicia), the results of an Independent-Samples T-test show that there is a statistically significant difference between the two participants' performances ($t(14)=-3.011$, $p=.009$). This indicates that Alicia produces statistically significantly higher adequate overt DO rates when comparable to Timmy.

A further analysis based on the verbal lexicon produced by the five C-E participants' data is shown below. Tables 65-69 deal with the participants' Chinese adequate overt DO production individually. The "*" in Tables 65-69 does not indicate ungrammaticality but rather inadequacy. The verbs that have appeared with less than 10 overt DOs in total in the available data across the investigation period are not included in the tables below, as they are quantitatively insufficient to be analyzed individually.

Table 65. Frequency of *Overt DOs in Timmy's Data

Verb		*Overt DO%	Tokens
Gin3	"to see"	42.86%	6/14
Sik1	"to know"	38.64%	17/44
Waan2	"to play"	35.71%	5/14
Mou5	"to not have"	34.55%	19/55
Waak6	"to draw"	30%	3/10
Cai3	"to build"	30%	6/20
Gau3	"to save"	30%	3/10
Daai3	"to bring"	29.41%	5/17
Geng1	"to be afraid"	26.09%	6/23
Jam2	"to drink"	23.08%	3/13
Bei2	"to give"	23.08%	6/26
Se6	"to shoot"	23.08%	3/13
Hoi1	"to open"	21.74%	5/23
Wan2	"to find"	20%	2/10
Zaa1	"to drive"	13.64%	3/22
Tai2	"to watch"	10%	4/40
Jung6	"to use"	10%	1/10
Ngaau5	"to bite"	8.89%	4/45
Cung1	"to flush"	8.33%	1/12
Lo2	"to take"	7.69%	4/52
Paak3	"to park"	7.69%	1/13
Jau5	"to have"	7.21%	16/222
Cit3	"to cut"	6.67%	1/27
Sik6	"to eat"	6.50%	8/123
Zung1ji3	"to like"	5.26%	1/19
Gong2	"to talk"	4%	1/25
Jiu3	"to want"	0.61%	1/164
Cing2	"to invite"	0%	0/11
Daa2	"to hit"	0%	0/38
Co5	"to take (a transport)"	0%	0/33
Zoek3	"to put on"	0%	0/15
Zyu2	"to cook"	0%	0/12
Zou6	"to make"	0%	0/51
Giu3	"to call"	0%	0/19
Baai2	"to put"	0%	0/17
Saan1	"to close"	0%	0/10
Jing2	"to take (a photo)"	0%	0/10
Jau4	"to color"	0%	0/41
Saat3	"to kill"	0%	0/14
Waa6	"to say"	0%	0/12

As shown in Table 65, Timmy's average inadequate overt DO rates vary between 0% and 42.86%. The average inadequate overt DO rates of 17 out of the 40 verbs are above 10%.

Table 66. Frequency of *Overt DOs in Sophie's Data

Verb		*Overt DO%	Tokens
Sik1	"to know"	95.83%	23/24
Mou5	"to not have"	35%	14/40
Waak6	"to draw"	18.92%	14/74
Jau5	"to have"	16.46%	13/79
Zung1ji3	"to like"	16.33%	8/49
Sai2	"to wash"	13.33%	2/15
Sik6	"to eat"	11.69%	9/77
Lo2	"to take"	10.34%	3/29
Tai2	"to watch"	10%	4/40
Seong2	"to think"	9.09%	1/11
Daa2	"to hit"	8.89%	4/45
Geng1	"to be afraid"	8.33%	1/12
Cing2	"to invite"	7.69%	1/13
Bei2	"to give"	7.69%	2/26
Waan2	"to play"	7.14%	1/14
Jam2	"to drink"	3.57%	1/28
Jiu3	"to want"	1.74%	2/172
Zou6	"to make"	0%	0/38
Bong1	"to help"	0%	0/29
Ngo1	"to push out (waste from the body)"	0%	0/31
Maai5	"to buy"	0%	0/25
Giu3	"to call"	0%	0/16
Hoi1	"to open"	0%	0/16
Zuk1	"to catch"	0%	0/14
Cit1	"to cut"	0%	0/10
Ngaau5	"to bite"	0%	0/10
Git3	"to marry"	0%	0/19

Table 66 demonstrates that Sophie's average inadequate overt DO rates vary between 0% and 95.83%. 9 out of the 27 verbs have average inadequate overt DO rates above 10%.

Table 67. Frequency of *Overt DOs in Alicia's Data

Verb		*Overt DO%	Tokens
Lo2	"to take"	14.29%	2/14
Mou5	"to not have"	12.50%	3/24
Waak6	"to draw"	10.53%	2/19
Sik6	"to eat"	7.69%	2/26
Jiu3	"to want"	1.11%	1/90
Jau5	"to have"	0%	0/109
Tai2	"to watch"	0%	0/13
Zou6	"to make"	0%	0/11
Bong1	"to help"	0%	0/14
Waan2	"to play"	0%	0/15
Caa4	"to put on (the skin)"	0%	0/20
Seong2	"to think"	0%	0/29

Table 67 indicates that Alicia's average inadequate overt DO rates vary between 0% and 14.29%, which are, in general, lower than those produced by her siblings (i.e. Timmy and Sophie). The average inadequate overt DO rates of 3 out of the 12 verbs are above 10%.

Table 68. Frequency of *Overt DOs in Llywelyn's Data

Verb		*Overt DO%	Tokens
Tai2	"to watch"	14.29%	9/63
Baai2	"to put"	10.53%	4/38
Jau4	"to visit"	9.09%	1/11
Jau5	"to have"	5.36%	3/56
Zaa1	"to drive"	5%	1/20
Mou5	"to not have"	5%	1/20
Seong2	"to think"	0%	0/36
Waan2	"to play"	0%	0/12
Se2	"to write"	0%	0/10
Jam2	"to drink"	0%	0/12
Lo2	"to take"	0%	0/18
Jiu3	"to want"	0%	0/70
Sik6	"to eat"	0%	0/25
Saan1	"to close"	0%	0/12
Maai5	"to buy"	0%	0/10

Table 68 shows that Llywelyn's average inadequate overt DO rates vary between 0% and 14.29%. This range is the same as that found in Alicia's data (c.f. Table 65). 2 out of the 15 verbs have average overt DO rates above 10%.

Table 69. Frequency of *Overt DOs in Charlotte's Data

Verb		*Overt DO%	Tokens
Mou5	"to not have"	36.36%	4/11
Bong1	"to help"	0%	0/16
Seong2	"to think"	0%	0/25

From Table 69 it can be noted that Charlotte, the E-dominant bilingual, produces less overt DOs when compared to the other four C-E bilinguals: only 3 verbs in her data appear with an overt DO at least 10 times. However, the participant produces average inadequate overt DO rates between 0% and 36.36%. This range is comparable to those found in the four C-dominant bilinguals' data (c.f. Tables 65-68).

Furthermore, from Tables 65-69, it can also be noted that no verb distinguishes itself as taking a noticeably high inadequate overt DO rate across the participants' data and that all the verbs vary in their frequency in terms of inadequate overt DO production.

In terms of non-adult-like null DO production, Tables 70-74 demonstrate its distribution in the participants' Chinese data individually. The verbs that have appeared less than 10 times in total in the available data across the investigation period, which are quantitatively insufficient to be analyzed individually, are not included in the tables below.

Table 70. Frequency of *Null DOs in Timmy's Data

Verb		*Null DO%	Tokens
Zuk1	"to catch"	9.09%	1/11
Wan2	"to find"	7.41%	2/27
Cit3	"to cut"	3.70%	1/27
Gin3	"to see"	3.57%	1/28
Waan2	"to play"	2.70%	1/37
Mou5	"to not have"	1.83%	2/109
Lo2	"to take"	1.37%	1/73
Jau5	"to have"	0.72%	2/70
Sik6	"to eat"	0.54%	1/184
Jam2	"to drink"	0%	0/15
Bei2	"to give"	0%	0/52
Gong2	"to say"	0%	0/38
Geng1	"to be afraid"	0%	0/38
Zung1ji3	"to like"	0%	0/33
Waak6	"to draw"	0%	0/23
Sik1	"to know"	0%	0/74
Hoi1	"to open"	0%	0/32
Cing2	"to invite"	0%	0/15
Tai2	"to watch"	0%	0/88
Zaa1	"to drink"	0%	0/35
Jiu3	"to want"	0%	0/191
Cai3	"to build"	0%	0/36
Sung	"to deliver"	0%	0/14
Ngaau5	"to bite"	0%	0/70
Daa2	"to hit"	0%	0/50
Paak3	"to park"	0%	0/25
Laai4	"to pull"	0%	0/17
Coeng3	"to sing"	0%	0/11
Cung1	"to flush"	0%	0/12
Co5	"to take (a transport)"	0%	0/34
Zoek3	"to put on"	0%	0/21
Zyu2	"to cook"	0%	0/24
Dang2	"to wait"	0%	0/11
Maai5	"to buy"	0%	0/19
Giu3	"to call"	0%	0/21
Gau3	"to save"	0%	0/11
Zi1	"to know"	0%	0/15
Daai3	"to bring"	0%	0/24
Se6	"to shoot"	0%	0/17
Baai2	"to put"	0%	0/39
Saan1	"to close"	0%	0/11
Zing2	"to fix"	0%	0/21
Saat3	"to kill"	0%	0/22
Jung6	"to use"	0%	0/11
Jau4	"to color"	0%	0/65
Mit1	"to pinch"	0%	0/11
Jing2	"to take (a photo)"	0%	0/11
Waa6	"to say"	0%	0/12

Table 70 shows that, in general, Timmy produces few non-adult-like null DOs: among the 48 verbs that appear more than 10 times in his data, 39 verbs take no non-adult-like null DO; the highest non-adult-like null DO rate found in Timmy's data is 9.09% with the verb *zuk1* ("to catch").

Table 71. Frequency of *Null DOs in Sophie's Data

Verb		*Null DO%	Tokens
Wan2	"to find"	35.29%	6/17
Daai3	"to bring"	15.38%	2/13
Gau3	"to save"	10%	1/10
Baai2	"to put"	8.70%	2/23
Teng1	"to listen"	7.14%	1/14
Zing2	"to fix"	6.25%	1/16
Waan2	"to play"	3.57%	1/28
Tai2	"to watch"	3.39%	4/118
Zou6	"to make"	2.38%	1/42
Jau5	"to have"	2.14%	3/140
Bei2	"to give"	1.67%	1/60
Lo2	"to take"	1.67%	1/60
Waak6	"to draw"	1.65%	2/121
Jam2	"to drink"	1.54%	1/65
Zung1ji3	"to like"	1.28%	1/78
Mou5	"to not have"	0.95%	1/105
Jiu3	"to want"	0.83%	2/241
Sik6	"to eat"	0.51%	1/198
Bong1	"to help"	0%	0/29
Sik1	"to know"	0%	0/54
Gin3	"to see"	0%	0/19
Ngo1	"to push out (waste from the body)"	0%	0/31
Daa2	"to hit"	0%	0/55
Sai2	"to wash"	0%	0/25
Maai5	"to buy"	0%	0/51
Maat3	"to wipe"	0%	0/21
Giu3	"to call"	0%	0/17
Nau1	"to be angry"	0%	0/15
Geng1	"to be afraid"	0%	0/36
Zyu2	"to cook"	0%	0/15
Seong2	"to think"	0%	0/14
Zoek3	"to put on"	0%	0/16
Cing2	"to invite"	0%	0/15
Ngaau5	"to bite"	0%	0/11
Git3	"to marry"	0%	0/19
Hoi1	"to open"	0%	0/38
Zuk1	"to catch"	0%	0/18
Zi1	"to know"	0%	0/88
Gong2	"to say"	0%	0/10
Cai3	"to build"	0%	0/14
Cit3	"to cut"	0%	0/21
Zam1	"to pour"	0%	0/19
Se2	"to write"	0%	0/15
Cai2	"to ride"	0%	0/10
Gaau2	"to bother"	0%	0/14
Caa4	"to apply"	0%	0/12

Table 71 shows that, similar to what is found in Timmy's data, in Sophie's data, among the 48 verbs, 28 verbs take no non-adult-like null DOs. The highest non-adult-like null DO rate (i.e. 35.29%) is taken by the verb *wan2* ("to find"), which is higher than what is found in Timmy's data (i.e. 9.09%).

Table 72. Frequency of *Null DOs in Alicia's Data

Verb		*Null DO%	Tokens
Cit3	"to cut"	6.67%	1/15
Seong2	"to think"	5.26%	2/38
Waak6	"to draw"	3.13%	1/32
Jau5	"to have"	0.50%	1/202
Zung1ji3	"to like"	0%	0/26
Maai5	"to buy"	0%	0/11
Cai3	"to build"	0%	0/10
Geng1	"to be afraid"	0%	0/11
Gin3	"to see"	0%	0/18
Lo2	"to take"	0%	0/21
Dou2	"to pour"	0%	0/10
Waa6	"to say"	0%	0/10
Jam2	"to drink"	0%	0/24
Tai2	"to watch"	0%	0/39
Sik6	"to eat"	0%	0/49
Jiu3	"to want"	0%	0/130
Zing2	"to fix"	0%	0/13
Zou6	"to make"	0%	0/14
Sik1	"to know"	0%	0/32
Zi1	"to know"	0%	0/17
Mou5	"to not have"	0%	0/84
Bei2	"to give"	0%	0/32
Daai3	"to bring"	0%	0/13
Baai2	"to put"	0%	0/39
Bong1	"to help"	0%	0/14
Hoi1	"to open"	0%	0/17
Caa4	"to apply"	0%	0/46
Waan2	"to play"	0%	0/34

From Table 72 it can be noted that Alicia produces no non-adult-like null DO with 24 out of 28 verbs in her data. The verb *cit3* ("to cut") takes the highest non-adult-like null DO rate: 6.67%.

Table 73. Frequency of *Null DOs in Llyweyn's Data

Verb		*Null DO%	Tokens
Gin3	"to see"	10%	1/10
Jiu3	"to want"	1.28%	1/78
Jau5	"to have"	1.11%	1/90
Tai2	"to watch"	0.75%	1/133
Zaa1	"to drink"	0%	0/21
Maai5	"to buy"	0%	0/25
Mou5	"to not have"	0%	0/63
Daa2	"to hit"	0%	0/12
Sik1	"to know"	0%	0/17
Se2	"to write"	0%	0/12
Zing2	"to fix"	0%	0/14
Zung1ji3	"to like"	0%	0/11
Bei2	"to give"	0%	0/14
Seong2	"to think"	0%	0/36
Jau4	"to visit"	0%	0/11
Sai2	"to wash"	0%	0/14
Zyu2	"to cook"	0%	0/13
Waan2	"to play"	0%	0/26
Hoi1	"to open"	0%	0/16
Saan1	"to close"	0%	0/16
Sik6	"to eat"	0%	0/40
Lo2	"to take"	0%	0/277
Jam2	"to drink"	0%	0/19
Baai2	"to put"	0%	0/80

As shown in Table 73, among the 24 verbs, 20 verbs take no non-adult-like null DO across the investigation period. The highest non-adult-like null DO rate is 10% with the verb *gin3* ("to see").

Table 74. Frequency of *Null DOs in Charlotte's Data

Verb		*Null DO%	Tokens
Seong2	"to think"	10%	3/30
Sik6	"to eat"	5.88%	1/17
Lo2	"to take"	0%	0/11
Bong1	"to help"	0%	0/18
Mou5	"to not have"	0%	0/35
Bei2	"to give"	0%	0/10
Zoek9	"to put on"	0%	0/22
Jiu3	"to want"	0%	0/11

Table 74 demonstrates that the E-dominant bilingual participant produces no non-adult-like null DO with 6 out of the 8 verbs that appear at least 10 times in the data and the highest non-adult-like null DO rate is 10% with the verb *seong2* ("to think"). This finding is fully comparable to what is found in the four C-dominant bilinguals' data.

What is more, from Tables 70-74, it can be noted that, similar to what is found in terms of inadequate overt DO production, no verb distinguishes itself as taking a noticeably high non-adult-like null DO rate across the five participants' data and that all the verbs vary in their frequency in terms of non-adult-like null DO production.

The results of the data analysis above in terms of Chinese adequate overt DO production indicate that the C-E bilinguals' DO production may not be influenced by the difference of the overall proficiency between the bilinguals' two L1s (i.e. the external view on language dominance) since based on both the overall and the developmental approach to the data, the E-dominant bilingual (i.e. Charlotte) is not found to produce lower adequate overt DO rates when compared to her C-dominant counterparts. This finding is in line with the quantitative analysis of the distribution of overt and null DOs presented above (i.e. subsection 4.2.1.2). What is more, as claimed previously, the only significant difference found within the C-E bilingual group between one of the C-E bilinguals (i.e. Timmy) and the other four C-E bilinguals in terms of adequate overt DO production is likely to be the result of individual differences. These results further reject Hypothesis #12a regarding the relation between interference and "external" language dominance since the "externally" C-dominant bilinguals and the "externally" E-dominant bilingual are found comparable in terms of adequate overt DO production. This, in turn, supports Hypothesis #12b regarding the role played by the internal view on language dominance.

4.2.2.3 Comparison within the C Monolingual Group

In the case of the C monolinguals (c.f. subsection 4.2.2.1), it can be noted from Table 62 that overall Gakei produces adequate overt DOs with higher frequency (91.81%) when compared to Chunyat (85.81%) and Kingtsun (79.66%). However, when taking a look at the developmental data, this is not the case at Stage I: at this stage, Gakei produces the lowest adequate overt DO rate (77.78%); while Kingtsun's figure (78.15%) is similar to that of Gakei, Chunyat produces the highest adequate overt DO rate (86.96%). At the next stage, while Chunyat and Kingtsun produce comparable adequate overt DO rates (around 85%), Gakei's figure goes beyond 90% and this figure maintains at a similar level at Stage III (92.13%).

The results of statistical tests show that, at Stage I, no significant difference is found among the three C monolinguals' performances in terms of adequate overt DO production ($F(2, 13)=3.252$, $p=.072$). At the next stage, no statistically significant difference is found among the three C monolingual participants' adequate overt DO production, either ($F(2, 7)=3.358$, $p=.095$). Since only Gakei's data is available at Stage III, no comparison is conducted. These results indicate that the C-E bilinguals' adequate overt DO production is statistically comparable when their MLU values are at a similar level.

An analysis based on the verbal lexicon produced by the C monolinguals is shown in Tables 75-77 in terms of their inadequate overt DO production and in Tables 78-80 in terms of their non-adult-like null DO production. The "*" in Tables 75-77 does not indicate ungrammaticality but rather inadequacy. The verbs that have appeared less than 10 times in total in the available data across the investigation period, which are quantitatively insufficient to be analyzed individually, are not included in the tables below.

Table 75. Frequency of *Overt DOs in Chunyat's Data

Verb		*Overt DO%	Tokens
Sik1	"to know"	57.89%	11/19
Jam2	"to drink"	31.82%	7/22
Zoek3	"to put on"	30.91%	17/55
Mou5	"to not have"	27%	25/100
Saan1	"to close"	23.08%	3/13
Jau5	"to have"	20.83%	15/72
Hoi1	"to open"	13.33%	4/30
Daa2	"to hit"	11.54%	3/26
Jau4	"to visit"	10%	1/10
Sik6	"to eat"	9.84%	6/61
Tai2	"to watch"	9.52%	2/21
Bei2	"to give"	9.09%	1/11
Zing2	"to fix"	7.14%	1/14
Lo2	"to take"	6.90%	2/29
Zaa1	"to drive"	6.67%	1/15
Waan2	"to play"	4.76%	3/63
Daap3	"to take (a transport)"	4.35%	1/23
Maai5	"to buy"	4.35%	1/23
Ceoi4	"to take off"	0%	0/10
Gam6	"to press"	0%	0/42
Jiu3	"to want"	0%	0/37
Sak1	" to stuff"	0%	0/14

From Table 75 it can be noted that Chunyat produces inadequate overt DOs ranging from 0% to 57.89%. Among the 22 verbs that appear with an overt DO at least 10 times in the available data, 9 verbs' average inadequate overt DO rates are above 10%.

Table 76. Frequency of *Overt DOs in Gakei's Data

Verb		*Overt DO%	Tokens
Co5	"to take (a transport)"	41.67%	5/12
Sik1	"to know"	29.41%	5/17
Mou5	"to not have"	25%	7/28
So1	"to comb"	25%	3/12
Cit3	"to cut"	20.83%	5/24
Jam2	"to drink"	19.44%	7/36
Hoi1	"to open"	15.79%	3/19
Tai2	"to watch"	14.29%	8/56
Dou2	"to pour"	11.11%	2/18
Daa2	"to hit"	9.09%	2/22
Maai5	"to buy"	7.41%	4/54
Jau5	"to have"	6.67%	5/75
Zou6	"to make"	6.67%	1/15
Gaau2	"to bother"	6.25%	1/16
Maat3	"to wipe"	5.88%	1/17
Sik6	"to eat"	3.77%	2/53
Jiu3	"to want"	3.57%	3/84
Lo2	"to take"	1.64%	1/61
Zing2	"to fix"	0%	0/12
Waan2	"to play"	0%	0/14
Sai2	"to wash"	0%	0/79
Bei2	"to give"	0%	0/26
Bong1	"to help"	0%	0/32
Seong2	"to think"	0%	0/16
Wan2	"to find"	0%	0/14
Mit1	"to pinch"	0%	0/13
Daai3	"to bring"	0%	0/10

Table 76 shows that Gakei produces inadequate overt DOs ranging from 0% to 41.67%. The highest figure is lower than that found in Chunyat's data (i.e.57.89%). Furthermore, 9 out of the 27 verbs have average inadequate overt DO rates higher than 10%.

Table 77. Frequency of *Overt DOs in Kingtsun's Data

Verb		*Overt DO%	Tokens
Sik1	"to know"	89.47%	17/19
Mou5	"to not have"	61.54%	40/65
Kam4	"to cover"	56.25%	9/16
Zoek3	"to put on"	40.63%	13/32
Jau5	"to have"	25.81%	16/62
Zin2	"to cut with scissors"	25%	4/16
Jiu3	"to want"	20.69%	12/58
Zing2	"to fix"	20%	2/10
Cung1	"to flush"	16.67%	2/12
Tai2	"to watch"	15.38%	4/26
Gau3	"to save"	13.33%	2/15
Zaa1	"to drive"	12.50%	3/24
Waan2	"to play"	12.50%	3/24
Gin3	"to see"	10.91%	6/55
Lo2	"to take"	10%	3/30
Daa2	"to hit"	9.68%	3/31
Jing2	"to take (a photo)"	7.69%	1/13
Lok6	"to put into"	6.25%	1/16
Taan4	"to play (an instrument)"	4.88%	2/41
Hoi1	"to open"	4.71%	4/85
Sik6	"to eat"	3.03%	1/33
Saan1	"to close"	0%	0/11
Jam2	"to drink"	0%	0/13
Co5	"to take (a transport)"	0%	0/32
Paai4	"to wait for"	0%	0/13
Sai2	"to wash"	0%	0/17

Table 77 shows that Kingtsun produces inadequate overt DOs ranging from 0% to 89.47%, which is the highest among the three C monolinguals. Moreover, 15 out of the 25 verbs have average inadequate overt DO rates above 10%.

From Tables 75-77 it can also be noted that, similar to what has been found in the C-E bilinguals' Chinese data, no verb distinguishes itself as taking a noticeably high inadequate overt DO rate across the three C monolingual participants' data and that all the verbs vary in their frequency in terms of inadequate overt DO production.

Regarding non-adult-like null DO production, Tables 78-80 demonstrate its distribution in the C monolingual participants' data individually. The verbs that have appeared less than 10 times in total in the available data across the investigation period, which are quantitatively insufficient to be analyzed individually, are not included in the tables below.

Table 78. Frequency of *Null DOs in Chunyat's Data

Verb		*Null DO%	Tokens
Dang2	"to wait"	13.33%	2/15
Ngaau5	"to bite"	10%	2/20
Mit1	"to pinch"	6.67%	2/30
Zing2	"to fix"	5.88%	4/68
Mou5	"to not have"	4.74%	11/232
Jiu3	"to want"	2.33%	2/86
Maai5	"to buy"	2.04%	1/49
Jau5	"to have"	0.59%	1/170
Sik6	"to eat"	0.56%	1/180
Waan2	"to play"	0.53%	1/187
Ceoi4	"to take off"	0%	0/22
Daai3	"to bring"	0%	0/18
Deu6	"to drop"	0%	0/15
Diu3	"to fish"	0%	0/23
Sik1	"to turn off"	0%	0/12
Jau4	"to visit"	0%	0/12
Zo2	"to block"	0%	0/11
Caap3	"to insert"	0%	0/10
Sak1	"to stuff"	0%	0/16
Bok1	"to hit"	0%	0/17
Se2	"to write"	0%	0/13
Bei2	"to give"	0%	0/20
Cai3	"to build"	0%	0/17
Gam6	"to press"	0%	0/105
Gin3	"to see"	0%	0/19
Dou6	"to pour"	0%	0/21
Dam2	"to throw"	0%	0/13
Zyun3	"to spin"	0%	0/13
Hoi1	"to open"	0%	0/64
Tai2	"to watch"	0%	0/62
Sik1	"to know"	0%	0/54
Saan1	"to close"	0%	0/18
Baai2	"to put"	0%	0/78
Daap3	"to take (a transport)"	0%	0/30
Zaa1	"to drive"	0%	0/20
Zoek3	"to put on"	0%	0/81
Jam2	"to drink"	0%	0/55
Pou5	"to hug"	0%	0/12
Daa2	"to hit"	0%	0/51
Lo2	"to take"	0%	0/57
Geng1	"to be afraid"	0%	0/32
Gong2	"to talk"	0%	0/12

Table 78 shows that Chunyat produces few non-adult-like null DOs in general. Among the 42 verbs that are taken into account, 32 verbs do not take any non-adult-like null DO during the investigation period. The highest non-adult-like null DO rate is 13.33% with the verb *dang2* ("to wait").

Table 79. Frequency of *Null DOs in Gakei's Data

Verb		*Null DO%	Tokens
Kap1	"to cover"	8.33%	1/12
Gin3	"to see"	7.69%	1/13
Zou6	"to make"	5.88%	1/17
Jam2	"to drink"	1.33%	1/75
Jiu3	"to want"	1.02%	1/98
Sik6	"to eat"	0.92%	1/109
Sai2	"to wash"	0.81%	1/123
Dang2	"to wait"	0%	0/13
Kam4	"to cover"	0%	0/13
Se2	"to write"	0%	0/13
Co5	"to take (a transport)"	0%	0/16
Co1	"to comb"	0%	0/19
Jap6	"to put into"	0%	0/14
Cung1	"to flush"	0%	0/20
Fong3	"to put"	0%	0/18
Dou2	"to pour"	0%	0/32
Gaau2	"to bother"	0%	0/25
Teng1	"to listen"	0%	0/17
Ci1	"to stick"	0%	0/11
Cai3	"to build"	0%	0/12
Maai5	"to buy"	0%	0/68
Zyu2	"to cook"	0%	0/15
Baai2	"to put"	0%	0/23
Daai3	"to bring"	0%	0/11
Cit3	"to cut"	0%	0/29
Pou5	"to hug"	0%	0/10
Zung1ji3	"to like"	0%	0/18
Sau1maai4	"to hide"	0%	0/38
Saan1	"to close"	0%	0/15
Mit1	"to pinch"	0%	0/23
Bong1	"to help"	0%	0/35
Wan2	"to find"	0%	0/16
Seong2	"to think"	0%	0/21
Hoi1	"to open"	0%	0/41
Waan2	"to play"	0%	0/44
Deu6	"to drop"	0%	0/18
Gam6	"to press"	0%	0/11
Gong2	"to talk"	0%	0/17
Mou5	"to not have"	0%	0/62
Tai2	"to watch"	0%	0/145
Luk6	"to record"	0%	0/10
Daa2	"to hit"	0%	0/41
Caak3	"dismantle"	0%	0/15
Zap1	"to pick up"	0%	0/12
Sik1	"to know"	0%	0/29
Baai2	"to put"	0%	0/100
Jau5	"to have"	0%	0/102
Zing2	"to fix"	0%	0/33
Maat3	"to wipe"	0%	0/30
Zaa1	"to drive"	0%	0/11
Bei2	"to give"	0%	0/51
Zi1	"to know"	0%	0/29
Sik1	"to turn off"	0%	0/16

Table 79 shows that Gakei produces very few non-adult-like null DOs during the investigation period. Among the 53 verbs that are taken into account, 46 verbs do not take any non-adult-like null DO during the investigation period. The highest non-adult-like null DO rate is 8.33% with the verb *kap1* ("to cover").

Table 80. Frequency of *Null DOs in Kingtsun's Data

Verb		*Null DO%	Tokens
Cai3	"to build"	17.24%	2/29
Bei2	"to give"	5%	3/60
Sik6	"to eat"	4.17%	3/72
Gin3	"to see"	4%	4/100
Zaa1	"to drive"	4%	3/75
Jau5	"to have"	2.70%	5/185
Sik1	"to know"	2.70%	1/37
Waan2	"to play"	2.04%	1/49
Tai2	"to watch"	1.82%	1/55
Hoi1	"to open"	1.81%	4/221
Zing2	"to fix"	1.79%	1/56
Jiu3	"to want"	1.04%	1/96
Mou5	"to not have"	0.64%	1/156
Maat3	"to wipe"	0%	0/18
Baai2	"to put"	0%	0/26
Co5	"to take (a transport)"	0%	0/38
Paai4	"to wait for "	0%	0/16
Bong1	"to help"	0%	0/13
Wan2	"to find"	0%	0/11
Ngaau5	"to bite"	0%	0/19
Dou2	"to pour"	0%	0/16
Zoek3	"to put on"	0%	0/37
Zai1	"to put"	0%	0/20
Teng1	"to listen"	0%	0/13
Sau1maai4	"to hide"	0%	0/18
Mit1	"to pinch"	0%	0/18
Ceoi4	"to take off"	0%	0/11
Zoek3	"to put on"	0%	0/37
Gaau2	"to bother"	0%	0/19
Lok6	"to put into"	0%	0/16
Lo2	"to take"	0%	0/45
Daai3	"to put on"	0%	0/23
Taan4	"to play (an instrument)"	0%	0/70
Daa2	"to hit"	0%	0/58
Kam4	"to cover"	0%	0/18
Jam2	"to drink"	0%	0/33
Zi1	"to know"	0%	0/31
Pou5	"to hug"	0%	0/18
Gam6	"to press"	0%	0/25
Cung1	"to flush"	0%	0/15
Geng1	"to be afraid"	0%	0/63
Saan1	"to close"	0%	0/38
Dam2	"to throw"	0%	0/24
Sai2	"to wash"	0%	0/27
Zin2	"to cut with scissors"	0%	0/36
Jing2	"to take (a photo)"	0%	0/15
Gau3	"to save"	0%	0/23

Table 80 shows that among the 48 verbs that are considered, 35 verbs do not take any non-adult-like null DO during the investigation period. The highest non-adult-like null DO rate is 17.24% with the verb *cai3* ("to build"). This figure is slightly higher than those found in Chunyat's and Gakei's data.

What can be concluded from Tables 78-80 is that there is not a particular verb which distinguishes itself by taking high non-adult-like null DO rates in all the three C monolingual participants' data, and that all the verbs vary in their frequency of taking non-adult-like null DOs.

The results found in the C monolinguals participants' data are similar to what is found in the C-E bilingual participants' data. They suggest that, although inadequate overt DOs and non-adult-like null DOs exist in both language groups' data, which specific verbs tend to take inadequate overt DOs or non-adult-like null DOs more frequently than others may vary from individual to individual.

A summary of the distribution of inadequate overt DOs and non-adult-like null DOs in the two language groups' data is shown in Table 81 by collapsing the participants' production in each language group.

Table 81. Distribution of Inadequate Overt DOs and *Null DOs

L1(s)	Inadequate Overt DO%	Tokens	*Null DO%	Tokens
C-E	4.49%	330/7351	1.02%	75/7351
C	6.18%	422/6827	1.04%	71/6827

The columns "Inadequate Overt DO%" and "*Null DO%" indicate percentages of occurrences of inadequate overt DOs and non-adult-like null DOs against the total number of DOs produced by the participants respectively.

From Table 81 it can be noted that the C monolinguals produce higher inadequate overt DO rates (6.18%) when compared to the C-E bilinguals (4.49%). However, in terms of non-adult-like null DO production, there is virtually no difference between the performances of the participants in the two language groups (1.02% *versus* 1.04%).

The qualitative analysis on the Chinese production above indicates that, on the one hand, based on the overall data (c.f. subsection 4.2.2.1, Table 62), the C-E bilinguals produce statistically significantly higher adequate overt DO rates when comparable to the C monolinguals. On the other hand, based on the developmental data, the difference between the performances of the two language groups reaches statistical significance only at Stage I; at Stage II and Stage III, the gaps between the two language groups reduce and the difference becomes statistically non-significant. This result does not support Hypotheses #7 and #8 regarding interference from English into Chinese in bilingual Chinese overt DO production since the C-E bilingual participants' performances are found even more adequate pragmatically speaking than those of the C monolinguals at some point (i.e. at Stage I). These results in turn, provide evidence for Hypothesis #9 regarding facilitation due to interlinguistic influence from English into Chinese since the C-E bilinguals are found to produce adequate overt DO rates with statistically significantly higher frequency when compared to the C monolinguals at Stage I. This finding suggests that bilinguals are aware of the pragmatic values that regulate the presence of overt objects in Chinese earlier than monolinguals.

Taking into account that the different maturational schedules of the two languages may be a factor that affects interlinguistic influence, and that, as previously discussed (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, chapter 3, section 3.1), Chinese is expected to mature earlier than English in the domain of DOs, the C-E bilinguals are not expected to experience

interference from English in their Chinese DO production. This is also supported by the results of the statistical tests, which confirms Hypothesis #10.

What is more, the results of the data analysis also show positive evidence for Hypothesis #11 regarding the relation between interference and input ambiguity. That is, on the one hand, and since all transitive verbs can take either an overt DO or a null DO in Chinese, no ambiguity occurs; on the other hand, ambiguity exists in English in that only mixed verbs have this characteristic and pure transitive verbs should always be followed by an overt DO. As a result, no interference is expected from English (the ambiguous language) into Chinese (the non-ambiguous language) in the C-E bilinguals' Chinese DO production. The fact that the C-E bilinguals do not overproduce neither overt nor null DOs when compared to their C monolingual counterparts supports this observation.

Furthermore, within the C-E bilingual group, the E-dominant bilingual's performance is not found statistically significantly different when comparable to her C-dominant bilingual counterparts throughout the investigation period since she produces adequate overt DOs to a similar extent as the C-dominant bilinguals. This result does not support Hypothesis #12a regarding the relation between the overall language proficiency (i.e. the external view on language dominance) and language interference which predicts that the E-dominant will experience more influence from English into Chinese. This, in turn, supports Hypothesis #12b regarding the role played by the internal view on language dominance due to the nature of the grammars in the domain studied in these two particular languages. That is, based on the reinterpretation of dominance proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), the C-E bilinguals may prefer the Chinese DO realization system since it provides more transparent and higher computational

valued functional features when compared to the English DO realization system: overt DOs in both English and Chinese are [+/- individuated] since they can represent specific/individuated and non-specific/non-individuated referents (chapters 1 and 3); however, while Chinese null DOs are [+/- individuated] just like Chinese overt DOs, English null DOs are [-individuated]. In this respect, the dominant language would always be Chinese (and, therefore, the source of influence), regardless of the amount of input bilinguals are exposed to in the two languages or any other similar language-external factors.

The results of the quantitative and qualitative analyses of the English data demonstrate that there are quantitative and qualitative differences between the C-E bilinguals with a different dominant language (c.f. subsections 4.1.1.2 and 4.1.2.2). However, no such difference is found in the Chinese data (c.f. subsections 4.2.1.2 and 4.2.2.2). These different findings make the role of overall language proficiency (i.e. the external view on language dominance) less straightforward. In the following section, this issue will be further studied.

4.3 The Role Played by Language Dominance

Charlotte is the only C-E bilingual participant in the present study that is reported to be E-dominant (c.f. subsection 4.1.1.2). She was born in New Zealand and stayed there until she was four months old. After moving to Hong Kong, her main caretaker was a Filipino domestic helper who spoke English during most of the time. Despite the community language being Chinese, it is reasonable to assume that Charlotte's English input was as much as or even more than her Chinese input, and, as a result, English becomes her dominant language. On the contrary, the four C-dominant C-E bilinguals did not have such experience.

In order to further investigate the role played by language dominance, the five C-E bilingual participants are divided into two subgroups, subgroup I being C-dominant which includes Timmy, Sophie, Alicia and Llywelyn, and subgroup II, E-dominant, which includes Charlotte. Based on this division, the influence of language dominance on interlinguistic influence will be explored in the English data (c.f. subsection 4.3.1) and in the Chinese data (c.f. subsection 4.3.2).

4.3.1 Analysis of the English Data

In terms of the English data, as suggested previously based on the individual data (c.f. subsections 4.1.1.2 and 4.1.2.2), a statistically significant difference has been found in terms of DO realization among the five C-E bilinguals from both quantitative and qualitative perspectives. Such difference could be explained by two possible factors: (i) the participants' different dominant language, or (ii) individual differences due to the small number of participants involved. In order to draw a clearer picture of the differences found among the C-E bilingual participants, statistical tests are run based on the C-E bilinguals' data when they are divided into two subgroups according to their different overall language proficiency in the two L1s.

Quantitatively, an Independent-Samples T-Test on the overall data shows that the difference in performance between the two subgroups is significant (t(41.983)=6.911, p<.001), which indicates that the E-dominant C-E bilingual (i.e. Charlotte) in the present study produces non-adult-like null DOs with statistically significantly lower frequency when compared to the four C-dominant C-E bilinguals.

When looking at the developmental data, since there is no available data of Charlotte at Stage III, the participants' performances are only compared at the first two stages. The results of

statistical tests reveal that at Stage I, a statistically significant difference is found between the C-dominant C-E bilinguals and the E-dominant C-E bilingual (t(12)=4.465, p=.001), which suggests that the E-dominant participant produces non-adult-like null DOs with statistically significantly lower frequency than the C-dominant participants; the same result is found at Stage II (t(34.289)=6.667, p<.001), which indicates that the non-adult-like null DO rates produced by the E-dominant participant are statistically significantly lower than those produced by the C-dominant participants.

That is, taken the English data both overall and developmentally, the E-dominant bilingual produces less non-adult-like DO rates when compared to her C-dominant peers.

To further examine the influence of language dominance, a comparison is carried out by involving the two groups of C-E bilinguals as well as the participants in the other two language groups (i.e. the S-E bilinguals and the E monolinguals). A One-way ANOVA on the monthly non-adult-like null DO rates produced by participants during the investigation period shows that there is a statistically significant difference among the participants' performance in each language group (F(3, 105)=25.604, p<.001). Diagram 6 demonstrates the results of a Tukey post hoc test.

Diagram 6. Difference in Performance in English Non-Adult-like Null DO Production
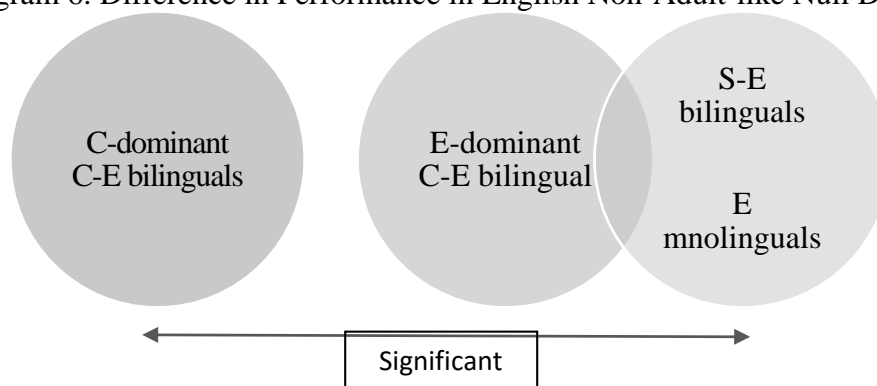
Diagram 6 reveals that when taking all the participants in the four language groups into account, the C-dominant C-E bilinguals' performances are statistically different from those of the other three language groups (E-dominant C-E $p=.001$, S-E $p<.001$, E $p<.001$); the E-dominant C-E bilingual's performance is comparable to those of the S-E bilinguals' ($p=.389$) and of the E monolinguals' ($p=.692$) but different from those of the C-dominant C-E bilinguals ($p=.001$); the S-E bilinguals' performances are comparable to those of the E monolinguals' ($p=.886$) and to that of the E-dominant C-E bilingual ($p=.389$) but different from those of the C-dominant C-E bilinguals ($p<.001$); the E monolinguals' performances are comparable to those of the S-E bilinguals' ($p=.389$) and that of the E-dominant C-E bilingual ($p=.692$) but different from those of the C-dominant C-E bilinguals ($p<.001$).

Regarding the developmental data based on the monthly non-adult-like null DO rates produced by the participants in each group, the results of statistical tests reveal that at Stage I, the performances of the participants in the four different language groups are statistically significantly different (Welch $F(3, 7.573)=8.148$, $p=.009$). The results of a Games-Howell post hoc test is shown in Diagram 7.

Diagram 7. Difference in Performance in English Non-Adult-like Null DO Production at Stage I
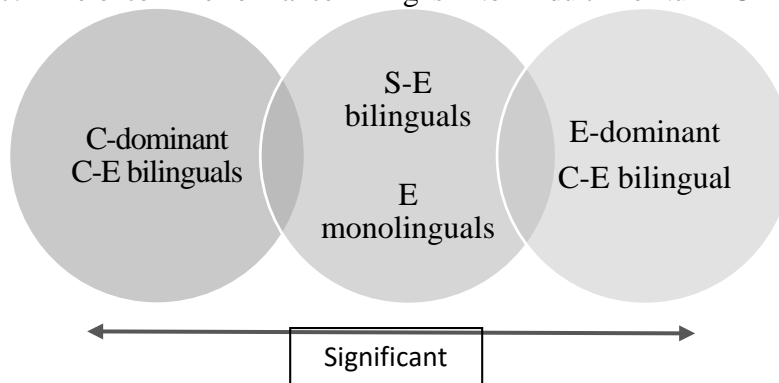
Diagram 7 shows that the S-E bilinguals' performances as well as those of the E monolinguals' are comparable to the other three language groups'. That is, at this stage, there is no statistically significant difference among the performances of the C-dominant C-E bilinguals, the S-E bilinguals and the E monolinguals; however, a statistically significant difference is found between the E-dominant C-E bilinguals and the C-dominant C-E bilinguals though the former's performance is comparable to those of the S-E bilinguals and the E monolinguals. This indicates that the monthly non-adult-like null DO rate produced by the E-dominant C-E bilingual (only the first month in Charlotte's available data falls into Stage I) is statistically significantly lower when compared to her C-dominant C-E bilingual counterparts.

At Stage II, the results of a Welch ANOVA demonstrate that the performances of the participants in the different language groups are statistically significantly different (Welch $F(3, 21.845)= 45.146$, $p<.001$). The results of a Games-Howell post hoc test are shown in Diagram 8.

Diagram 8. Difference in Performance in English Non-Adult-like Null DO Production at Stage II
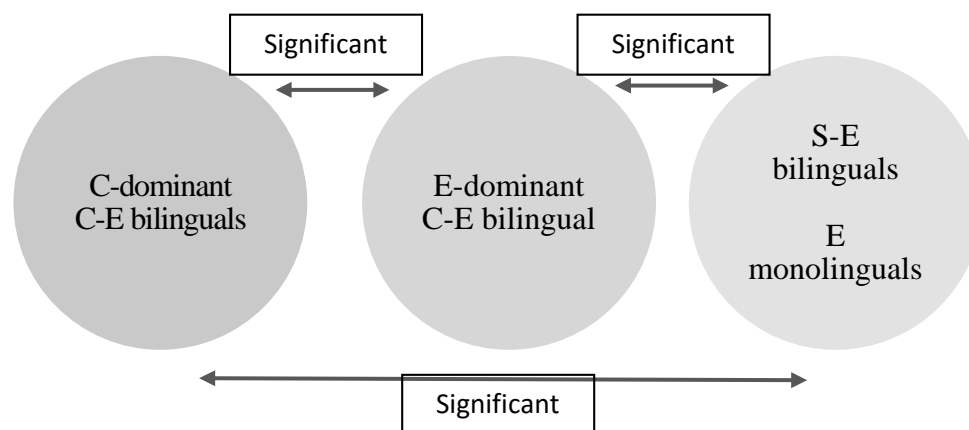
Diagram 8 shows that at Stage II, on the one hand, as what is found at the previous stage, a statistically significant difference is found between the two C-E bilingual groups with a different dominant language ($p<.001$); on the other hand, in contrast to the results found at Stage I, the E-dominant C-E bilingual's performance is statistically significantly different from those

of the S-E bilinguals (*p*=.001) as well as from those of the E monolinguals (*p*=.028). These results indicate that at this stage, the C-dominant C-E bilinguals produce the highest non-adult-like null DO rates when compared to their counterparts in the other three language groups; meanwhile, the E-dominant C-E bilingual produces statistically significantly higher non-adult-like null DO rates when compared to the S-E bilinguals and the E monolinguals while her figures are statistically significantly lower when compared to the C-dominant C-E bilinguals. Furthermore, the S-E bilinguals' performances are comparable to those of the E monolinguals. The E-dominant bilingual's rates, therefore, fall in-between the C-dominant bilinguals' and the other two participant groups.

Qualitatively, in the four C-dominant bilinguals' English data, some common characteristics in terms of verb type are found: that is, a particular verb (i.e. *put*) stands out by taking non-adult-like null DOs with higher frequency; and the non-adult-like null DO structure of this verb is believed to be the result of interference from Chinese to English (c.f. subsections 4.1.2.1 and 4.1.2.2). At the same time, such characteristics are not shared by the E-dominant bilingual's data, the same result that is found in the S-E bilinguals' and the E monolinguals' data. In other words, the E-dominant C-E bilingual's performance is more similar to those of the participants in the other two language groups when compared to her C-dominant C-E counterparts from a qualitative perspective.

What the results of the statistical tests suggest is that overall the E-dominant C-E bilinguals' performance in English is more similar to those of the S-E bilinguals and of the E monolinguals when compared to the C-dominant C-E bilinguals. This is reflected by the fact that, on the one hand, there is a statistically significant difference between the performances of the two groups of C-E bilinguals based on both the overall data and the developmental data; on the

other hand, no statistically significant difference is found among the E-dominant C-E bilingual's performance and those of the S-E bilinguals and of the E monolinguals' based on the overall data (c.f. Diagram 6) as well as the developmental data at Stage I (c.f. Diagram 7); furthermore, a statistically significant difference is found among the C-dominant C-E bilinguals' performances and those of the S-E bilinguals and of the E monolinguals based on the overall data (c.f. Diagram 6) as well as the developmental data at Stage II (c.f. Diagram 8); last but not least, no qualitative difference is found among the E-dominant C-E bilingual's data and the S-E bilinguals' and the E monolinguals' data as opposed to the C-dominant C-E bilinguals' data.

However, quantitatively, statistically significant differences are found among the E-dominant C-E bilingual's English data and those of the S-E bilinguals and the E monolinguals at Stage II. This indicates that the E-dominant C-E bilingual produces non-adult-like null DOs with statistically significantly higher frequency when compared to the S-E bilingual and E monolingual counterparts.

These results provide support for Hypothesis #5a regarding the relationship between the overall language proficiency and non-adult-like null DO production since interlinguistic influence is found from Chinese into English in the C-E bilinguals with a different dominant language to a different extent: on the one hand, the C-dominant C-E bilinguals overproduce null DOs in English in a way that is quantitatively and qualitatively different from the E-dominant C-E bilingual, the E monolinguals and the S-E bilinguals; on the other hand, the influence from Chinese into English is found weaker in the E-dominant C-E bilingual as she produces DOs in a more comparable way to the E monolinguals and the S-E bilinguals than the C-dominant C-E bilinguals.

What is more, the results above also provide positive evidence for Hypothesis #5b regarding the C-E bilinguals' preference for the Chinese DO realization system rather than the English one, regardless of their proficiency in the two L1s. This is reflected by the fact that though being E-dominant, the C-E bilingual is found to produce non-adult-like null DOs with statistically higher frequency when compared to the S-E bilinguals and the E monolinguals at Stage II, which suggests a statistically significant difference between the E-dominant C-E bilingual participant and the E monolinguals and the S-E bilinguals in terms of non-adult-like null DO production. This could indicate that, to some extent, not only the C-dominant C-E bilinguals but also the E-dominant C-E bilingual may have a preference for the Chinese DO realization system rather than the English one regardless of their overall language proficiency in the two L1s since the Chinese DO system provides more transparent and higher computational valued functional features (c.f. chapter 3, section 3.1) and therefore this is the language that is guiding their English DO production.

4.3.2 Analysis of the Chinese Data

In terms of the Chinese data, statistical tests based on the five participants' individual data (c.f. subsections 4.1.2.2 and 4.2.2.2) suggest that, in terms of non-adult-like null DO production, no statistically significant difference is found among the five C-E bilinguals' performances from both quantitative and qualitative perspectives; in terms of overt DO production, there is no statistically significant difference between the E-dominant C-E bilingual' performance and three out of the four C-dominant C-E bilinguals' performances based on both the overall data and the developmental data; however, a statistically significant difference is found based on the overall data between one of the C-dominant C-E bilingual's (i.e. Timmy)

performance and those of the other four C-E bilinguals from a quantitative perspective and between the same C-dominant C-E bilingual's (i.e. Timmy) performance and those of the three out of the four C-E bilinguals (i.e. Alicia, Llywelyn and Charlotte) from a qualitative perspective. Such difference, as previously addressed (c.f. subsections 4.1.2.2 and 4.2.2.2), is very likely to be the result of individual differences due to the small number of participants involved. As in the case of the English data, in order to clear up picture of the differences found among the C-E bilingual participants, statistical tests are run based on the C-E bilinguals data when they are divided into two subgroups according to their different overall language proficiency in the two L1s.

Quantitatively, Independent-Samples T-Tests on the overall data show that, in terms of overt DO production, no statististically significant difference is found between the two subgroups ($t(10.329)=1.962$, $p=.077$), which indicates that the E-dominant C-E bilingual (i.e. Charlotte) in the present study produces overt DOs to a comparable extent when compared to the C-dominant C-E bilinguals; the same result is found in term of non-adult-like null DO production between the performances of the two groups of C-E bilinguals with a different dominant language: the E-dominant C-E bilingual (i.e. Charlotte) produces non-adult-like null DOs to a comparable extent when compared to the C-dominant C-E bilinguals ($t(10.574)=-1.377$, $p=.197$).

When looking at the developmental data, since there is no available data of Charlotte at Stage III, the participants' performances are only compared at the first two stages. The results of statistical tests reveal that, in terms of overt DO production, at Stage I, no statistically significant difference is found between the two subgroups of C-E bilinguals ($t(4)=-.299$, $p=.780$), which suggests that the E-dominant participant produces adequate adult-like overt DOs in a similar way

when compared to the C-dominant C-E participant (among the C-dominant C-E bilingual participants, only Llywelyn's data is available at Stage I); the same result is found in terms of non-adult-like null DO production: the two C-E bilinguals in the two subgroups produce non-adult-like null DOs with similar frequency ($t(4)=.804$, $p=.466$), which indicates that the non-adult-like null DO rates produced by the E-dominant participant at Stage I are statistically significantly comparable to those produced by the C-dominant participant (i.e. Llywelyn).

At Stage II, in terms of overt DOs, the difference between the performances of the two subgroups of C-E bilinguals is found statistically non-significant ($t(6.769)=1.786$, $p=.119$); in terms of non-adult-like null DO production, no statistically significant difference is found between the two subgroups of C-E bilinguals ($t(6.894)=-1.462$, $p=.118$), either. These results suggest that at Stage II, the E-dominant C-E participant's DO production is comparable to that of the C-dominant C-E bilingual.

Another comparison is carried out by involving the two groups of C-E bilinguals as well as the participants in the C monolingual group. A Welch ANOVA on the monthly overt DO rates produced by participants during the investigation period shows that there are statistically significant differences in the participants' performance among the three language groups (Welch $F(2, 21.512)=13.731$, $p<.001$). Diagram 9 demonstrates the results of a Games-Howell post hoc test.

Diagram 9. Difference in Performance in Chinese Overt DO Production
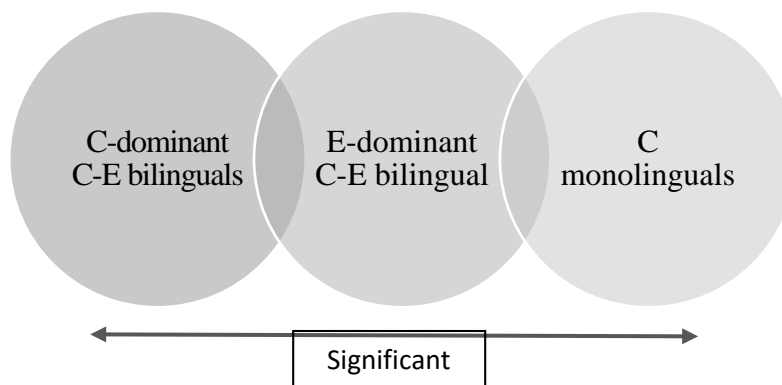
What Diagram 9 demonstrates is that, in terms of overt DO production, no statistically significant difference is found between the C-dominant C-E bilinguals' and the E-dominant C-E bilingual's performances ($p=.171$) and between the E-dominant C-E bilingual's and the C monolinguals' performances ($p=.735$). However, a statistically significant difference is found between the C-dominant C-E bilinguals' and the C monolinguals' performances. This is to say, the C-dominant C-E bilinguals produce overt DOs with statistically significantly higher frequency when compared to the C monolinguals. As discussed in subsection 4.2.1.1, this higher frequency produced by the C-E bilinguals does not indicate overproduction of overt DOs but a frequency rate that is closer to that found in adult-to-adult conversation setting (i.e. 59.9%, Wang et al. 1992) when compared to that of the C monolinguals.

In terms of non-adult-like null DO production, the results of the statistical tests show that there is no statistically significant difference among the three language groups (Welch $F(2, 22.562)=.925$, $p=.411$), which suggests that the performances of the participants in the two C-E bilingual subgroups as well as in the C monolingual group are comparable.

Regarding the developmental data, in terms of overt DO production at Stage I, Diagram 10 shows the difference among the three language groups.

Diagram 10. Difference in Performance in Chinese Overt DO Production at Stage I
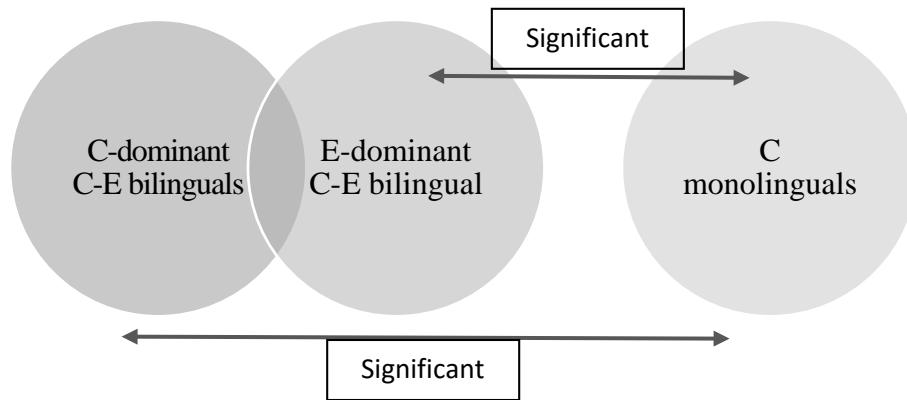

Diagram 10 reveals that at Stage I, in terms of overt DO production, there is a statistically significant difference between the performances of the C-dominant C-E bilinguals and that of the C monolinguals' ($t(15)$=2.170, p=.046) as well as between the performances of the E-dominant C-E bilingual and that of the C monolinguals' ($t(15)$=-2.337, p=.034); however, no such difference is found between the performances of the C-dominant C-E bilinguals and the E-dominant C-E bilingual ($t(4)$=-.299, p=.780).

In terms of non-adult-like null DOs, no statistically significant difference is found among the performances of the two C-E bilingual subgroups and the C monolingual group ($F(2, 17)$=1.321, p=.293) which suggests that the performances of the participants in the three different language groups are comparable at this stage.

At Stage II, in terms of overt DO production, the results of a statistical test show that the difference among the performances of the three language groups is not statistically significant (Welch $F(2, 12.220)$=3.738, p=.054); the same result is found in terms of non-adult-like null DO production (Welch $F(2,13.240)$=1.142, p=.349). These results suggest that the statistically significant difference found between the performances of the two subgroups of C-E bilinguals and those of the C monolinguals at Stage I reduces to a statistically non-significant level at Stage

II and that the participants in the two C-E bilingual subgroups as well as those in the C monolingual group produce DOs in a comparable way from a quantitative perspective.

Qualitatively, as discussed in subsection 4.2.2.2, overall all the five participants produce average adequate overt DOs with high frequency (above 90%) (c.f. subsection 4.2.2.1, Table 62). Furthermore, an individual comparison among the five C-E bilinguals shows that the "externally" E-dominant C-E bilingual (i.e. Charlotte) produces adequate overt DO rates that are comparable to those produced by three out of the four "externally" C-dominant C-E bilinguals (i.e. Sophie, Alicia and Llywelyn); however, at Stage II, one of the C-dominant C-E bilinguals' (i.e. Timmy) adequate overt DO rates are statistically significantly lower than those of the E-dominant C-E bilingual (i.e. Charlotte) and those of two out of the three C-dominant C-E bilinguals (i.e. Alicia and Llywelyn); at Stage III, Timmy' average adequate overt DO rates remain statistically significantly lower than those of Alicia. Therefore, the difference found between Timmy and the other four C-E bilinguals is likely to be the result of individual differences.

In order to further examine the role played by language dominance, another statistical test is run based on the C-E bilinguals' data by dividing them into two subgroups according to their dominant language. The results show that overall the difference between the the C-dominant C-E bilingual subgroup and the E-dominant C-E bilingual subgroup does not reach statistical significance ($t(56)=-2.001$, $p=.050$).

Regarding the developmental data, no statistically significant difference is found between the adequate overt DO rates produced by the participants in the two subgroups either at Stage I ($t(4)=-1.606$, $p=.184$) or at Stage II ($t(34)=-1.313$, $p=.198$), which indicates that the E-dominant C-E bilingual produces adequate overt DOs with frequency that is comparable to that of the C-dominant C-E bilinguals.

Another statistical test is run by involving the two C-E bilingual subgroups' data as well as that of the C monolinguals. As addressed in subsection 4.2.2.1, the C-E bilinguals produce higher adequate overt DO rates when compared to the C monolinguals. The results show that the overall performances of the participants in the three groups are statistically significantly different (Welch $F(2, 28.112)=12.420$, $p<.001$). Diagram 11 reveals the results of the Tukey post hoc test.

Diagram 11. Difference in Performance in Chinese Adequate Overt DO Production
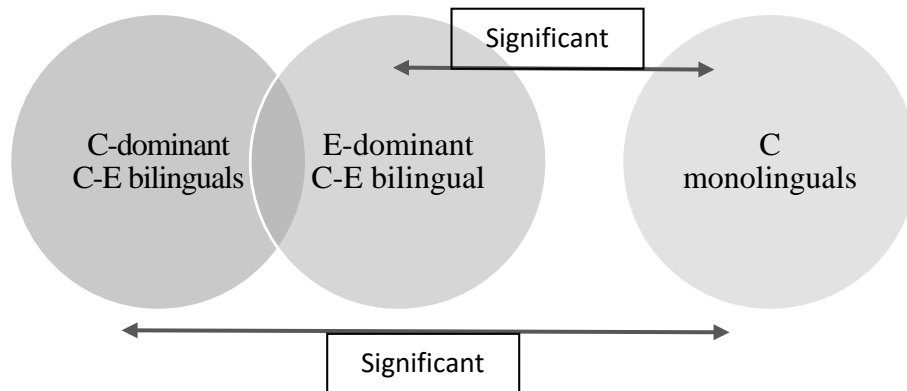
From Diagram 11 it can be noted that a statistically significant difference is found between the C-dominant C-E bilinguals and the C monolinguals ($p<.001$) as well as between the E-dominant C-E bilingual and the C monolinguals ($<.001$); however, no such difference is found between the C-E bilinguals with a different dominant language ($p=.192$). These results suggest that the C-E bilingual participants, regardless of their dominant language, produce statistically significantly higher adequate overt DO rates when compared to their C monolingual counterparts, which means that the C-E bilinguals' performances are more adult-like in terms of overt DO production.

A statistical test based on the developmental data shows that at Stage I, a statistically significant difference is found among the two C-E subgroups and the C monolingual group ($F(2$,

17)=4.296, *p*=.031); the results of a Tukey post hoc test reveal the pairwise differences, as shown in Diagram 12.

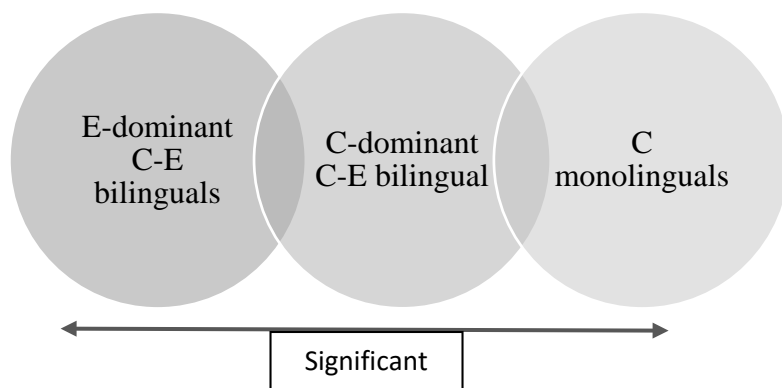Diagram 12. Difference in Performance in Chinese Adequate Overt DO Production at Stage I

Diagram 12 shows that at Stage I, no statistically significant difference is found between the two subgroups of C-E bilinguals or between the C-dominant C-E bilinguals and the C monolinguals; however, the E-dominant C-E bilingual's adequate overt DO production is statistically significantly different from that of the C monolinguals, which suggests that at this stage, the E-dominant C-E bilingual's performance in terms of adequate overt DO production is more adult-like when compared to the C monolinguals.

At Stage II, no statistically significant difference is found among the participants in the three groups in terms of adequate overt DO production (*F*(2, 43)=2.964, *p*=.062), which indicates that the participants performances are comparable to each other.

What is more, when taking verbal lexicon into consideration, among the five C-E bilinguals' data, no verb distringuishes itself as taking a noticeably high inadequate overt DO rates or non-adult-like null DO rates, a result that is different from what has been found in the C-E bilinguals' English data (c.f. subsections 4.1.2.1 and 4.1.2.2).

The fact that the E-dominant C-E bilingual and the C-dominant C-E bilinguals are found to have comparable performances in Chinese in the domain of DO from both quantitative and qualitative perspectives provides positive evidence for Hypothesis #12b regarding the relationship between language interference and the internal view on language dominance. That is, based on the reinterpretation of dominance proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), the C-E bilinguals, regardless of their overall language proficiency in their two L1s, may prefer the Chinese DO realization system since it provides more transparent and higher computational valued functional features when compared to the English DO realization system: overt DOs in both English and Chinese are [+/- individuated] since they can represent specific/individuated and non-specific/non-individuated referents (chapters 1 and 3); however, while Chinese null DOs are [+/- individuated] just like Chinese overt DOs, English null DOs are [-individuated]. In this respect, the dominant language would always be Chinese (and, therefore, the source of influence), regardless of the amount of input bilinguals are exposed to in the two languages or any other similar language-external factors. These results, in turn, do not support Hypothesis #12a regarding the relationship between language interference and the external view on language dominance since the E-dominant C-E bilingual does not experience stronger influence from English into Chinese when compared to her C-dominant counterparts in her DO production in Chinese.

The results found in the English data (c.f. subsection 4.3.1) together with those found in the Chinese data (c.f. subsection 4.3.2) draw a clearer picture of the role played by language dominance: both overall proficiency in the two L1s in bilingual children (i.e. the external view on language dominance) as well as the nature of the functional features in the two L1s (i.e. the

internal view on language dominance) may contribute to explain the nature and directionality of interlinguistic influence. In addition, the so-called bilingual effect may also play a role in interlinguistic influence. However, the influence of the three factors appears to be language-bound: in the English data, both the external view and the internal view on language dominance seem to abide; while in the Chinese data, a mixture of both and of the bilingual effect could be simultaneously taking effect.

On the one hand and with respect to English, the E-dominant C-E bilingual and the E monolinguals produce DOs in a similar way and to a large extent from both quantitative and qualitative perspectives; in contrast, the C-dominant C-E bilinguals produce DOs quantitatively and qualitatively differently from the E monolinguals. This difference between the E-dominant and the C-dominant C-E bilingual participants when compared to the E monolinguals is likely to be the result of their different overall language proficiency in their two L1s. In the case of the C-dominant C-E bilinguals, they experience interference from Chinese into English in their English production, which is demonstrated by the fact that these bilinguals produce more non-adult-like null DOs in English and their English null DO output is based on the Chinese structure. In the case of the E-dominant C-E bilingual, she experiences a much weaker interference from Chinese into English in her English DO production. This is demonstrated by the fact that she produces non-adult-like null DO rates at a comparable level to the E monolinguals based on both the overall data as well as the data at Stage I. However, at Stage II, her performance can be considered as an in-between case: she produces non-adult-like null DO rates that are statistically significantly lower than the C-dominant C-E bilinguals but statistically significantly higher than the E monolinguals. This finding reveals that though being E-dominant, this C-E bilingual still experiences interference from Chinese into English. This is likely to be the result of the fact that

the Chinese DO realization system still serves as the guiding system in the C-E bilingual's DO production due to its nature; the reason behind this preference is that it provides more transparent and higher computational valued functional features when compared to the English DO realization system (c.f. chapters 1 and 3).

On the other hand, there is virtually no difference between the E-dominant C-E bilingual's and the C-dominant C-E bilinguals' Chinese production in the domain of DOs from both quantitative and qualitative perspectives. This provides further evidence for the claim that the Chinese DO realization system may serve as the guiding one regardless of the amount of input bilinguals are exposed to in the two languages or any other similar language-external factor. Moreover, both the E-dominant C-E bilingual and the C-dominant C-E bilinguals behave more adult-like overall and at Stage I when compared to the C monolinguals but such difference reduces into statistically non-significant at the subsequent stage (i.e. Stage II). This could be the results of them being bilinguals. That is, the fact that they are bilinguals makes them more sensitive to grammatical properties (i.e. DOs in this particular study), irrespective of their overall proficiency in their two L1s. In other words, external dominance is not making any difference in the C-E bilinguals' Chinese production; the fact that they have both DO realization systems available (i.e. the more transparent one in Chinese and the less transparent one in English) is what makes the C-E bilinguals different from the C monolinguals. This finding could be tied to the so-called bilingual effect in that the availability of the two systems makes the C-E bilinguals more aware of grammatical properties (in the domain of DOs in this particular case). This suggests positive influence raised by the so-called bilingual effect.

What is more, the reason why the influence of the three factors discussed above (i.e. the external and internal views on language dominance and the so-called bilingual effect) appears to

be language-bound might lie in the nature of the grammars in the bilinguals' two L1s. The fact that the E-dominant C-E bilingual performs as an in-between case (between the C-dominant C-E bilinguals and the E monolinguals) in her English DO production at Stage II but her performance in Chinese is fully comparable to the C-dominant C-E bilinguals indicates that, when the realization mechanism is less straightforward in language A (i.e. English) than in language B (i.e. Chinese) (c.f. chapter 1), overall language proficiency may play an important role in the sense that, though being guided by the mechanism of language B (i.e. the Chinese DO realization mechanism), if a bilingual child is more proficient in language A (i.e. English), this interference could be somehow reduced. Nevertheless, in the case of language B (i.e. Chinese) whose grammar in the studied domain is very straightforward, the higher proficiency in language A (i.e. English) would not surpass the guiding system (i.e. the Chinese DO realization mechanism). This finding again points to the role played by language ambiguity in interlinguistic influence, as discussed in chapter 2.

4.4 Summary: Main Findings in the English and Chinese Data Analyses

Chapter 4 has been devoted to the analysis of data involved in the present study. In particular, section 4.1 discusses and compares the English data produced by the C-E bilinguals, the E monolinguals as well as the S-E bilinguals while section 4.2 discusses and compares the Chinese data produced by the C-E bilinguals and the C monolinguals. In addition, the present chapter has also offered a detailed analysis of the role played by language dominance in interlinguistic influence by comparing the English and the Chinese data produced by the C-E bilinguals with a different dominant language (i.e. section 4.3). In the light of these previous comparisons, the present section offers an account of the hypotheses proposed in chapter 3 (c.f.
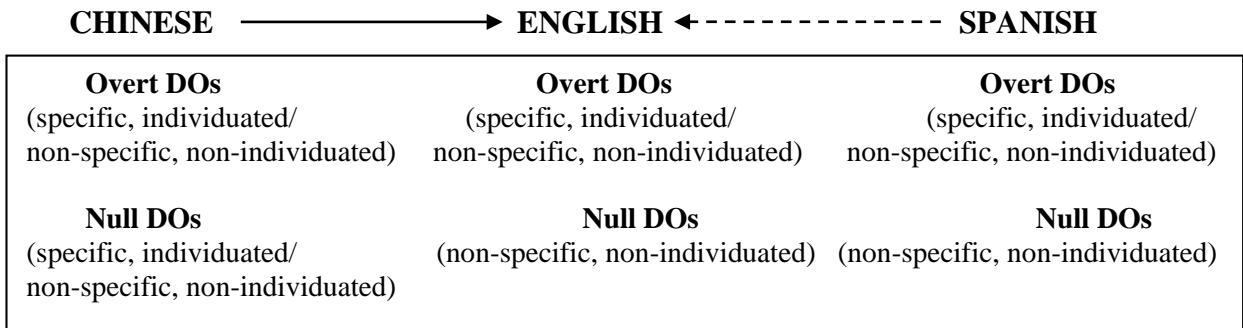
section 3.1). In particular, subsection 4.4.1 focuses on the findings from the analysis of the English data and subsection 4.4.2 deals with the findings from the analysis of the Chinese data.

4.4.1 Interlinguistic Influence from Chinese into English in C-E Bilinguals

In terms of interlinguistic influence from Chinese into English, two main scenarios are considered in the case of the C-E bilinguals' English DO production: one where Chinese null DOs may cause INTERFERENCE and one where Chinese would have NO INTERFERENCE into English in the domain of DOs. Based on the results of the data analyses in sections 4.1 and 4.3, several conclusions can be drawn which correspond to the hypotheses proposed in chapter 3 (c.f. section 3.1).

Hypothesis #1, as shown in (191), regarding delay due to interlinguistic influence from Chinese into English in the C-E bilinguals' English DO production, is confirmed.

(191) HYPOTHESIS #1 - **Confirmed**
DELAY: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL
ENGLISH (quantitative difference between C-E bilinguals and E monolinguals)

CHINESE ⟶ ENGLISH ⬱- - - - - - - - - - - SPANISH

Overt DOs (specific, individuated/ non-specific, non-individuated)	**Overt DOs** (specific, individuated/ non-specific, non-individuated)	**Overt DOs** (specific, individuated/ non-specific, non-individuated)
Null DOs (specific, individuated/ non-specific, non-individuated)	**Null DOs** (non-specific, non-individuated)	**Null DOs** (non-specific, non-individuated)

It has been found that overall the C-E bilinguals produce non-adult-like null DOs with statistically significantly higher frequency when compared to the E monolinguals and the S-E bilinguals (c.f. subsection 4.1.1). In terms of the developmental data, a statistically significant difference is found at Stage II between the C-E bilinguals and the E monolinguals as well as the

S-E bilinguals in non-adult-like null DO production in that the C-E bilinguals produce non-adult-like null DOs statistically significantly more frequently. In contrast, there is no statistically significant difference between the E monolinguals' and the S-E bilinguals' performances in terms of the non-adult-like null DOs overall as well as at Stages I and III; at Stage II, the S-E bilinguals' performances are found even more adult-like when compared to those of the E monolinguals. The difference between the C-E bilinguals' performances and those of the participants in the other two language groups in non-adult-like null DO production is considered to be the result of transfer from Chinese which results in delay. These results, in turn, also provide support for Hulk and Müller's (2000) Interference Hypothesis and Hsin's (2012) STH for delay (c.f. chapter 2, subsection 2.2.1): that is, the realization of DOs in Chinese and English satisfies the conditions that are proposed in the two hypotheses, namely, (i) the realization of the DO is an issue which involves semantic, syntactic and pragmatic factors (c.f. chapter 1), and (ii) both Chinese and English have overt and null DOs but their distribution is constrained by different discourse conditions (i.e. discourse-pragmatic constraints in the two languages conflict) (c.f. chapter 2). Such delay is not found in the S-E bilinguals' English production because of the similar DO realization mechanism in the two languages of these bilinguals.

Moreover, the delay that occurs in the DO production of the C-E bilinguals is demonstrated not to be the result of the so-called bilingual effect, since no delay is found in the S-E bilinguals and they do not experience a longer null DO period when compared to their E monolingual peers.

What is more, acceleration is found in the S-E bilinguals' English DO production at Stage II as they produce non-adult-like null DO with statistically significantly lower frequency when compared to the E monolinguals. This is likely to be that result of the overlapped DO

realization mechanism in the two languages, which is in line with the condition for acceleration proposed by Hsin (2012) (c.f. chapter 2, subsection 2.2.1).

Hsin's (2012) STH also proposes conditions where transfer may occur, namely, conflicting parameter setting (c.f. chapter 2, subsection 2.2.1), which accords with the DO realization mechanism in Chinese and that in English. Hypothesis #2, as in (192), is confirmed by the results of the qualitative analysis of the English data (c.f. subsection 4.1.2).

(192)   HYPOTHESIS #2 - **Confirmed**
        TRANSFER: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH
        (qualitative different between C-E bilinguals and E monolinguals)

CHINESE ——————————▶ **ENGLISH** ◀------✖------ **SPANISH**

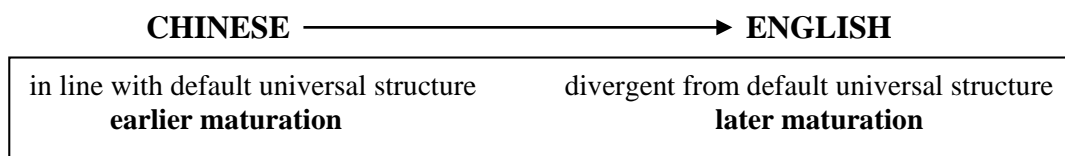| [+ null object] | [- null object] | [- null object] |
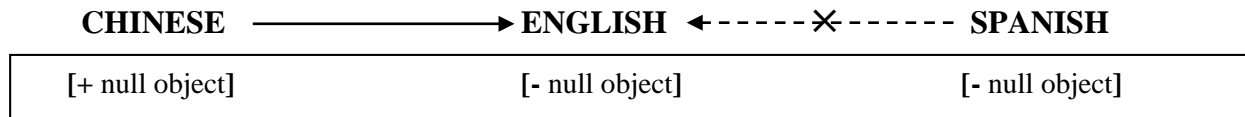
The qualitative analysis of the English data shows that in the four C-dominant C-E bilinguals' data, the verb *put* stands out by taking high non-adult-like null DO rates, while in the other participants' data, no such verb is found. Furthermore, it is very likely that such common and non-adult-like structures of the verb *put* in the C-dominant C-E bilinguals' English production originate from the target C-E bilingual children's other L1 (i.e. Chinese) where such structures become adult-like according to the Chinese adult grammar. In fact, in these C-E bilinguals' Chinese production during the parallel period, such structures with the verb *put* are found to be abundant. In contrast, no verb distinguishes itself by taking non-adult-like null DOs with high frequency in the E-dominant C-E bilingual's, the S-E bilinguals' and the E monolinguals' data. These results support Hypothesis #2 regarding language transfer in bilingual acquisition. That is, the C-dominant C-E bilinguals produce non-adult-like null DOs in a way that is not found in the E monolinguals' language production due to the influence from Chinese;

such production is not found in the S-E bilinguals' English data since English and Spanish have the same parameter setting in the domain of DOs.

Regarding the factors that may influence the directionality of interlinguistic influence, the results of the English data analysis have confirmed the role played by the maturational schedules of the two L1s of the bilinguals in interlinguistic influence, as shown in (193).

(193)   HYPOTHESIS #3 - **Confirmed**
         INTERFERENCE AND MATURATIONAL SCHEDULES:
         OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ⟶ **ENGLISH**

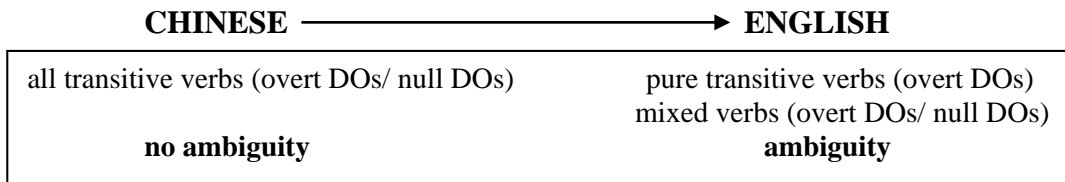| in line with default universal structure	divergent from default universal structure
earlier maturation	**later maturation**

This hypothesis states that interlinguistic influence would occur from Chinese into English in the C-E bilinguals (regardless of their dominant L1) since Chinese is expected to mature earlier than English (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, and chapter 3, section 3.1). The result of such influence would lead to interference which would manifest itself as in Hypotheses #1 and #2. As discussed in section 4.1 and subsection 4.3.1, both C-dominant and E-dominant C-E bilinguals are found to produce non-adult-like null DOs in a way that is different from the E monolinguals and the S-E bilinguals: on the one hand, the C-dominant C-E bilinguals produce non-adult-like null DOs with statistically higher frequency according to both the overall data and to the developmental data at Stage II; what is more, the C-dominant C-E bilinguals also produce English DO output based on the grammar of the other L1 (i.e. Chinese as seen with the verb *put*); on the other hand, the E-dominant C-E bilingual is also found to produce non-adult-like null DOs statistically significantly more frequently at Stage II.

These results, in other words, demonstrate interference from Chinese into the C-E bilinguals' English in the domain of DOs regardless of their dominant L1.

Furthermore, the results of the analysis of the English data also provide positive evidence for Hypothesis #4 regarding the relation between language interference and input ambiguity, as shown in (194).

(194)   HYPOTHESIS #4 - **Confirmed**
INTERFERENCE AND INPUT AMBIGUITY TRIGGERED BY THE NATURE OF VERBS: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL ENGLISH

CHINESE ──────────────▶ **ENGLISH**

all transitive verbs (overt DOs/ null DOs)	pure transitive verbs (overt DOs)
	mixed verbs (overt DOs/ null DOs)
no ambiguity	**ambiguity**

Since all transitive verbs can take either overt or null DOs in Chinese while, in English, only mixed verbs have this characteristic whereas pure transitive verbs can virtually only take overt DOs, the ambiguity caused by the two types of verbs in English would trigger and reinforce interference from Chinese which provides no ambiguity in terms of DO realization. That is, the C-E bilinguals will overextend the unambiguous Chinese DO system. The result of such overextension would also lead to the phenomena discussed in Hypotheses #1 and #2. The statistically significantly difference found between the English DOs produced by the C-E bilinguals (regardless of their dominant L1) (c.f. section 4.1, subsection 4.3.1) and the qualitative difference between the English DO production of the C-dominant C-E bilinguals and that of the E monolinguals and the S-E bilinguals (c.f. subsection 4.1.2.1) accord with the inference in Hypothesis #4.
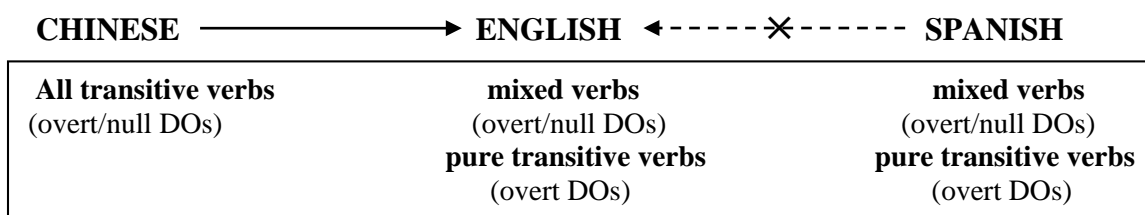
Language dominance has also been considered as a factor that affects interlinguistic influence in some previous bilingual literature (c.f. chapter 2, section 2.2). Its role is further

confirmed by the results of the analysis of the English data in the present study, as shown in

(195).

(195)   HYPOTHESIS #5
         INTERFERENCE AND LANGUAGE DOMINANCE
    a.   EXTERNAL VIEW ON LANGUAGE DOMINANCE - **Confirmed**
         C-DOMINANT C-E BILINGUALS
         INTERFERENCE: OVERPRODUCTION OF NULL DOs IN CHILD
         BILINGUAL ENGLISH

    CHINESE ⎯⎯⎯⎯⎯⎯⎯⎯⎯→ **ENGLISH**

dominant L1	non-dominant L1

    E-DOMINANT C-E BILINGUALS
    NO/LESS INTERFERENCE: NO/LESS OVERPRODUCTION OF NULL
    DOs IN CHILD BILINGUAL ENGLISH

    CHINESE ------------------→ **ENGLISH**

non-dominant L1	dominant L1

    b.   INTERNAL VIEW ON LANGUAGE DOMIANNCE - **Confirmed**
         INTERFERENCE: OVERPRODUCTION OF NULL DOs IN CHILD
         BILINGUAL ENGLISH

    CHINESE ⎯⎯⎯⎯⎯⎯⎯⎯⎯→ **ENGLISH**

OVERT DOs	OVERT DOs
[+/- individuated]	[+/- individuated]
NULL DOs	NULL DOs
[+/- individuated]	[- individuated]

The double hypothesis captures language dominance from two different points of view:

the external view on language dominance (Hypothesis #5a) and the internal view on language

dominance (Hypothesis #5b) (c.f. chapter 2, subsection 2.2.1.4). Hypothesis #5a indicates that, if

the overall language proficiency plays an important role, on the one hand, interlinguistic

influence would occur from Chinese into English in C-dominant C-E bilinguals; on the other

hand, E-dominant C-E bilinguals may not experience such influence or may be affected less by it. This hypothesis is supported by the results found in the data analysis in subsection 4.3.1: interlinguistic influence is found from Chinese into English in the C-E bilinguals with a different dominant language to a different extent: on the one hand, the C-dominant C-E bilinguals overproduce null English DOs in a way that is quantitatively and qualitatively different from the E-dominant C-E bilingual, the E monolinguals and the S-E bilinguals; on the other hand, the E-dominant C-E bilingual is found to experience weak influence from Chinese into English which is demonstrated in that she produces DOs in a more comparable way to the E monolinguals and the S-E bilinguals than the C-dominant C-E bilinguals.

Moreover, based on the internal view on language dominance as proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), Hypothesis #5b suggests that the C-E bilinguals' preference would be the Chinese DO realization system rather than the English one, regardless of their proficiency in the two L1s, since the Chinese DO system provides more transparent and higher computational valued functional features (c.f. chapter 3, section 3.1). In other words, both the C-dominant and E-dominant C-E bilinguals would experience influence from Chinese into English in the domain of DO production. This prediction is in line with the results of the data analysis: the E-dominant C-E bilingual produces non-adult-like null DOs statistically significantly more frequently when compared to the S-E bilinguals and the E monolinguals at Stage II. This indicates that, to some extent, not only the C-dominant C-E bilinguals but also the E-dominant C-E bilingual may prefer the Chinese DO realization system rather than the English one and that the Chinese DO realization system is the one that is guiding their English DO production.

What is more, some previous studies on DO realization in child language have suggested that verb type (i.e. pure transitive verbs *versus* mixed verbs) may play a role in children's null DO overproduction (e.g. Ingham 1993) (c.f. chapter 2, sections 2.1.1 and 2.2.2). However, this is not the case in the present study, as shown (196).

(196) HYPOTHESIS #6 – **Not Confirmed**
INTERFERENCE AND VERB TYPE: MORE OVERPRODUCTION OF NULL
DOs WITH MIXED VERBS THAN WITH PURE TRANSITIVE VERBS

CHINESE ⎯⎯⎯⎯⟶ **ENGLISH** ◄- - - - -✕- - - - - - **SPANISH**

All transitive verbs	**mixed verbs**	**mixed verbs**
(overt/null DOs)	(overt/null DOs)	(overt/null DOs)
	pure transitive verbs	**pure transitive verbs**
	(overt DOs)	(overt DOs)

This hypothesis suggests that all groups of participants (i.e. both bilinguals and monolinguals) would produce higher non-adult-like null DO rates with mixed verbs than with pure transitive verbs since the former would be more difficult to acquire than the latter (c.f. chapter 2, chapter 3, subsection 3.1.1) while a quantitative difference would appear between C-E bilinguals, on the one hand, and S-E bilinguals and E monolinguals, on the other, due to influence from Chinese into English. Such prediction is not supported by the results of the data analysis (c.f. subsection 4.1.2) which suggest that verb type does not appear to be a significant factor that affects interlinguistic influence in the present study: the overall data show that the non-adult-like null DO rates produced by the ten participants with pure transitive verbs and mixed verbs are surprisingly similar (i.e. around 10%) (c.f. subsection 4.1.2.1, Table 47); the developmental data of the ten participants show that the non-adult-like null DOs rates with pure transitive verbs are higher than those with mixed verbs at two of the three developmental stages (i.e. Stage I and Stage III); moreover, statistical analyses have shown that the differences
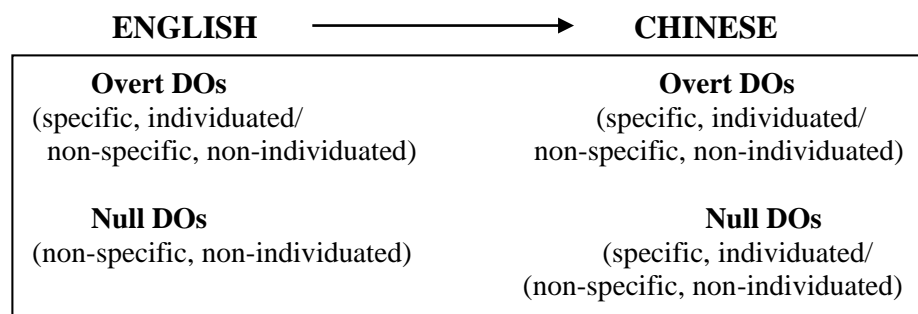
between the non-adult-like null DO rates with the two verb types have not reached statistical significance across the three language groups. In other words, the participants in the present study are no found as faithful as the participants in Ingham's (1993) study to language input and they do not avoid producing transitive structures that they cannot trace in the input.

4.4.2 Interlinguistic Influence from English into Chinese

In terms of interlinguistic influence from English into Chinese, two main scenarios are considered in the case of the C-E bilinguals' English DO production: one where English may cause INTERFERENCE into Chinese in the domain of DOs and one where English overt DOs would have a FACILITATION effect into Chinese DO production (c.f. chapter 3, subsection 3.1.2). Based on the results of the data analyses in sections 4.2 and 4.3, several conclusions can be drawn which correspond to the hypotheses proposed in chapter 3 (c.f. section 3.1).

Hypothesis #7, as shown in (197), regarding delay due to interlinguistic influence from English into Chinese is not supported by the results of the Chinese data analysis.

(197)   HYPOTHESIS #7 – **Not Confirmed**
        DELAY: OVERPRODUCTION OF NULL DOs IN CHILD BILINGUAL CHINESE

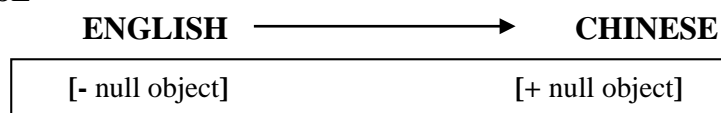| ENGLISH	⟶	CHINESE
Overt DOs (specific, individuated/ non-specific, non-individuated)		**Overt DOs** (specific, individuated/ non-specific, non-individuated)
Null DOs (non-specific, non-individuated)		**Null DOs** (specific, individuated/ (non-specific, non-individuated)

Hypothesis #7 suggests that delay may occur in C-E bilinguals' Chinese DO acquisition due to the influence of English which would manifest itself in that C-E bilinguals may produce more pragmatically inadequate null objects in Chinese, if compared to C monolinguals. However,

this is not the case based on the results of the Chinese data analysis which shows that the C-E bilinguals' null DO production is comparable to that of the C monolinguals from both an overall and a developmental perspective.

The DO realization mechanism in Chinese and that in English also satisfy Hsin's (2012) STH for transfer (c.f. chapter 2, subsection 2.2.1, chapter 3, subsection 3.1.1). Nevertheless, based on the Chinese data analysis, no such effect has been detected, as shown in (198).

(198) HYPOTHESIS #8 – **Not Confirmed**
       TRANSFER: OVERPRODUCTION OF OVERT DOs IN CHILD BILINGUAL
       CHINESE

ENGLISH ⟶	**CHINESE**
[- null object]	[+ null object]

According to this hypothesis, the C-E bilingual children would overproduce overt DOs due to transfer from English overt DOs into Chinese, and this would not be found in their C monolingual counterparts. Such transfer would only affect the quantity of overt DOs but not their quality since Chinese null DO constructions are structurally assimilated to topicalization in English, but with phonetically null topic(s) instead of overt ones due to its TC properties (Huang 1982, 1984, c.f. chapter 1, subsection 1.3.2, examples in (25)). However, the results of the data analysis of the present study do not support such prediction: the C-E bilinguals are found to produce adult-like overt DO rates that are comparable to those produced by the C monolinguals overall and at Stages II and III in the developmental analysis; moreover, at Stage I, the C-E bilinguals produce adult-like overt DO rates that statistically significantly approximate more to the figure that is found in adult-to-adult conversation settings when compared to the C monolinguals; in addition, when taking adequacy into account, the C-E bilingual participants' performances are found even more adequate pragmatically speaking than those of the C

monolinguals overall as well as the initial stage of the investigation period (i.e. at Stage I) in the present study. All these results point to the fact that the C-E bilinguals' overt DO production is not only comparable to that of the C monolinguals but also more adult-like at some point.

As previously discussed (c.f. chapter 1, sections 1.3 and 1.4; chapter 3, section 3.1), in the domain of DOs, Chinese is the superset language and English is the subset one. Based on the analysis of the Subset Principle (Berwick 1985, Atkinson 1992) and the two target languages in this particular case, a facilitation effect might occur from English into Chinese. This proposal is supported by the results of the data analysis in the present study, as shown in (199).

(199)   HYPOTHESIS #9 - **Confirmed**
NO INTERFERENCE/FACILITATION: NO OVERPRODUCTION OF OVERT OR NULL DOs IN CHILD BILINGUAL CHINESE

ENGLISH - - - - - - - - -✕- - - - - - - - - -▶ **CHINESE**

subset	superset
overt DOs (unmarked)	overt DOs (unmarked by definition)
null DOs (marked)	null DOs (marked by definition but *unmarked d*ue to the nature of null DOs in Chinese)
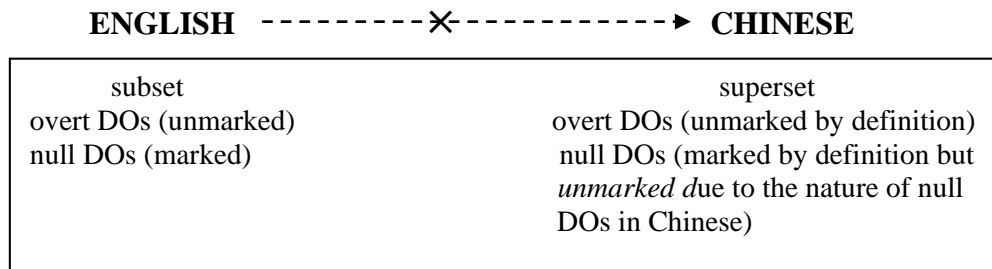
Hypothesis #9 indicates that, on the one hand, cross-linguistic influence should not favor the reinforcement of the marked option (i.e. overt DOs) in Chinese in the C-E bilinguals' Chinese output because the unmarked option (i.e. null DOs in this particular case) have more weight; on the other hand, the fact that English provides the null DO option, though being the marked option, would reinforce its value in Chinese. The results of the statistical tests show that at Stage I, when compared to the C monolinguals, the C-E bilinguals not only produce adult-like overt DO rates that are closer to the figure found in adult-to-adult conversation settings, but also produce statistically significantly higher adequate overt DO rates; at the subsequent stages, the

C-E bilinguals performances are comparable to those of the C monolingual from both quantitative and qualitative perspectives. In other words, the C-E bilinguals are aware of the pragmatic values that regulate the presence of overt objects in Chinese earlier than monolinguals.

In terms of the factors that may influence the directionality of interlinguistic influence, the results of the Chinese data analysis have confirmed the role played by the maturational schedules of the two L1s of the bilinguals in interlinguistic influence, as shown in (200).

(200)   HYPOTHESIS #10 - **Confirmed**
INTERFERENCE AND MATURATIONAL SCHEDULES: NO INTERFERENCE IN CHILD BILINGUAL CHINESE IN THE DOMAIN OF DOs

ENGLISH ----------✕----------▶ **CHINESE**

divergent from default universal structure	in line with default universal structure
later maturation	**earlier maturation**

According to Hypothesis #10, interference would not occur from English into Chinese in C-E bilinguals (regardless of their dominant L1) since Chinese is expected to mature earlier than English in the domain of DOs (c.f. chapter 2, subsections 2.1.1, 2.2.2.3 and section 2.3, chapter 3, section 3.1). Consequently, the C-E bilinguals' performances would be comparable to those of the C monolinguals. This prediction is supported by the results of the data analysis, which reveal that the C-E bilinguals' performances in terms of Chinese DO production are by no means less satisfactory when compared to those of the C monolinguals: the difference between the null DO production of the participants in the two language groups is statistically non-significant based on both overall and developmental data; moreover, in the case of overt DO production, the C-E bilinguals are found more adult-like at Stage I from both quantitative and qualitative perspectives while at the latter two stages the difference between the performances of the participants in the two language groups does not reach statistical significance.

Moreover, the results of the data analysis also provide positive evidence for Hypothesis #11 regarding the relation between interference and input ambiguity, as shown in (201).

(201) HYPOTHESIS #11 - **Confirmed**
INTERFERENCE AND INPUT AMBIGUITY: NO INTERFERENCE IN CHILD BILINGUAL CHINESE IN THE DOMAIN OF DOs

ENGLISH - - - - - - - - -✕- - - - - - - - - -▶ **CHINESE**

pure transitive verbs (overt DOs) mixed verbs (overt DOs/ null DOs) **ambiguity**	all transitive verbs (overt DOs/ null DOs) **no ambiguity**
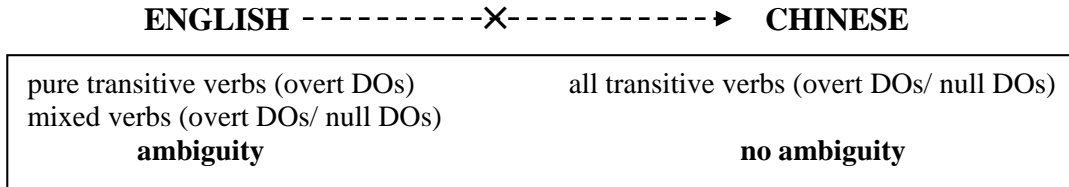
According to this hypothesis, interference from English into Chinese would not be expected since there is no ambiguity in DO realization in Chinese because all transitive verbs behave in the same way (i.e. they can all take both overt and null DOs) while in English pure transitive verbs and mixed verbs have different restrictions on DO realization. Interference, therefore, would not go from the ambiguous language (i.e. English) into the non-ambiguous language (i.e. Chinese). The fact that the C-E bilinguals do not overproduce either overt or null DOs when compared to their C monolingual counterparts has supported this observation.

In terms of the influence of language dominance on interlinguistic influence, the results of the Chinese data analysis reveal that the overall language proficiency in the two L1s (i.e. the external view on language dominance) does not seem to affect the C-E bilinguals' Chinese DO output and that the performances of the C-dominant and E-dominant C-E bilinguals are comparable, as shown in (202).

(202)   HYPOTHESIS #12
        INTERFERENCE AND LANGUAGE DOMINANCE:
        a.   EXTERNAL VIEW ON LANGUAGE DOMINANCE – **Not Confirmed**
             C-DOMINANT C-E BILINGUALS
             WEAK/NO INTERFERENCE: NO SIGNIFICANT OVERPRODUCTION
             OF OVERT DOs IN CHILD BILINGUAL CHINESE

        ENGLISH - - - - - - - - - - - - - - - - - - - ▶ **CHINESE**

non-dominant L1	dominant L1

        E-DOMINANT C-E BILINGUALS
        INTERFERENCE: OVERPRODUCTION OF OVERT DOs IN CHILD
        BILINGUAL CHINESE

        ENGLISH ——————————————▶ **CHINESE**

dominant L1	non-dominant L1

        b.   INTERNAL VIEW ON LANGUAGE DOMIANNCE - **Confirmed**

        ENGLISH - - - - - - - - ✗ - - - - - - - - - - ▶ **CHINESE**

OVERT DOs	**OVERT DOs**
[+/- individuated]	[+/- individuated]
NULL DOs	**NULL DOs**
[- individuated]	[+/- individuated]

This double hypothesis captures both the external view on language dominance (Hypothesis #12a) and the internal view on language dominance (Hypothesis #12b). On the one hand, according to the external view on language dominance as proposed by Petersen (1988), Lanza (1997), and Nicoladis and Genesee (1998), among others (c.f. chapter 2, subsection 2.2.1.4), no strong interference would occur from English into Chinese in C-dominant C-E bilinguals. In contrast, E-dominant C-E bilinguals may overproduce overt Chinese DOs due to the influence from English. This is not in line with the findings in the data analysis in the present study: the E-dominant bilingual's performance in the domain of DOs in Chinese is not found statistically significantly different when compared to those of her C-dominant bilingual

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counterparts from both quantitative and qualitative perspectives (c.f. sections 4.2 and 4.3). This suggests that the E-dominant C-E bilingual does not experience stronger influence from English into Chinese when compared to her C-dominant counterparts in her DO production in Chinese.

This result, on the other hand, provides positive evidence for Hypothesis #12b: based on the reinterpretation of language dominance (i.e. the internal view on language dominance) proposed by Liceras, Spradlin and Fernández Fuertes (2005) and Liceras et al. (2008) (c.f. chapter 2, subsection 2.2.1.4), the C-E bilinguals, regardless of their overall language proficiency in their two L1s, would prefer the Chinese DO realization system since it provides more transparent and higher computational valued functional features when compared to the English DO realization system: overt DOs in both English and Chinese are [+/- individuated] since they can represent specific/individuated and non-specific/non-individuated referents (chapters 1 and 3); however, while Chinese null DOs are [+/- individuated] just like Chinese overt DOs, English null DOs are [-individuated]. In this respect, the dominant language would always be Chinese (and, therefore, the source of influence), regardless of the amount of input bilinguals are exposed to in the two languages or any other similar language-external factor. In other words, no interference from English into Chinese would be expected, and there would be no significant difference between the performances of C-dominant and English dominant C-E bilinguals. The fact that no statistically significant difference has been found between the E-dominant C-E bilingual's performance and those of the C-dominant C-E bilinguals from both quantitative and qualitative perspectives supports such hypothesis.

Conclusion

There is a general consensus that bilingual children establish two separate language systems at the very initial stages of language acquisition (Genesee 1989, Meisel 1989, De Houwer 1990, Genesee, Nicoladis, and Paradis 1995, among others): the so-called Language Differentiation Hypothesis. However, regardless of this consensus, how the interaction between the two languages takes place along the developmental process remains a matter of debate: some previous studies support the Interdependent Development Hypothesis (i.e. the development of one language may influence the development of the other) (Cummins 1979, 1991, Bernhardt and Kamil 1995, Gawlitzek-Maiwald and Tracy 1996, Döpke 2000, Hulk and Müller 2000, Paradis and Navarro 2003, Van Gelderen et al. 2004, Sorace 2004, Serratrice, Sorace, and Paoli 2004, Lleó and Rabow 2006, among others) and others support the Autonomous Development Hypothesis (i.e. the development of each language is comparable to the development in the corresponding monolinguals) (Padilla and Liebman 1975, De Houwer 1990, Nicoladis 1994, Paradis and Genesee 1996, 1997, Meisel 2001, among others). In this study, I have provided new empirical evidence that lend support to the Interdependent Development Hypothesis; that is, in the case of simultaneous bilingual language acquisition the development of the two languages in bilingual children is interdependent and so the development of the bilingual system occurs in such a way that the two languages influence each other. In particular, I have focused on the linguistic domain of DOs and I have studied how bilingual children with one of the L1s allowing null DOs (i.e. Chinese) and the other not allowing them (i.e. English) acquire and produce DOs in both languages. To be more specific, both the Chinese and the English production of a set of C-E bilinguals has been studied in order to detect the possible interlinguistic influence between the two L1s of these bilinguals; moreover, I have also investigated the nature and directionality of interlinguistic influence. Specifically, I have studied the three potential

manifestations of interlinguistic influence as proposed by Paradis and Genesee (1996), namely, acceleration, delay and transfer. Furthermore, factors that may characterize the directionality of interlinguistic influence such as maturational schedules, input ambiguity, language dominance and verb type have also been addressed.

With respect to the linguistic characterization of DOs, Chinese and English differ in at least the following respects: (i) the widespread possibility of null DOs in Chinese as opposed to the limited one in English, and (ii) the analysis that has been proposed for the null DO phenomena in Chinese (i.e. as a discourse-oriented language whose sentences are organized in terms of TCs and topic-prominence) as compared to that in English (i.e. a sentence-oriented language organized in terms of syntax-prominence). In particular, by means of a comparative grammatical approach to the DO phenomenon in these languages, I have shown that the different behavior that the two languages under investigation exhibit in the domain of DOs is the result of the fact that they belong to different language types and are, therefore, controlled by different parameters: being a discourse-oriented language, Chinese is controlled by DOP (Huang 1984, Wang et al. 1992) while English is a sentence-oriented language and is controlled by other parameters (i.e. Taraldsen's generalization 1978 and Rizzi's ECP 1994).

In terms of child acquisition of DOs, previous studies have shown that all monolingual children go through a null object stage regardless of whether their L1 allows them or not. Four main explanations have been proposed to account for such phenomenon: (i) performance limitations (Valian 1991), (ii) children' ability to associate DO realization and discourse conditions (Rispoli 1992, Guerriero, Oshima-Takane, and Kuriyama 2006), (iii) influence from the linguistic environment (Ingham 1993, Tomasello and Brooks 1998, Brooks 1999, Tomasello 2001) and (iv) children's null cognate object default (Pérez-Leroux, Pirvulescu, and Roberge 2008).

With respect to bilingual acquisition, within the context of the Interdependent Development Hypothesis, the three potential manifestations of interlinguistic influence could occur under the following conditions respectively: (i) acceleration may occur if there are available identical syntactic structures that allow bilinguals to bootstrap one of their grammars onto the other, so that the more advanced system will boost the development of the less advanced one (Hsin 2012); (ii) delay may occur in the domains in which the two grammar systems have similar but conflicting structures (Hulk and Müller 2000, Hsin 2012); furthermore, delay may occur due to the fact that bilingual children have received less input in each language than the respective monolinguals (De Houwer 1990, Gathercole 2007); and (iii) transfer may be the consequence of one of these three factors, namely, the different maturational schedules of the two L1s in bilingual children, bilingual children's different language dominance (Paradis and Genesee 1996), or similar but conflicting structures in bilingual children's two L1s so that such structures in one language may be less straightforward than those in the other language (Hulk and Müller 2000, Müller 2003).

In terms of DO acquisition in bilingual children, different results regarding interlinguistic influence have been found in previous studies: no interlinguistic influence has been found in Serratrice, Sorace, and Paoli's (2004) case study of an Italian-English bilingual child's DO production in his two L1s, while in Yip and Matthew's (2005) study on C-E bilinguals' English DO production, Paradis, Crago, and Genesee's (2006) study on English-French bilinguals, and Mykhaylyk and Ytterstad's (2015) study on English-Ukrainian bilinguals, possible language transfer from the bilinguals' one language into the other language has been detected. What is more, in Müller and Hulk's (2001), Pérez-Leroux, Pirvulescu, and Roberge's (2009) and Pirvulescu et al.'s (2014) studies, a delay effect has been found in bilingual children in the domain of DOs.

Taking previous works on the analysis of DOs as well as studies on bilingual acquisition as a point of departure, the present dissertation has focused on two main questions:

- Does the two language systems in bilingual children interact with each other?

- If there is interlinguistic influence, what is the nature and directionality of this influence in bilingual language development?

The first question deals with the nature of interlinguistic influence with a focus on examining its three potential manifestations, as proposed by Paradis and Genesee (1996), based on the data selected for the present study. The second question attempts to explore the factors that might shape and characterize interlinguistic influence (i.e. maturational schedules, input ambiguity, language dominance and verb type).

In order to address these two questions, twelve hypotheses have been formulated, six of which deal with interlinguistic influence from Chinese into English and the other six with interlinguistic influence from English into Chinese. With respect to interlinguistic influence from Chinese into English, I have contemplated two scenarios: one where Chinese may cause interference and one where Chinese would have no interference into English in the domain of DOs. If interference occurs from Chinese into English, C-E bilinguals will overproduce null DOs in their English when compared to E monolinguals and S-E bilinguals from both quantitative and qualitative perspectives. If no interference occurs, C-E bilinguals' DO production in English will be comparable to that of E monolinguals and that of the S-E bilinguals. Moreover, since Spanish and English are typologically similar languages in terms of DO realization, interference would not be expected from Spanish into English. Therefore, the performances of the E monolinguals and those of the S-E bilinguals are expected to be comparable. With respect to interlinguistic influence from English into Chinese, another two scenarios have been contemplated: one where English may cause interference into Chinese and one where overt DOs would have a facilitation effect into Chinese in the domain of DOs.

If interference occurs from English into Chinese, C-E bilinguals will overproduce both null and overt DOs in their Chinese. On the contrary, if facilitation occurs, C-E bilinguals' performance in terms of DO production will be more adult-like than that of C monolinguals. Furthermore, when it comes to the factors that may shape interlinguistic influence, if maturational schedules of the two L1s of the bilinguals play an important role, interlinguistic influence is expected from Chinese into English but not the other way around since Chinese is the language that matures earlier in the domain of DOs. Moreover, if input ambiguity plays a role, interlinguistic influence is expected to be reinforced from Chinese into English since Chinese is the language that provides no ambiguity in the domain of DOs while English does provide ambiguity which is caused by the two verb types (i.e. pure transitive verbs and mixed verbs). In addition, language dominance, which has been considered from two different perspectives, namely, the external view (i.e. the overall proficiency of the two L1s in bilingual children) (Petersen 1988, Lanza 1993, 1997, Paradis and Genesee 1996, 1998, among others) and the internal view (i.e. the nature of the functional features in the bilinguals' two L1s) (Liceras, Spradlin and Fernández Fuertes 2005, Liceras et al. 2008), has also been taken into account. If the overall proficiency of the bilinguals' two L1s is crucial, on the one hand, English-dominant C-E bilinguals will experience weaker influence from Chinese into their English production and stronger influence from English into their Chinese production; on the other hand, Chinese-dominant C-E bilinguals will experience stronger influence from Chinese into their English production and weaker influence from English into their Chinese production. What is more, if the verb type in English plays a role, children, regardless of their L1(s), will produce more non-adult-like null DOs with mixed verbs that with pure transitive verbs since the formers do not always show the same pattern and are, therefore, less transparent than the latters. Nevertheless, a quantitative difference would appear between C-E bilinguals and E monolinguals given the prominent nature of null DOs in Chinese.

Regarding the participants, a set of five C-E bilingual children in Hong Kong (Yip-Matthews corpus in CHILDES, MacWhinney 2000) have been included in the target group, four of whom are reported to be Chinese-dominant and the other, English-dominant. Furthermore, three more groups of participants have been selected from the CHILDES project in order to be able to address the different issues put forward in the initial hypotheses (e.g. to tease apart interlinguistic influence from the so-called bilingual effect). These groups include two S-E bilinguals in Salamanca, Spain (FerFuLice corpus), three English monolinguals in the United States (Sachs corpus, Bloom 70 corpus, and Demetras Trevor corpus), and three C monolinguals (LeeWongLeung corpus). Based on the available data in each participant' corpus, spontaneous data from a period of (approximately) one year has been selected. Taking into account the fact that there appears to be a turning point in development at the age of 2;03 when the child's MLU value reaches approximately 2.4 (Rispoli 1992), the selected age range is from 2;00 to 3;00 with small fluctuations and taking into account the individual child's MLU values.

The selected data have been classified taking as a point of reference the adult grammar (i.e. adult-like or non-adult-like) and the form of the DO (i.e. overt or null). In addition, in order to be able to carry out further qualitative analyses, on the one hand, the transitive verbs in the English data have also been classified as pure transitive verbs or mixed verbs; and, on the other hand, in the Chinese data, overt DOs have been further classified according to their adequacy (i.e. adequate or inadequate).

What is more, the selected data have been divided into three different developmental stages based on the children's MLU values in each language which are considered to reflect children's language abilities in a more accurate way (Brown 1973). The three developmental stages have been established according to Rispoli's (1992) proposal that the MLU value of 2.4 at approximately the age of 2;03 appears to be a turning point in the acquisition of DOs.

Therefore, Stage I covers the period when the child produces utterances with MLU values below 2.4; Stage II covers the period when the child produces utterances with MLU values between 2.4 and 3.5; and Stage III covers the period when the child produces utterances with MLU values higher than 3.5.

In order to yield answers to the different initial hypotheses that have been established, two main comparisons have been carried out: one involves the English data produced by the C-E bilinguals, the E monolinguals as well as the S-E bilinguals and the other, the Chinese data produced by the C-E bilinguals and the C monolinguals. In addition, in order to explore the role played by language dominance in interlinguistic influence, I have also conducted another comparison of the English and the Chinese data produced by the C-E bilinguals with a different dominant language.

In the light of these comparisons, the present study has found that, regarding the nature of interlinguistic influence, in the first place, interference (i.e. delay and transfer) has been found from Chinese into English in the domain of DOs in the C-E bilinguals' language output. This is demonstrated in the results of the English data both in the overall analyses as well as in the developmental analyses. In particular, quantitatively, the C-E bilinguals produce non-adult-like null DOs with statistically significantly higher frequency when compared to the E monolinguals and the S-E bilinguals; with respect to the developmental data, a statistically significant difference has also been found at Stage II between the C-E bilinguals and the participants in the other two language groups in non-adult-like null DO production in that the C-E bilinguals produce non-adult-like null DOs statistically significantly more frequently and until later. Qualitatively, in the four Chinese-dominant C-E bilinguals' data, the verb *put* has been found to distinguish itself by taking high non-adult-like null DO rates, while in the other participants' data, no such verb has been found. It is very likely that such common and non-adult-like structures of the verb *put* in the Chinese-

dominant C-E bilinguals' English production originate from their other L1 (i.e. Chinese) where such structures become adult-like. This proposal has been further supported by the fact that in the C-E bilinguals' Chinese production during the parallel period, the null DO structures with the verb *put* have been found abundant. On the contrary, no verb distinguishes itself by taking non-adult-like null DOs with high frequency in the English-dominant C-E bilingual's, the S-E bilinguals' and the E monolinguals' data. Furthermore, the different performances that the C-E bilinguals have demonstrated is not likely to be the result of the so-called bilingual effect, since the S-E bilinguals' performances are by no means less satisfactory when compared to those of the E monolinguals.

In the second place, no interference (i.e. delay and transfer) has been found from English into Chinese in the domain of DOs in the C-E bilinguals' language production as the C-E bilinguals' DO production has been found comparable to that of the C monolinguals overall; from a developmental point of view, the C-E bilinguals' DO production is even more adult-like at the initial stage of the investigation period (i.e. Stage I) in terms of overt DO production: the C-E bilinguals produce adult-like overt DO rates that statistically significantly approximate more to the figure that has been found in adult-to-adult conversation settings in Wang et al.'s (1992) study when compared to the C monolinguals; in addition, when taking adequacy into account, the C-E bilingual participants' performances have also been found more adequate pragmatically speaking than those of the C monolinguals overall as well as at Stage I. All these results have pointed to the fact that the C-E bilinguals' overt DO production is not only comparable to that of the C monolinguals but also more adult-like at some point, which suggests a facilitation effect.

With respect to the effect of maturational schedules of the two L1s of the bilinguals in interlinguistic influence, the results of the data analyses have confirmed its role. In the domain of DOs, Chinese is expected to mature earlier than English because Chinese null DOs

are all-purpose, which is in line with children's initial default option as proposed by Pérez-Leroux, Pirvulescu, and Roberge (2008) while English DOs are divergent from it; this indicates that children do not experience the period of convergence in Chinese while they have to do so in English. Interference is expected to occur from the language that matures earlier (i.e. Chinese) into the language that matures later (i.e. English) in the domain under study (i.e. DOs); in contrast, such influence is not expected to occur the other way around (i.e. from English into Chinese). In the present study, I have found that the C-E bilinguals, regardless of their dominant language, on the one hand, produce non-adult-like null DOs in English in different ways when compared to the E monolinguals and the S-E bilinguals; on the other hand, in the Chinese DO production, the C-E bilinguals' performances are not less satisfactory when compared to those of the C monolinguals. Therefore, these results suggest that interference occurs from Chinese, the language that matures earlier in the domain of DOs, into English, the language that matures later.

Furthermore, the results of the present study have also confirmed the role played by input ambiguity. Since all transitive verbs can take either overt or null DOs in Chinese while, in English, only mixed verbs have this characteristic whereas pure transitive verbs can virtually only take overt DOs, the ambiguity caused by the two types of verbs in English would trigger and reinforce interference from Chinese which provides no ambiguity in the domain of DOs. This means that the C-E bilinguals may overextend the unambiguous Chinese DO system while they would not do so with the English DO system. This indicates that interference is expected to be reinforced from Chinese into English but not from English into Chinese. From the results of the present study, I have found a statistically significantly quantitative difference between the English DOs produced by the C-E bilinguals (regardless of their dominant L1) as well as a qualitative difference between the English DO production of the Chinese-dominant C-E bilinguals and that of the E monolinguals and the S-E bilinguals;

in contrast, the C-E bilinguals do not overproduce either overt or null DOs when compared to their C monolingual counterparts. These results have provided positive evidence for the observation above; that is, the directionality of transfer goes from Chinese, the unambiguous system, into English, the ambiguous system.

Regarding language dominance, I have considered it from two different points of views, namely, the external view which refers to the overall proficiency in the two L1s in bilingual children (Petersen 1988, Lanza 1993, 1997, Paradis and Genesee 1996, 1997, among others) and the internal view which refers to the nature of the functional features in the bilinguals' two L1s (Liceras, Spradlin and Fernández Fuertes 2005, Liceras et al. 2008). The results found in the English data and the Chinese data (c.f. subsection 4.3.2) have drawn a clearer picture of its role. That is, both views on dominance may contribute to explain the nature and directionality of interlinguistic influence. Nevertheless, the influence of the two factors (i.e. the overall proficiency in the two L1s in bilingual children and the nature of functional features in the bilinguals' two L1s) have appeared to be language-bound: on the one hand, in the English data, both the external view and the internal view of language dominance seem to abide. That is, the English-dominant C-E bilingual and the E monolinguals produce DOs in a similar way and to a large extent (except for Stage II) from both quantitative and qualitative perspectives; in contrast, the Chinese-dominant C-E bilinguals produce DOs quantitatively and qualitatively differently from the E monolinguals. From my point of view, such difference between the English-dominant and the Chinese-dominant C-E bilingual participants when compared to the E monolinguals is likely to be the result of their different overall language proficiency in their two L1s. In addition, the English-dominant C-E bilingual experiences a much weaker interference from Chinese into English in her English DO production than the Chinese-dominant C-E bilinguals. However, at Stage II, the English-dominant C-E bilingual's performance has found to be an in-between case: she

produces non-adult-like null DO rates that are statistically significantly lower than the Chinese-dominant C-E bilinguals but statistically significantly higher than the E monolinguals. This finding reveals that though being English-dominant, this C-E bilingual still experiences interference from Chinese into English. This, I reckon, is likely to be the result of the fact that the Chinese DO realization system still serves as the guiding system in the C-E bilingual's DO production due to its nature (i.e. it provides more transparent and higher computational valued functional features when compared to the English DO realization system).

On the other hand, in the Chinese data, a mixture of the overall proficiency in the two L1s in bilingual children and the nature of the functional features in the bilinguals' two L1 as well as the so-called bilingual effect could be simultaneously taking effect in the interlinguistic influence from English into Chinese. First, virtually no difference has been found between the English-dominant C-E bilingual's and the Chinese-dominant C-E bilinguals' Chinese production in the domain of DOs from both quantitative and qualitative perspectives. This finding has provided further evidence for the claim that the Chinese DO realization system is serving as the guiding system regardless of language-external factors. Moreover, both the English-dominant C-E bilingual and the Chinese-dominant C-E bilinguals behave more adult-like overall and at some point in development (i.e. Stage I) when compared to the C monolinguals. I have proposed that this could be the result of them being bilinguals, which means that the fact that they are bilinguals makes them more sensitive to grammatical properties (i.e. DOs in this particular study), irrespective of their overall proficiency in their two L1s. This finding could be tied to the so-called bilingual effect in that the availability of the two systems makes the C-E bilinguals more aware of grammatical properties (in the domain of DOs in this particular case). This suggests positive influence raised by the so-called bilingual effect.

What is more, the reason why the influence of the three factors discussed above (i.e. the external and internal views of language dominance and the so-called bilingual effect) appears to be language-bound may lie in the nature of the grammars in the bilinguals' two L1s in the present study and again points to the role played by language ambiguity in interlinguistic influence. That is, the fact that the English-dominant C-E bilingual performs as an in-between case (between the Chinese-dominant C-E bilinguals and the E monolinguals) in her English DO production at Stage II but her performance in Chinese is fully comparable to the Chinese-dominant C-E bilinguals indicates that, when the realization mechanism is less straightforward in language A (i.e. English) than in language B (i.e. Chinese), overall language proficiency may play an important role in the sense that, though being guided by the mechanism of Language B (i.e. the Chinese DO realization mechanism), if a bilingual child is more proficient in language A (i.e. English), this interference could be somehow reduced. Nevertheless, in the case of language B (i.e. Chinese) whose grammar in the studied domain is very straightforward, the higher proficiency in language A (i.e. English) would not surpass the leading role of the guiding system (i.e. the Chinese DO realization mechanism).

Finally, with regard to verb type (i.e. pure transitive verbs *versus* mixed verbs), the results of the data analysis in English in the present study have not provided supportive evidence for its role in interlinguistic influence: on the one hand, the results of the analysis of the overall data of the ten participants have yielded similar non-adult-like null DO rates (i.e. around 10%) with pure transitive verbs and mixed verbs alike; on the other hand, the developmental data of the ten participants show that the non-adult-like null DOs rates with pure transitive verbs are even higher than those with mixed verbs at two of the three developmental stages (i.e. Stage I and Stage III); moreover, statistical analyses have also demonstrated that the differences between the non-adult-like null DO rates with the two verb types have not reached statistical significance across the three language groups.

Several issues remain to be accounted for in a more detailed way. The participants in the present study have not been found as faithful as the participants in Ingham's (1993) study to the language input and they do not avoid producing transitive structures that they cannot trace in the input. Neither do the non-adult-like null DO rates produced by the ten participants in the developmental data accord with the U-shape pattern for children' lexical conservativity as suggested in Ingham's (1993), Tomasello's (2001), Tomasello and Brooks' (1998), and Brooks' (1999) studies. There could be several explanations: on the one hand, the different types of data (i.e. natural language data *versus* experimental data) that have been involved in the present study and the previous studies may make a difference to the results of data analysis; on the other hand, the different criteria used to classify the data may also contribute to the discrepancy; that is, in the previous studies, the participants' DO production is classified according to its form (i.e. overt or null) while in the present study, both the form of the DOs (i.e. overt or null) as well as their grammaticality (i.e. adult-like or non-adult-like) haven been taken into account. However, these possible explanations together with other related issues are of great interest for a future analysis.

The present study has provided considerable insight into the nature and tendency of interlinguistic influence between two languages that are typologically different in bilingual children. Essentially, I have been able to tease apart, on the one hand, interference and the so-called bilingual effect, and on the other hand, the roles played by different factors (i.e. maturational schedules, input ambiguity, language dominance and verb type) that may determine the nature and directionality of interlinguistic influence.

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Abbreviations

ABS	Absolutive
ACC	Accusative
Agr	Agreement
ANOVA	Analysis of Variance
Asp	Aspect
AspP	Aspectual Phrase
AUX	Auxiliary
C1	The first discourse condition
C2	The second discourse condition
C-command	Constituent command
C-dominant	Chinese-dominant
C monolingual	Chinese monolingual
C-E bilingual	Chinese-English bilingual
CP	Complementizer Phrase
C-selection	Category-selection
CVL	Cumulative Verb Lexicon
DAT	Dative
DBO	Double Objects
Det	Determiner
DO	Direct Object
DOP	Discourse-Oriented Parameter

DP	Determiner Phrase
E-dominant	English-dominant
E monolingual	English monolingual
ECP	Empty Category Principle
EPP	Extended Projection Principle
ERG	Ergative
F-balanced	French-balanced
F-dominant	French-dominant
Fem	Feminine
GEN	Genitive
I	Inflection
I-feature	Inflection-feature
I-principle	Principle of Informativeness
IDBO	Inverted Double Objects
IL	Individual-Level
IMP	Imperative
IP	Inflectional Phrase
L1	First Language
LF	Logical Form
Masc	Masculine
MLU	Mean Length of Utterance in Morphemes
MLUw	Mean Length of Utterance in Words
N	Noun

NOM	Nominative
NP	Noun Phrase
NSP	Null Subject Parameter
O	Object
OP	Operator
P	Pronoun
PD	Prepositional Dative
PF	Phonetic Form
P_G	Possible grammar
PL	Plural
PP	Prepositional Phrase
Q-SFP	Question Sentence-Final Particle
RC	Relative Clause
RI	Root Infinitive
RT	Relevance Theory
S	Subject
S-dominant	Spanish-dominant
S-E bilingual	Spanish-English bilingual
S monolingual	Spanish monolingual
S-selection	Semantic selection
SFP	Non-Question Sentence-Final Particle
SG	Singular
SL	Stage-Level

SPEC	Specifier
STH	Structural Transfer Hypothesis
SVD	Serial Verb Dative
T	Tense
TC	Topic Chain
TD	Typically Developed
TOP	Topic
T$_{OP}$	Tense operator
TP	Tense Phrase
UG	Universal Grammar
V	Verb
V2	Verb-second
VP	Verb Phrase
XP	X Phrase

Statistical Tests

Type of Test	Function
Chi-Square Test	The Chi-Square Test for Independence is used to discover if there is a relationship between two categorical variables.
Independent-Samples T-Test	The Independent-Samples T-Test compares the means between two unrelated groups on the same continuous, dependent variable.
Kendall's Tau-b Correlation	Kendall's Tau-b (T_b) Correlation Coefficient is a nonparametric measure of the strength and direction of association that exists between two variables measured on an ordinal scale. It is considered a nonparametric alternative to the Pearson's Product-Moment Correlation when the data has failed one or more of the assumptions of this test.
Pearson Product-Moment Correlation	The Pearson Product-Moment Correlation coefficient is a measure of the strength of a linear association between two variables and is denoted by r. It attempts to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, r, indicates how far away all these data points are to this line of best fit.

One-Way Analysis of Variance (ANOVA)	The One-Way Analysis of Variance (ANOVA) is used to determine whether there are any significant differences between the means of two or more independent (unrelated) groups. It is an omnibus test statistic and cannot tell which specific groups are significantly different from each other; it only tells that at least two groups are different. In order to determine which of the groups differ from the rest, a Tukey post-hoc test is necessary.
One-Way Multivariate Analysis of Variance (MANOVA)	The One-Way Multivariate Analysis of Variance (One-Way MANOVA) is used to determine whether there are any differences between independent groups on more than one continuous dependent variable. The One-Way MANOVA is an omnibus test statistic and cannot tell which specific groups are significantly different from each other; it only tells that at least two groups are different. In order to determine which of these groups differ from the rest, a post-hoc test is necessary.
Two-Way Analysis of Variance (Two-Way ANOVA)	The Two-Way ANOVA compares the mean differences between groups that have been split

	on two independent variables (called factors). The primary purpose of a two-way ANOVA is to understand if there is an interaction between the two independent variables on the dependent variable.

The interaction term in a Two-Way ANOVA informs whether the effect of one of the independent variables on the dependent variable is the same for all values of the other independent variable (and vice versa). Additionally, if a statistically significant interaction is found, it is necessary to determine whether there are any "simple main effects", and, if there are, what these effects are. |
| **Welch ANOVA** | The Welch ANOVA is based on the usual ANOVA F test. It is run when the data show a lot of heteroscedasticity (i.e. different groups have different standard deviations). It is an omnibus test statistic and cannot tell which specific groups are significantly different from each other; it only tells that at least two groups are different. In order to determine which of the groups differ from the rest, a Games-Howell post-hoc test is |

	necessary.
Z-Score Test	Z-Score tests are statistical calculations that can be used to compare population means to those of a sample's. The z-score tells how far, in standard deviations, a data point is from the mean or average of a data set. A Z-Score Test compares a sample to a defined population and is typically used for dealing with problems relating to large samples ($n>30$). Z-Score tests are most useful when the standard deviation is known.